



**TETER, LLP**

ARCHITECTS ENGINEERS CONNECTED

# **PROJECT MANUAL**

CONTRACTUAL – LEGAL REQUIREMENTS  
TECHNICAL SPECIFICATIONS

FOR

**LOCKER ROOM REMODEL  
LIVE OAK MIDDLE SCHOOL  
TULARE CITY SCHOOL DISTRICT**

Project No.: 19-11344

DSA File No.: 5499

DSA Appl. No.: 02-118489



# DSA 103-19: LISTING OF STRUCTURAL TESTS & SPECIAL INSPECTIONS, 2019 CBC

**Application Number:** 02-118489  
**DSA File Number:** 54-99

**School Name:** Live Oak Middle School  
**Increment Number:**

**School District:** Tulare City School District  
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## 2019 CBC

**IMPORTANT:** This form is only a summary list of structural tests and some of the special inspections required for the project. Generally, the structural tests and special inspections noted on this form are those that will be performed by the Geotechnical Engineer of Record, Laboratory of Record, or Special Inspector. The actual complete test and inspection program must be performed as detailed on the DSA approved documents. The appendix at the bottom of this form identifies work NOT subject to DSA requirements for special inspection or structural testing. The project inspector is responsible for providing inspection of all facets of construction, including but not limited to, special inspections not listed on this form such as structural wood framing, high-load wood diaphragms, cold-formed steel framing, anchorage of non-structural components, etc., per Title 24, Part 2, Chapter 17A (2019 CBC).

**\*\*NOTE:** Undefined section and table references found in this document are from the CBC, or California Building Code.

### KEY TO COLUMNS

1. TYPE	2. PERFORMED BY
<p><b>Continuous</b> – Indicates that a continuous special inspection is required</p> <p><b>Periodic</b> – Indicates that a periodic special inspection is required</p> <p><b>Test</b> – Indicates that a test is required</p>	<p><b>GE</b> – Indicates that the special inspection shall be performed by a registered geotechnical engineer or his or her authorized representative.</p> <p><b>LOR</b> – Indicates that the test or special inspection shall be performed by a testing laboratory accepted in the DSA Laboratory Evaluation and Acceptance (LEA) Program. See CAC Section 4-335.</p> <p><b>PI</b> – Indicates that the special inspection may be performed by a project inspector when specifically approved by DSA.</p> <p><b>SI</b> – Indicates that the special inspection shall be performed by an appropriately qualified/approved special inspector.</p>

# DSA 103-19: LISTING OF STRUCTURAL TESTS & SPECIAL INSPECTIONS (SOILS), 2019 CBC

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## Geotechnical Reports: Project does NOT have and does NOT require a geotechnical report

1. GENERAL:			
Table 1705A.6			
Test or Special Inspection	Type	Performed By	Code References and Notes
<input checked="" type="checkbox"/> a. Verify that: <ul style="list-style-type: none"> <li>• Site has been prepared properly prior to placement of controlled fill and/or excavations for foundations.</li> <li>• Foundation excavations are extended to proper depth and have reached proper material.</li> <li>• Materials below footings are adequate to achieve the design bearing capacity.</li> </ul>	See Notes	PI	Refer to specific items identified in the Appendix listing exemptions for limitations. Placement of controlled fill exceeding 12" depth under foundations is not permitted without a geotechnical report.

2. SOIL COMPACTION AND FILL:			
Table 1705A.6			
Test or Special Inspection	Type	Performed By	Code References and Notes
<input type="checkbox"/> a. Verify use of proper materials, densities and inspect lift thicknesses, placement and compaction during placement of fill.	Continuous	LOR*	* Under the supervision of a geotechnical engineer or LOR's engineering manager. Refer to specific items identified in the Appendix listing exemptions for limitations.
<input type="checkbox"/> b. Compaction testing.	Test	LOR*	* Under the supervision of a geotechnical engineer or LOR's engineering manager. Refer to specific items identified in the Appendix listing exemptions for limitations.

3. DRIVEN DEEP FOUNDATIONS (PILES):			
Table 1705A.7			

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	Test or Special Inspection	Type	Performed By	Code References and Notes
<input type="checkbox"/>	a. Verify pile materials, sizes and lengths comply with the requirements.	Continuous	GE*	* By geotechnical engineer or his or her qualified representative.
<input type="checkbox"/>	b. Determine capacities of test piles and conduct additional load tests as required.	Test	LOR*	* Under the supervision of the geotechnical engineer.
<input type="checkbox"/>	c. Inspect driving operations and maintain complete and accurate records for each pile.	Continuous	GE*	* By geotechnical engineer or his or her qualified representative.
<input type="checkbox"/>	d. Verify locations of piles and their plumbness, confirm type and size of hammer, record number of blows per foot of penetration, determine required penetrations to achieve design capacity, record tip and butt elevations and record any pile damage.	Continuous	GE*	* By geotechnical engineer or his or her qualified representative.
<input type="checkbox"/>	e. Steel piles.	Provide tests and inspections per STEEL section below.		
<input type="checkbox"/>	f. Concrete piles and concrete filled piles.	Provide tests and inspections per CONCRETE section below.		
<input type="checkbox"/>	g. For specialty piles, perform additional inspections as determined by the registered design professional in responsible charge.	*	*	* As defined on drawings or specifications.

4. CAST-IN-PLACE DEEP FOUNDATIONS (PIERS):				
Table 1705A.8				
	Test or Special Inspection	Type	Performed By	Code References and Notes

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<input type="checkbox"/>	a. Inspect drilling operations and maintain complete and accurate records for each pier.	<b>Continuous</b>	<b>PI</b>	Continuous inspection to be provided by project inspector. Refer to specific items identified in the Appendix listing exemptions for limitations.
<input type="checkbox"/>	b. Verify pier locations, diameters, plumbness and lengths. Record concrete or grout volumes.	<b>Continuous</b>	<b>PI</b>	Continuous inspection to be provided by project inspector. Refer to specific items identified in the Appendix listing exemptions for limitations.
<input type="checkbox"/>	c. Concrete piers.	Provide tests and inspections per CONCRETE section below.		

## 5. RETAINING WALLS:

Test or Special Inspection	Type	Performed By	Code References and Notes
<input type="checkbox"/> a. Placement, compaction and inspection of backfill.	<b>Continuous</b>	<b>GE*</b>	<b>1705A.6.1.</b> * By geotechnical engineer or his or her qualified representative. (See Section 2 above).
<input type="checkbox"/> b. Placement of soil reinforcement and/or drainage devices.	<b>Continuous</b>	<b>GE*</b>	* By geotechnical engineer or his or her qualified representative.
<input type="checkbox"/> c. Segmental retaining walls; inspect placement of units, dowels, connectors, etc.	<b>Continuous</b>	<b>GE*</b>	* By geotechnical engineer or his or her qualified representative. See DSA IR 16-3.
<input type="checkbox"/> d. Concrete retaining walls.	Provide tests and inspections per CONCRETE section below.		
<input type="checkbox"/> e. Masonry retaining walls.	Provide tests and inspections per MASONRY section below.		

## 6. OTHER SOILS:

Test or Special Inspection	Type	Performed By	Code References and Notes

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	a. Soil Improvements	Test	GE*	Submit a comprehensive report documenting final soil improvements constructed, construction observation and the results of the confirmation testing and analysis to CGS for final acceptance. * By geotechnical engineer or his or her qualified representative.
<input type="checkbox"/>	b. Inspection of Soil Improvements	<b>Continuous</b>	<b>GE*</b>	* By geotechnical engineer or his or her qualified representative.
<input type="checkbox"/>	c.			

# DSA 103-19: LISTING OF STRUCTURAL TESTS & SPECIAL INSPECTIONS (Concrete), 2019 CBC

Table 1705A.3; ACI 318-14 Sections 26.12 & 26.13

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7. CAST-IN-PLACE CONCRETE			
	Test or Special Inspection	Type	Performed By
<b>Material Verification and Testing:</b>			
<input checked="" type="checkbox"/>	a. Verify use of required design mix.	Periodic	SI
<input checked="" type="checkbox"/>	b. Identify, sample, and test reinforcing steel.	Test	LOR
<input checked="" type="checkbox"/>	c. During concrete placement, fabricate specimens for strength tests, perform slump and air content tests, and determine the temperature of the concrete.	Test	LOR
<input checked="" type="checkbox"/>	d. Test concrete ( $f'_c$ ).	Test	LOR
<b>Inspection:</b>			
<input checked="" type="checkbox"/>	e. Batch plant inspection: <b>Periodic</b>	See Notes	SI
<input type="checkbox"/>	f. Welding of reinforcing steel.	Provide special inspection per STEEL, Category 19.1(d) & (e) and/or 19.2(g) & (h) below.	

## 8. PRESTRESSED / POST-TENSIONED CONCRETE (in addition to Cast-in-Place Concrete tests and inspections):



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Table 1705A.3; ACI 318-14 Sections 26.12 & 26.13

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	Test or Special Inspection	Type	Performed By	Code References and Notes
<input type="checkbox"/>	a. Sample and test prestressing tendons and anchorages.	Test	LOR	1705A.3.4, 1910A.3
<input type="checkbox"/>	b. Inspect placement of prestressing tendons.	Periodic	SI	1705A.3.4, Table 1705A.3 Items 1 & 9.
<input type="checkbox"/>	c. Verify in-situ concrete strength prior to stressing of post-tensioning tendons.	Periodic	SI	Table 1705A.3 Item 11. Special inspector to verify specified concrete strength test prior to stressing.
<input type="checkbox"/>	d. Inspect application of post-tensioning or prestressing forces and grouting of bonded prestressing tendons.	Continuous	SI	1705A.3.4, Table 1705A.3 Item 9; ACI 318-14 Section 26.13

## 9. PRECAST CONCRETE (in addition to Cast-in-Place Concrete tests and inspections):

	Test or Special Inspection	Type	Performed By	Code References and Notes
<input type="checkbox"/>	a. Inspect fabrication of precast concrete members.	Continuous	SI	ACI 318-14 Section 26.13.
<input type="checkbox"/>	b. Inspect erection of precast concrete members.	Periodic	SI*	Table 1705A.3 Item 10. * May be performed by PI when specifically approved by DSA.

## 10. SHOTCRETE (in addition to Cast-in-Place Concrete tests and inspections):

	Test or Special Inspection	Type	Performed By	Code References and Notes
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Table 1705A.3; ACI 318-14 Sections 26.12 & 26.13

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<input type="checkbox"/>	a. Inspect shotcrete placement for proper application techniques.	Continuous	SI	1705A.19, Table 1705A.3 Item 7, 1908A.6, 1908A.7, 1908A.8, 1908A.9, 1908A.11, 1908A.12. See ACI 506.2-13 Section 3.4, ACI 506R-16.
<input type="checkbox"/>	b. Sample and test shotcrete ( $f'_c$ ).	Test	LOR	1908A.5, 1908A.10.

## 11. POST-INSTALLED ANCHORS:

Test or Special Inspection	Type	Performed By	Code References and Notes
<input checked="" type="checkbox"/> a. Inspect installation of post-installed anchors	See Notes	SI*	1617A.1.19, Table 1705A.3 Item 4a (Continuous) & 4b (Periodic), 1705A.3.8 (See Appendix for exemptions). ACI 318-14 Sections 17.8 & 26.13. * May be performed by the project inspector when specifically approved by DSA.
<input checked="" type="checkbox"/> b. Test post-installed anchors.	Test	LOR	1910A.5. (See Appendix for exemptions.)

## 12. OTHER CONCRETE:

Test or Special Inspection	Type	Performed By	Code References and Notes
<input type="checkbox"/> a.			

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1705A.4; TMS 602-16, Tables 3 and 4.

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13. STRUCTURAL MASONRY:				
Test or Special Inspection	Type	Performed By	Code References and Notes	
Material Verification and Testing: (See Appendix for exemptions.)				
<input type="checkbox"/> a. Mill certificate indicates compliance with requirements for reinforcement, anchors, ties, fasteners and metal accessories. See item 7b for identification, sampling and testing of reinforcing steel.	Periodic	SI*	2103A.4; TMS 602-13 Article 1.5B.2 & 2.4. * To be performed by qualified LOR representative. Applicable testing by LOR. See IR 17-10.16 for unidentified reinforcing steel.	
<input type="checkbox"/> b. Producer's certificate of compliance for masonry units, mortar and grout materials.	Test	LOR	1705A.4, 2103A.2.1, 2103A.3, 2103A.5; TMS 602-16 Articles 2.1, 2.2, 2.6A and 2.6B, and Table 6 footnote 3.	
<input type="checkbox"/> c. Test masonry ( $f_m$ ).	Test	LOR	1705A.4. For Unit Strength: 2105A.3 (2114.6.1+); TMS 602-16 Articles 1.4B.2, 1.5B.1 & 1.5B.2. For Prism (required when $f_m > 2000$ psi): 2105A.2; TMS 602-16 Articles 1.4B.3, 1.4B.4, 1.5B.1 & 1.5B.2.	
<input type="checkbox"/> d. Verify proportions of site prepared, premixed or preblended mortar and grout.	Periodic	SI	TMS 602-16 Table 3 Item 5, Table 4 Item 1a & 2d.	
<input type="checkbox"/> e. Test core-drilled samples.	Test	LOR	2105A.4. (See Appendix for exemptions.)	
Inspection: (See Appendix for exemptions.)				
<input type="checkbox"/> f. Inspect preparation of prisms.	Continuous	SI	TMS 602-16 Articles 1.4.B.3 & 1.4.B.4 & Table 4 Item 4.	
<input type="checkbox"/> g. Verify size, location and condition of all dowels, construction supporting masonry, etc.	Periodic	SI		

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1705A.4; TMS 602-16, Tables 3 and 4.

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<input type="checkbox"/>	<b>h.</b> Verify size, grade and type of reinforcement and anchor bolts.	<b>Periodic</b>	<b>SI</b>	TMS 602-16 Table 4 Item 1c.
<input type="checkbox"/>	<b>i.</b> Welding of reinforcing steel.	TMS 602-16 Table 4 Item 3e. Provide special inspection per STEEL, Category 19.1(d) & (e) and/or 19.2(g) & (h) below.		
<input type="checkbox"/>	<b>j.</b> Inspect placement of reinforcement and connectors.	<b>Continuous</b>	<b>SI</b>	TMS 602-16 Table 4 Item 2c.
<input type="checkbox"/>	<b>k.</b> Inspect placement of masonry units and construction of mortar joints.	<b>Periodic</b>	<b>SI</b>	TMS 602-16 Table 4 Item 3b.
<input type="checkbox"/>	<b>l.</b> Verify preparation, construction and protection of masonry during cold weather (temperature below 40° F) or hot weather (temperature above 90° F).	<b>Periodic</b>	<b>SI*</b>	TMS 602-16 Table 4 Item 3f. * May be performed by the project inspector when specifically approved by DSA.
<input type="checkbox"/>	<b>m.</b> Inspect type, size and location of anchors and all other items to be embedded in masonry including other details of anchorage of masonry to structural members, frames and other construction.	<b>Continuous</b>	<b>SI</b>	TMS 602-16 Table 4 Item 3d.
<input type="checkbox"/>	<b>n.</b> Inspect grout space prior to placement of grout.	<b>Continuous</b>	<b>SI</b>	TMS 602-16 Table 4 Item 2a.

## 14. VENEER OR GLASS BLOCK PARTITIONS: 1705A.4.1; TMS 602-16 Tables 3 and 4.

	Test or Special Inspection	Type	Performed By	Code References and Notes
<input checked="" type="checkbox"/>	<b>a.</b> Verify proportions of siteprepared mortar and grout and/or verify certification of premixed mortar.	<b>Periodic</b>	<b>SI</b>	TMS 602-16 Table 3 Item 5 and Table 4 Items 1a & 2d.

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<input checked="" type="checkbox"/>	<b>b.</b> Inspect placement of units and construction of mortar joints.	<b>Periodic</b>	<b>SI</b>	TMS 602-16 Table 4 Item 3b.
<input checked="" type="checkbox"/>	<b>c.</b> Inspect placement of reinforcement, connectors and anchors.	<b>Periodic</b>	<b>SI</b>	TMS 602-16 Table 4 Item 2c.
<input checked="" type="checkbox"/>	<b>d.</b> Inspect type, size and location of anchors and all other items to be embedded in masonry including details of anchorage of masonry to structural members, frames and other construction.	<b>Periodic</b>	<b>SI</b>	TMS 602-16 Table 4 Item 3d.
<input checked="" type="checkbox"/>	<b>e.</b> Verify preparation, construction and protection of masonry during cold weather (temperature below 40° F) or hot weather (above 90° F).	<b>Periodic</b>	<b>SI*</b>	TMS 602-16 Table 4 Item 3f. * May be performed by the project inspector when specifically approved by DSA.
<input type="checkbox"/>	<b>f.</b> Test veneer bond strength	<b>Test</b>	<b>LOR</b>	<b>1410.2.1; TMS 402 Article 12.3.2.4. (Field constructed mock-up laboratory tested in accordance with ASTM C482).</b>

## 15. POST-INSTALLED ANCHORS IN MASONRY:

<b>Test or Special Inspection</b>	<b>Type</b>	<b>Performed By</b>	<b>Code References and Notes</b>
<input checked="" type="checkbox"/> <b>a.</b> Inspect installation of postinstalled anchors	<b>See Notes</b>	<b>SI*</b>	<b>1617A.1.19, 1705A.4, Table 1705A.3 Item 4a (Continuous) &amp; 4b (Periodic);</b> ACI 318-14 Sections 17.8 & 26.13. * May be performed by the project inspector when specifically approved by DSA. (See Appendix for exemptions.)
<input checked="" type="checkbox"/> <b>b.</b> Test post-installed anchors.	<b>Test</b>	<b>LOR</b>	<b>1705A.4, 1910A.5.</b> (See Appendix for exemptions.)

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1705A.4; TMS 602-16, Tables 3 and 4.

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16. OTHER MASONRY:			
Test or Special Inspection	Type	Performed By	Code References and Notes
<input type="checkbox"/> a.			

# DSA 103-19: LISTING OF STRUCTURAL TESTS & SPECIAL INSPECTIONS (Steel and Aluminum), 2019 CBC

1705A.2.1, Table 1705A.2.1; AISC 303-16, AISC 341-16, AISC 358-16, AISC 360-16; AISI S100-16

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## 17. STRUCTURAL STEEL, COLD-FORMED STEEL AND ALUMINUM USED FOR STRUCTURAL PURPOSES

Material Verification and Testing:			
Test or Special Inspection	Type	Performed By	Code References and Notes
<input checked="" type="checkbox"/> <p>a. Verify identification of all materials and:</p> <ul style="list-style-type: none"> <li>• Mill certificates indicate material properties that comply with requirements.</li> <li>• Material sizes, types and grades comply with requirements.</li> </ul>	Periodic	*	Table 1705A.2.1 Item 3a 3c, 2202A.1; AISI S100-16 Section A3.1 & A3.2, AISI S240-15 Section A3 & A5, AISI S220-15 Sections A4 & A6. * By special inspector or qualified technician when performed off-site.
<input checked="" type="checkbox"/> <p>b. Test unidentified materials</p>	Test	LOR	2202A.1.
<input type="checkbox"/> <p>c. Examine seam welds of HSS shapes</p>	Periodic	SI	DSA IR 17-3.
Inspection:			
<input checked="" type="checkbox"/> <p>d. Verify and document steel fabrication per DSA-approved construction documents.</p>	Periodic	SI	Not applicable to cold-formed steel light-frame construction, except for trusses (1705A.2.4).

## 18. HIGH-STRENGTH BOLTS: RCSC 2014

Material Verification and Testing of High-Strength Bolts, Nuts and Washers:			
Test or Special Inspection	Type	Performed By	Code References and Notes
<input type="checkbox"/> <p>a. Verify identification markings and manufacturer's certificates of compliance conform to ASTM standards specified in the DSA-approved documents.</p>	Periodic	SI	Table 1705A.2.1 Items 1a & 1b, 2202A.1; AISC 360-16 Section A3.3, J3.1, and N3.2; RCSC 2014 Section 1.5 & 2.1; DSA IR 17-8 & DSA IR 17-9.

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1705A.2.1, Table 1705A.2.1; AISC 303-16, AISC 341-16, AISC 358-16, AISC 360-16; AISI S100-16

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<input type="checkbox"/>	<b>b.</b> Test high-strength bolts, nuts and washers.	<b>Test</b>	<b>LOR</b>	<b>Table 1705A.2.1 Item 1c, 2213A.1; RCSC 2014 Section 7.2; DSA IR 17-8.</b>
<b>Inspection of High-Strength Bolt Installation:</b>				
<input type="checkbox"/>	<b>c.</b> Bearing-type ("snug tight") connections.	<b>Periodic</b>	<b>SI</b>	<b>Table 1705A.2.1 Item 2a, 1705A.2.6, 2204A.2; AISC 360-16 J3.1, J3.2, M2.5 &amp; N5.6; RCSC 2014 Section 9.1; DSA IR 17-9.</b>
<input type="checkbox"/>	<b>d.</b> Pretensioned and slip-critical connections.	*	<b>SI</b>	<b>Table 1705A.2.1 Items 2b &amp; 2c, 1705A.2.6, 2204A.2; AISC 360-16 J3.1, J3.2, M2.5 &amp; N5.6; RCSC 2014 Sections 9.2 &amp; 9.3; DSA IR 17-9. *</b> "Continuous" or "Periodic" depends on the tightening method used.

<b>19. WELDING:</b>				
<b>1705A.2.5, Table 1705A.2.1 Items 4 &amp; 5; AWS D1.1 and AWS D1.8 for structural steel; AWS D1.2 for Aluminum; AWS D1.3 for cold-formed steel; AWS D1.4 for reinforcing steel; DSA IR 17-3 (See Appendix for exemptions.)</b>				
<b>Verification of Materials, Equipment, Welders, etc.:</b>				
<b>Test or Special Inspection</b>		<b>Type</b>	<b>Performed By</b>	<b>Code References and Notes</b>
<input checked="" type="checkbox"/>	<b>a.</b> Verify weld filler material identification markings per AWS designation listed on the DSA-approved documents and the WPS.	<b>Periodic</b>	<b>SI</b>	DSA IR 17-3.
<input checked="" type="checkbox"/>	<b>b.</b> Verify weld filler material manufacturer's certificate of compliance.	<b>Periodic</b>	<b>SI</b>	DSA IR 17-3.
<input checked="" type="checkbox"/>	<b>c.</b> Verify WPS, welder qualifications and equipment.	<b>Periodic</b>	<b>SI</b>	DSA IR 17-3.



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1705A.2.1, Table 1705A.2.1; AISC 303-16, AISC 341-16, AISC 358-16, AISC 360-16; AISI S100-16

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## 19.1 SHOP WELDING:

	Test or Special Inspection	Type	Performed By	Code References and Notes
<input type="checkbox"/>	a. Inspect groove welds, multi-pass fillet welds, single pass fillet welds > 5/16", plug and slot welds.	Continuous	SI	Table 1705A.2.1 Items 5a.1 4; AISC 360-16 (and AISC 341-16 as applicable); DSA IR 17-3.
<input checked="" type="checkbox"/>	b. Inspect single-pass fillet welds ≤ 5/16", floor and roof deck welds.	Periodic	SI	1705A.2.2, Table 1705A.2.1 Items 5a.5 & 5a.6; AISC 360-16 (and AISC 341-16 as applicable); DSA IR 17-3.
<input type="checkbox"/>	c. Inspect welding of stairs and railing systems.	Periodic	SI	1705A.2.1; AISC 360-16 (and AISC 341-16 as applicable); AWS D1.1 & D1.3; DSA IR 17-3.
<input type="checkbox"/>	d. Verification of reinforcing steel weldability other than ASTM A706.	Periodic	SI	1705A.3.1; AWS D1.4; DSA IR 17-3. Verify carbon equivalent reported on mill certificates.
<input type="checkbox"/>	e. Inspect welding of reinforcing steel.	Continuous	SI	Table 1705A.2.1 Item 5b, 1705A.3.1, Table 1705A.3 Item 2, 1903A.8; AWS D1.4; DSA IR 17-3.

## 19.2 FIELD WELDING:

	Test or Special Inspection	Type	Performed By	Code References and Notes
<input type="checkbox"/>	a. Inspect groove welds, multi-pass fillet welds, single pass fillet welds > 5/16", plug and slot welds.	Continuous	SI	Table 1705A.2.1 Items 5a.1 4; AISC 360-16 (AISC 341-16 as applicable); DSA IR 17-3.
<input type="checkbox"/>	b. Inspect single-pass fillet welds ≤ 5/16".	Periodic	SI	Table 1705A.2.1 Item 5a.5; AISC 360-16 (AISC 341-16 as applicable); DSA IR 17-3.

# DSA 103-19: LISTING OF STRUCTURAL TESTS & SPECIAL INSPECTIONS (Steel and Aluminum), 2019 CBC

1705A.2.1, Table 1705A.2.1; AISC 303-16, AISC 341-16, AISC 358-16, AISC 360-16; AISI S100-16

**Application Number:**

02-118489

**DSA File Number:**

54-99

**School Name:**

Live Oak Middle School

**Increment Number:**

**School District:**

Tulare City School District

**Date Created:**

2020-11-13 14:48:52

<input type="checkbox"/>	c. Inspect end-welded studs (ASTM A-108) installation (including bend test).	Periodic	SI	2213A.2; AISC 360-16 (AISC 341-16 as applicable); AWS D1.1; DSA IR 17-3.
<input type="checkbox"/>	d. Inspect floor and roof deck welds.	Periodic	SI	1705A.2.2, Table 1705A.2.1 Item 5a.6; AISC 360-16 (AISC 341-16 as applicable); AWS D1.3; DSA IR 17-3.
<input type="checkbox"/>	e. Inspect welding of structural cold-formed steel.	Periodic	SI*	1705A.2.5; AWS D1.3; DSA IR 17-3. The quality control provisions of AISI S240-15 Chapter D shall also apply. * May be performed by the project inspector when specifically approved by DSA.
<input type="checkbox"/>	f. Inspect welding of stairs and railing systems.	Periodic	SI*	1705A.2.1; AISC 360-16 (AISC 341-16 as applicable); AWS D1.1 & D1.3; DSA IR 17-3. * May be performed by the project inspector when specifically approved by DSA.
<input type="checkbox"/>	g. Verification of reinforcing steel weldability.	Periodic	SI	1705A.3.1; AWS D1.4; DSA IR 17-3. Verify carbon equivalent reported on mill certificates.
<input type="checkbox"/>	h. Inspect welding of reinforcing steel.	Continuous	SI	Table 1705A.2.1 Item 5b, 1705A.3.1, Table 1705A.3 Item 2, 1903A.8; AWS D1.4; DSA IR 17-3.

**20. NONDESTRUCTIVE TESTING:**

1705A.2.1, Table 1705A.2.1; AISC 303-16, AISC 341-16, AISC 358-16, AISC 360-16; AISI S100-16

Test or Special Inspection	Type	Performed By	Code References and Notes
<input type="checkbox"/> a. Ultrasonic	Test	LOR	1705A.2.1, 1705A.2.5; AISC 341-16 J6.2, AISC 360-16 N5.5; ANSI/ASNT CP-189, SNT-TC-1A; AWS D1.1, AWS D1.8; DSA IR 17-2.

# DSA 103-19: LISTING OF STRUCTURAL TESTS & SPECIAL INSPECTIONS (Steel and Aluminum), 2019 CBC

1705A.2.1, Table 1705A.2.1; AISC 303-16, AISC 341-16, AISC 358-16, AISC 360-16; AISI S100-16

**Application Number:**

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<input type="checkbox"/>	<b>b.</b> Magnetic Particle	Test	LOR	1705A.2.1, 1705A.2.5; AISC 341-16 J6.2, AISC 360-16 N5.5; ANSI/ASNT CP-189, SNT-TC-1A; AWS D1.1, AWS D1.8; DSA IR 17-2.
<input type="checkbox"/>	<b>c.</b>	Test	LOR	

## 21. STEEL JOISTS AND TRUSSES: 1705A.2.1, Table 1705A.2.1; AISC 303-16, AISC 341-16, AISC 358-16, AISC 360-16; AISI S100-16

Test or Special Inspection	Type	Performed By	Code References and Notes
<input type="checkbox"/> <b>a.</b> Verify size, type and grade for all chord and web members as well as connectors and weld filler material; verify joist profile, dimensions and camber (if applicable); verify all weld locations, lengths and profiles; mark or tag each joist.	Continuous	SI	1705A.2.3, Table 1705A.2.3; AWS D1.1; DSA IR 22-3 for steel joists only. 1705A.2.4; AWS D1.3 for cold-formed steel trusses.

## 22. SPRAY APPLIED FIRE-PROOFING: 1705A.2.1, Table 1705A.2.1; AISC 303-16, AISC 341-16, AISC 358-16, AISC 360-16; AISI S100-16

Test or Special Inspection	Type	Performed By	Code References and Notes
<input type="checkbox"/> <b>a.</b> Examine structural steel surface conditions, inspect application, take samples, measure thickness and verify compliance of all aspects of application with DSA-approved documents.	Periodic	SI	1705A.14.
<input type="checkbox"/> <b>b.</b> Test bond strength.	Test	LOR	1705A.14.6.

# DSA 103-19: LISTING OF STRUCTURAL TESTS & SPECIAL INSPECTIONS (Steel and Aluminum), 2019 CBC

1705A.2.1, Table 1705A.2.1; AISC 303-16, AISC 341-16, AISC 358-16, AISC 360-16; AISI S100-16

**Application Number:**

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<input type="checkbox"/>	c. Test density.	Test	LOR	1705A.14.5.
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**23. ANCHOR BOLTS AND ANCHOR RODS:**

Test or Special Inspection				
		Type	Performed By	Code References and Notes
<input checked="" type="checkbox"/>	a. Anchor Bolts and Anchor Rods	Test	LOR	Sample and test anchor bolts and anchor rods not readily identifiable per procedures noted in DSA IR 17-11.
<input type="checkbox"/>	b. Threaded rod not used for foundation anchorage.	Test	LOR	Sample and test threaded rods not readily identifiable per procedures noted in DSA IR 17-11.

**Other Steel**

Test or Special Inspection				
		Type	Performed By	Code References and Notes
<input type="checkbox"/>	a.			

## Appendix: Work Exempt from DSA Requirements for Structural Tests / Special Inspections

<b>Application Number:</b> 02-118489	<b>School Name:</b> Live Oak Middle School	<b>School District:</b> Tulare City School District
<b>DSA File Number:</b> 54-99	<b>Increment Number:</b>	<b>Date Created:</b> 2020-11-13 14:48:52

Exempt items given in DSA IR A-22 or the 2019 CBC (including DSA amendments) and those items identified below with a check mark by the design professional are NOT subject to DSA requirements for the structural tests / special inspections noted. **Items marked as exempt shall be identified on the approved construction documents.** The project inspector shall verify all construction complies with the approved construction documents.

<b>SOILS:</b>	
<input type="checkbox"/>	1. Deep foundations acting as a cantilever footing designed based on minimum allowable pressures per CBC Table 1806A.2 and having no geotechnical report for the following cases: A) free standing sign or scoreboard, B) cell or antenna towers and poles less than 35'-0" tall (e.g., lighting poles, flag poles, poles supporting open mesh fences, etc.), C) single-story structure with dead load less than 5 psf (e.g., open fabric shade structure), or D) covered walkway structure with an apex height less than 10'-0" above adjacent grade.
<input type="checkbox"/>	2. Shallow foundations, etc. are exempt from special inspections and testing by a Geotechnical Engineer for the following cases: A) buildings without a geotechnical report and meeting the exception item #1 criteria in CBC Section 1803A.2 supported by native soil (any excavation depth) or fill soil (not exceeding 12" depth per CBC Section 1804A.6), B) soil scarification/recompaction not exceeding 12" depth, C) native or fill soil supporting exterior non-structural flatwork (e.g., sidewalks, site concrete ramps, site stairs, parking lots, driveways, etc.), D) unpaved landscaping and playground areas, or E) utility trench backfill.

<b>CONCRETE/MASONRY:</b>	
<input type="checkbox"/>	1. Post-installed anchors for the following: A) exempt non-structural components (e.g., mechanical, electrical, plumbing equipment - see item 7 for "Welding") given in CBC Section 1617A.1.18 (which replaces ASCE 7-16, Section 13.1.4) or B) interior nonstructural wall partitions meeting criteria listed in exempt item 3 for "Welding."
<input type="checkbox"/>	2. Concrete batch plant inspection is not required for items given in CBC Section 1705A.3.3.2 subject to the requirements and limitations in that section.

# Appendix: Work Exempt from DSA Requirements for Structural Tests / Special Inspections

<b>Application Number:</b> 02-118489	<b>School Name:</b> Live Oak Middle School	<b>School District:</b> Tulare City School District
<b>DSA File Number:</b> 54-99	<b>Increment Number:</b>	<b>Date Created:</b> 2020-11-13 14:48:52

<input type="checkbox"/>	3. Non-bearing non-shear masonry walls may be exempt from certain DSA masonry testing and special inspection items as allowed per DSA IR 21-1.16. Refer to construction documents for specific exemptions accordingly for each applicable wall condition.
<input checked="" type="checkbox"/>	4. Epoxy shear dowels in site flatwork and/or other non-structural concrete.
<input type="checkbox"/>	5. Testing of reinforcing bars is not required for items given in CBC Section 1910A.2 subject to the requirements and limitations in that section.

	<b>Welding:</b>
<input type="checkbox"/>	1. Solid-clad and open-mesh gates with maximum leaf span or rolling section for rolling gates of 10' and apex height less than 8'-0" above lowest adjacent grade. When located above circulation or occupied space below, these gates are not located within 1.5x gate/fence height (max 8'-0") to the edge of floor or roof.
<input type="checkbox"/>	2. Handrails, guardrails, and modular or relocatable ramps associated with walking surfaces less than 30" above adjacent grade (excluding post base connections per the 'Exception' language in Section 1705A.2.1); fillet welds shall not be ground flush.
<input type="checkbox"/>	3. Non-structural interior cold-formed steel framing spanning less than 15'-0", such as in interior partitions, interior soffits, etc. supporting only self weight and light-weight finishes or adhered tile, masonry, stone, or terra cotta veneer no more than 5/8" thickness and apex less than 20'-0" in height and not over an exit way. Maximum tributary load to a member shall not exceed the equivalent of that occurring from a 10'x10' opening in a 15' tall wall for a header or king stud.
<input type="checkbox"/>	4. Manufactured support frames and curbs using hot rolled or cold-formed steel (i.e., light gauge) for mechanical, electrical, or plumbing equipment weighing less than 2000# (equipment only) (connections of such frames to superstructure elements using welding will require special inspection as noted in selected item(s) for Sections 19, 19.1 and/or 19.2 of listing above).
<input type="checkbox"/>	5. Manufactured components (e.g., Tolco, B-Line, Afcon, etc.) for mechanical, electrical, or plumbing hanger support and bracing (connections of such components to superstructure elements using welding will require special inspection as noted in selected item(s) for Sections 19, 19.1 and/or 19.2 of listing above).

## Appendix: Work Exempt from DSA Requirements for Structural Tests / Special Inspections

<b>Application Number:</b> 02-118489	<b>School Name:</b> Live Oak Middle School	<b>School District:</b> Tulare City School District
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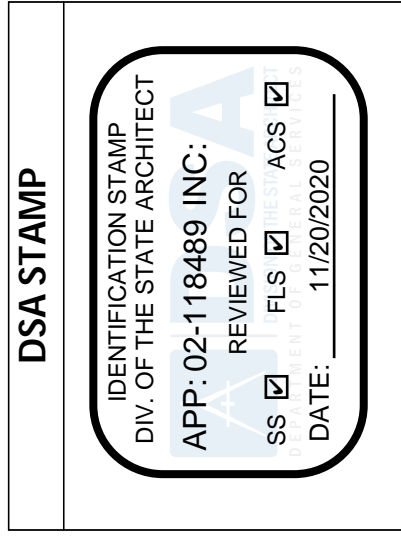
<input type="checkbox"/>	6. TV Brackets, projector mounts with a valid listing (see DSA IR A-5) and recreational equipment (e.g., playground structures, basketball backstops, etc.) (connections of such elements to superstructure elements using welding will require special inspection as noted in selected item(s) for section 19, 19.1 and/or 19.2 located in the Steel/Aluminum category).
<input type="checkbox"/>	7. Any support for exempt non-structural components given in CBC Section 1617A.1.18 (which replaces ASCE 7-16, Section 13.1.4) meeting the following: A) when supported on a floor/roof, <400# and resulting composite center of mass (including component's center of mass) ≤4' above supporting floor/roof, B) when hung from a wall or roof/floor, <20# for discrete units or <5 plf for distributed systems.

# DSA 103-19: LISTING OF STRUCTURAL TESTS & SPECIAL INSPECTIONS(SIGNATURE), 2019 CBC

<b>Application Number:</b> 02-118489 <b>DSA File Number:</b> 54-99	<b>School Name:</b> Live Oak Middle School <b>Increment Number:</b>  <b>School District:</b> Tulare City School District <b>Date Created:</b> 2020-11-13 14:48:52
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Name of Architect or Engineer in general responsible charge:  <p style="text-align: center; font-weight: bold;">Elizabeth Garcia</p>	
Name of Structural Engineer (When structural design has been delegated):  <p style="text-align: center; font-weight: bold;">Eric Bailey</p>	
Signature of Architect or Structural Engineer: 	Date:  <p style="text-align: center; font-weight: bold;">11/13/2020</p>

**Note:** To facilitate DSA electronic mark-ups and identification stamp application, DSA recommends against using secured electronic or digital signatures.





# DSA 103-19: LIST OF REQUIRED VERIFIED REPORTS, CBC 2019

**Application Number:**

02-118489

**School Name:**

Live Oak Middle School

**School District:**

Tulare City School District

**DSA File Number:**

54-99

**Increment Number:**

2020-11-13 14:48:52

1. Structural Testing and Inspection: Laboratory Verified Report Form DSA 291

2. Concrete Batch Plant Inspection: Laboratory Verified Report Form DSA 291

3. Post-installed Anchors: Laboratory Verified Report Form DSA 291, or, for independently contracting SI, Special Inspection Verified Report Form DSA 292

4. Masonry Inspection: Laboratory Verified Report Form DSA 291, or, for independently contracting SI, Special Inspection Verified Report Form DSA 292

5. Shop Welding Inspection: Laboratory Verified Report Form DSA 291, or, for independently contracting SI, Special Inspection Verified Report Form DSA 292



APP: 02-118489 INC:

REVIEWED FOR

SS  FLS  ACS

DATE: 11/20/2020

SECTION 000107  
SEALS PAGE



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END OF SECTION



# **NOTICE TO BIDDERS**

**TULARE CITY SCHOOL DISTRICT**

District Office  
600 North Cherry St.  
Tulare, CA 93274

Notice is hereby given that Tulare City School District (hereinafter referred to as "Owner") will receive sealed bids prior to the date and time stated for the Bid Opening for the award of the Contract to construct:

## **LIVE OAK MIDDLE SCHOOL LOCKER ROOM REMODEL**

As per drawings and specifications which may now be obtained electronically from the Architect:

**TETER, LLP**  
**7535 N. Palm Ave., Suite 2001**  
**Fresno, CA 93711**  
[kristina.zamora@teterae.com](mailto:kristina.zamora@teterae.com)

This Contract is subject to prequalification pursuant to Public Contract Code section 20111.6.

Public works projects shall be subject to compliance monitoring and enforcement by the Department of Industrial Relations. For all projects over Twenty-Five Thousand Dollars (\$25,000), a contractor or subcontractor shall not be qualified to submit a bid or to be listed in a bid proposal subject to the requirements of Public Contract Code section 4104 unless currently registered and qualified under Labor Code section 1725.5 to perform public work as defined by Division 2, Part 7, Chapter 1 (§§ 1720 et seq.) of the Labor Code. For all projects over Twenty-Five Thousand Dollars (\$25,000), a contractor or subcontractor shall not be qualified to enter into, or engage in the performance of, any contract of public work (as defined by Division 2, Part 7, Chapter 1 (§§ 1720 et seq.) of the Labor Code) unless currently registered and qualified under Labor Code section 1725.5 to perform public work.

Contract Time shall be One Hundred and Ten (110) calendar days, and liquidated damages for delay shall accrue. See Agreement between Owner and Contractor for more information.

Bids must be sealed and filed in the District Office of the Owner at Tulare City School Board Room 600 North Cherry St., Tulare, CA 93274 by March 2, 2021, before 11:00 a.m. on the clock designated by the Owner or its representative as the bid clock, after which bids shall be collected and the public reading of the bids will occur outside in the parking lot at 11:30 a.m. the same day. No bid will be accepted by Owner after this time. Facsimile (FAX) copies of the bid will not be accepted.

Mandatory pre-bid conference will be held on January 21, 2021, at 10:00 a.m. at Live Oak Middle School, 980 N. Laspina, Tulare, CA. Bidders not attending the mandatory pre-bid conference will be disqualified.

Bids must be accompanied by a bidder's bond, cashier's check, or certified check for at least ten percent (10%) of the amount of the base bid and made payable to the Owner. Pursuant to the

Contract Documents, the successful bidder will be required to furnish a Payment (Labor and Material) Bond in the amount of one hundred percent (100%) of the Contract Sum, and a Faithful Performance Bond in the amount of one hundred percent (100%) of the Contract Sum, as set forth in the Contract Documents.

The successful bidder will be allowed to substitute securities or establish an escrow in lieu of retainage, pursuant to Public Contract Code Section 22300, and as described in the Agreement Between Owner and Contractor and General Conditions.

The Owner will not consider or accept any bids from contractors who are not licensed to do business in the State of California, in accordance with the California Public Contract Code, providing for the licensing of contractors. In accordance with Section 3300 of said Code, the bidder shall have a Class "B" license and shall maintain that license in good standing through Contract completion and all applicable warranty periods. For all projects over Twenty-five Thousand Dollars (\$25,000), bidder shall state the public works contractor registration number on the Designation of Subcontractors form for each subcontractor performing more than one-half of one percent (0.5%) of the bidder's total bid.

The Director of Industrial Relations of the State of California, in the manner provided by law, has ascertained the general prevailing rate of per diem wages and rate for legal holidays and overtime work. The Contractor must pay for any labor therein described or classified in an amount not less than the rates specified. These rates may be obtained at <http://www.dir.ca.gov>.

July 9, 2019

By the order of the Board of Trustees  
Of Tulare City School District

By: Joyce Nunes  
Assistant Supt. of Business Services/Psych. Services

Advertise: Friday, January 8, 2021  
Friday, January 15, 2021

# **INSTRUCTIONS TO BIDDERS**

TULARE CITY SCHOOL DISTRICT  
District Office  
600 North Cherry St.  
Tulare, CA 93274

## **LIVE OAK MIDDLE SCHOOL LOCKER ROOM REMODEL**

**SECURING DOCUMENTS:** Drawings and Specifications are available electronically from the Architect at:

TETER, LLP  
7535 N. Palm Ave., Suite 201  
Fresno, CA 93711  
kristina.zamora@teterae.com

**PREQUALIFICATION:** This Contract is subject to prequalification. If a bidder is not prequalified to bid on the Contract, Owner will not accept the bid. Any subcontractors the bidder lists for work requiring C-4, C-7, C-10, C-16, C-20, C-34, C-36, C-38, C-42, C-43, or C-46 licenses must have current pre-qualified status with the Owner. Bidders must submit the prequalification application to the Owner by the date specified in the application. Bidders may obtain the prequalification application from the Owner at [www.tcsdk8.org](http://www.tcsdk8.org)

**RETENTION:** The Owner will withhold retention of 5% from all progress payments.

**REGISTRATION:** For all projects over Twenty-Five Thousand Dollars (\$25,000), the Owner shall not accept any bid or enter into any contract without proof of the bidder's current registration to perform public work under Labor Code section 1725.5.

For all projects over Twenty-five Thousand Dollars (\$25,000), the bidder shall not accept any sub-bid or enter into any subcontract without proof of the subcontractor's current registration to perform public work under Labor Code section 1725.5.

**MANDATORY PRE-BID CONFERENCES:** Mandatory pre-bid conference will be held on January 21, 2021, at 10:00 a.m. at Live Oak Middle School, 980 N. Laspina, Tulare, CA. Bidders not attending the mandatory pre-bid conference will be disqualified.

### **BIDS:**

Bids to receive consideration shall be made in accordance with the following instructions:

1. Bids shall be made on a form therefor, obtained from the Architect or Owner. Bids not made on the proper form shall be disregarded. Numbers must be stated in words and figures, and the signatures of all individuals must be in longhand.

2. No bid will be considered which makes exceptions, changes, or in any manner makes reservations to the terms of the drawings or specifications. If prequalification is required for this Contract, no bid will be accepted from a contractor that has not been prequalified.
3. Questions regarding documents, discrepancies, omissions, or doubt as to meanings shall be referred immediately to the Architect who will send written instructions clarifying such questions to each bidder. Oral responses will not be binding on the Owner or Architect. Questions will be accepted until 5:00 p.m. on February 11, 2021 and the last Addendum (if required) will be issued on February 19, 2021.
4. Each bid must give the full business address of the bidder and be signed by bidder with bidder's usual signature. Bids by partnerships must furnish the full name of all partners and must be signed in the partnership name by a general partner with authority to bind the partnership in such matters, followed by the signature and designation of the person signing. The name of the person signing shall also be typed or printed below the signature. Bids by corporations must be signed with the legal name of the corporation, followed by the name of the state of incorporation and by the signature and designation of the chairman of the board, president or any vice president, and then followed by a second signature by the secretary, assistant secretary, the chief financial officer or assistant treasurer. All persons signing must be authorized to bind the corporation in the matter. The name of each person signing shall also be typed or printed below the signature. Satisfactory evidence of the authority of the officer signing on behalf of a corporation shall be furnished.
5. Pursuant to the provisions of Sections 4100 to 4114, inclusive, of the Public Contract Code of the State of California, which are hereby incorporated and made a part hereof and these Instructions to Bidders, every bidder shall set forth in its bid (using the Owner's form for Designation of Subcontractors:
  - A. The name and location of the place of business, the California contractor license number, and for all projects over Twenty-Five Thousand Dollars (\$25,000), the public works contractor registration number, of each subcontractor who will perform work or labor or render service to the bidder in or about the construction of the work or improvement, or a subcontractor licensed by the State of California who, under subcontract to the bidder, specially fabricates and installs a portion of the Work or improvement according to detailed drawings contained in the plans and specifications, in an amount in excess of one-half ( $\frac{1}{2}$ ) of one percent (1%) of the bidder's total bid. An inadvertent error in listing a California contractor's license number shall not be grounds for filing a bid protest or for considering the bid nonresponsive if the bidder submits the corrected contractor's license number to the Owner within 24 hours after the bid opening, or any continuation thereof, so long as the corrected contractor's

license number corresponds to the submitted name and location for that subcontractor.

- B. The portion of the Work which will be done by each such subcontractor. If the bidder fails to specify a subcontractor for any portion of the Work to be performed under the Contract in excess of one-half (1/2) of one percent (1%) of the bidder's total bid, the bidder agrees to perform that portion itself. The successful bidder shall not, without the consent of the Owner:
- 1) Substitute any person as subcontractor in place of the subcontractor designated in the original bid.
  - 2) Permit any subcontract to be assigned or transferred or allow it to be performed by anyone other than the original subcontractor listed in the bid.
  - 3) Sublet or subcontract any portion of the Work in excess of one-half (1/2) of one percent (1%) of the total bid as to which the original bid did not designate a subcontractor.
6. The Director of Industrial Relations of the State of California, in the manner provided by law, has ascertained the general prevailing rate of per diem wages and the rate for legal holidays and overtime work. The Contractor must pay for any labor therein described or classified in an amount not less than the rates specified. Copies of the required rates are on file at the Owner's business office and are available to any interested party on request.
7. All bids must be accompanied by a completed Non-Collusion Declaration and Sufficient Funds Declaration (Labor Code § 2810). All bids must be accompanied by an executed Fingerprinting Notice and Acknowledgment; Iran Contracting Act Certification, if required by law (see form); Workers' Compensation certification; Contractor Questionnaire, if required (see paragraph 13; and DVBE Certification of Participation and Good Faith Worksheet, if DVBE is required (see paragraph 10).
8. Bids must be accompanied by a certified check, cashier's check, or bidder's bond, for an amount not less than ten percent (10%) of the amount of the base bid, made payable to the order of the Owner. If a bidder's bond accompanies the bid, said bond shall be secured by an Admitted Surety (an insurance organization authorized by the Insurance Commissioner to transact business of insurance in the State of California during this calendar year). The surety insurer must, unless otherwise agreed to by Owner in writing, at the time of issuance of the bond, have a rating not lower than "A-" as rated by A.M. Best Company, Inc. or other independent rating companies. Owner reserves the right to approve or reject the surety insurer selected by Contractor and to require Contractor to obtain a bond from a surety insurer satisfactory to the Owner. Said check or bond shall be given

as a guarantee that the bidder will enter into the Contract if awarded the Work, and in case of refusal or failure to enter into said Contract, the check or bond, as the case may be, shall be payable to the Owner and retained as liquidated damages.

9. Bids shall be sealed and filed as indicated in the Notice to Bidders. Irrespective of how a bidder chooses to deliver the bid and other documents to the Owner, the bidder is responsible for ensuring that the bid and other documents are actually received at the location designated in the Contract Documents for receipt of the bid and other documents prior to the time for the bid opening. Bids and other documents for any reason not actually received at the designated location prior to the time for the bid opening shall not be opened or considered.
10. **THIS CONTRACT IS SUBJECT TO THE DVBE REQUIREMENTS OF EDUCATION CODE SECTION 17076.11.**
11. Contractor shall maintain its license in good standing through Completion of the Work and all applicable warranty periods. Owner reserves the right to reject any bid as nonresponsive if bidder or any subcontractor is not licensed in good standing from the time the bid is submitted to Owner up to award of the Contract, whether or not the bidder listed the subcontractor inadvertently, or if a listed subcontractor's license is suspended or expires prior to award of the Contract. Owner also reserves the right to reject any bid as nonresponsive if a listed subcontractor's license is not in good standing to perform the work for which it is listed from the time of submission of the bidder's bid to award of the Contract.
12. The Owner reserves the right to waive any irregularity and to reject any or all bids.
13. No Contractor Questionnaire is required to be submitted with a bid on this Contract.
14. To summarize, each bid for the Contract must include the following documents:
  - a. Bid form
  - b. Bid security
  - c. Designation of Subcontractors
  - d. Non-Collusion Declaration
  - e. Sufficient Funds Declaration
  - f. Fingerprinting Notice and Acknowledgement
  - g. Iran Contracting Act Certification, if required by law
  - h. Workers' Compensation Certification
  - i. Contractor Questionnaire, if required
  - j. DVBE Participation Certification, if required
  - k. DVBE Good Faith Worksheet, if required

**WITHDRAWAL OF BIDS:** Bids may be withdrawn by bidders prior to the time fixed for the submittal of bids or any authorized postponement thereof. A successful bidder shall not be relieved of the bid unless by consent of the Owner or bidder's recourse to Public Contract Code §5100 et seq.

Unless otherwise required by law, no bidder may withdraw its bid for a period of sixty (60) days after the date set for the opening thereof or any extension thereof. The owner reserves the right to take more than sixty (60) days to make a decision regarding rejection of the bid or award of the Contract.

**OPENING OF BIDS:** Opening of bids shall be as soon after the hour set as will be possible; opening and declaration to be as set forth in the Notice to Bidders. Any and all bidders will be permitted to attend.

**EXAMINATION OF CONTRACT DOCUMENTS AND SITE:** Before submitting a bid, bidders shall examine the drawings, read the specifications, the form of Agreement between Contractor and Owner, and the other Contract Documents. Bidders shall visit the site of the proposed Work, examine the building, or buildings, if any, and any work that may have been done thereon. Bidders shall fully inform themselves of all conditions, in, at, and about the site, the building or buildings, if any, and any work that may have been done thereon.

Pursuant to Public Contract Code section 1104: 1) bidders shall not be required to assume responsibility for the completeness and accuracy of architectural or engineering plans and specifications, except on clearly designated design build projects; 2) however, bidders shall be required to review architectural or engineering plans and specifications prior to submission of their bids and to report any errors and omissions to the Architect or Owner; and 3) the review shall be confined to the bidder's capacity as a bidder and not as a licensed design professional.

**FORM OF AGREEMENT BETWEEN OWNER AND CONTRACTOR:** The form of Agreement between Owner and Contractor which the successful bidder will be required to execute, if awarded the Work, is a part of this Bid Package.

**ADDENDA OR BULLETINS:** Any addenda or bulletins, issued during the time of bidding, shall form a part of the drawings and specifications loaned to the bidder for the preparation of its bid, shall be covered in the bid, and shall be made a part of the Contract Documents. All addenda or bulletins shall be signed by the Architect and approved by the Division of State Architect.

**EVIDENCE OF RESPONSIBILITY:** Upon the request of Owner, a bidder shall submit promptly to the Owner or its designee satisfactory evidence showing the bidder's financial resources, the bidder's experience in the type of work required by the Owner, the bidder's organization available for the performance of the Contract, and any other required evidence of the bidder's or its subcontractor's qualifications to perform the proposed Contract. The Owner may consider such evidence before making its decision

awarding the proposed Contract. Failure to submit evidence of the bidder's or its subcontractors' responsibility to perform the proposed Contract may result in rejection of the bid.

**AWARD OF CONTRACT:** Rejection of any or all bids, to contract work with whomever and in whatever manner, to abandon work entirely, and/or to waive any informality in receiving of bids is reserved as the right of the Owner. Before the Contract is awarded, the Owner may at its sole discretion, require from the proposed Contractor on the Project further evidence of the reasonable qualifications of such contractor to faithfully, capably, and reasonably perform such proposed Contract and may consider such evidence before making its decision on the award of such proposed Contract.

The Contract shall be awarded to the lowest responsible and responsive bidder as interpreted by the Owner under California law and as specified herein and shall be entered into by the successful bidder within ten (10) days after mailing, faxing or delivery of the Notice of Award of Contract. Owner reserves the right, without any liability, to cancel the award of any bid for any reason at any time before the full execution of the Agreement between Owner and Contractor.

**EXECUTION OF AGREEMENT BETWEEN OWNER AND CONTRACTOR:**

The Agreement between Owner and Contractor shall be signed by the successful bidder in as many originals as the Owner deems necessary and returned, together with the required Contract bonds, insurance certificates, additional insured endorsement, declarations page, a Public Contract Code section 3006(a) Roof Project Certification, if required, Drug-Free Workplace Certification, and Independent Contractor Student Contact Form, within ten (10) days after receipt of the notice of award of the Contract. If the ten (10) day period would expire after the date for commencement of the Work, Contractor must submit the documents before the date of commencement of the Work. If the successful bidder does not comply with this paragraph, Owner may revoke and/or cancel the award to the successful bidder and award the Contract to the next lowest bidder, or may otherwise proceed as allowed by law. A Roof Project Certification is not required if (1) the Owner has ADA (average daily attendance) of 2,500 or less, or (2) the Work involves repair of 25% or less of the roof, or costs \$21,000 or less.

**CONTRACT BONDS:** As required by the Contract Documents, two bonds, as itemized below and in the forms presented in these Contract Documents, shall be furnished by the successful bidder on the Project at the time of entering into the Contract and filed with the Owner before the successful bidder commences any Work. They shall be in the form of surety bonds issued by Admitted Surety insurers (an insurance organization authorized by the Insurance Commissioner to transact business of insurance in the State of California during this calendar year). The surety insurers must, unless otherwise agreed to by Owner in writing, at the time of issuance of the bond, have a rating not lower than "A-" as rated by A.M. Best Company, Inc. or other independent rating companies. Owner reserves the right to approve or reject the surety insurers selected by Contractor and to require Contractor to obtain bonds from surety insurers satisfactory to the Owner.



**Performance Bond** in the amount of one hundred percent (100%) of the Contract Sum to insure Owner during construction, and for one year after Completion and during any warranty or guaranty period, against faulty or improper materials or workmanship and to assure Owner of full and prompt performance of the Contract.

**Payment Bond** (Labor and Material) in the amount of one hundred percent (100%) of the Contract Sum in accordance with the laws of the State of California to secure payment of any and all claims for labor and materials used or consumed in performance of this Contract.

**SUBSTITUTION OF MATERIALS:** The Contractor must ensure that the proposed substitutions by the Contractor or its subcontractors are submitted to the Owner and Architect a minimum of twenty-one (21) calendar days prior to the bid opening for review and possible approval of any equipment or materials thought to be equal to or better than those specified in the drawings or specifications. An addendum may be issued prior to bid opening, including all equipment and materials deemed equivalent to those specified and approved by the Architect. Submittals shall include comparative spec-data of the specified equipment or material and the proposed substitution as set forth in the Contract Documents. Submittals without this information will be automatically rejected.

**PAYMENTS:** Payments to the Contractor on account of the Contract shall be made in accordance with the terms of the Contract Documents.

**TAXES:** The Owner is generally exempt from payment of Federal Excise Tax on materials. The Owner will furnish exemption certificates to the Contractor to be used to obtain materials ordinarily subject to Federal Excise Tax without payment of the tax. Bidder shall deduct Federal Excise Taxes from their bid prices before submitting bids, so that such taxes will not be included in the Contract Sum.

**EARLY TERMINATION:** Notwithstanding any provision herein to the contrary, if for any fiscal year of this Contract the governing body of the Owner fails to appropriate or allocate funds for future periodic payments under the Contract after exercising reasonable efforts to do so, the Owner may upon thirty (30) days' notice, order Work on the Project to cease. The Owner will remain obligated to pay for the Work already performed but shall not be obligated to pay the balance remaining unpaid beyond the fiscal period for which funds have been appropriated or allocated and for which the Work has not been done.

**TIME OF COMPLETION AND LIQUIDATED DAMAGES:** The Contract Time shall be One Hundred and Ten (110) calendar days. See Article III of the Agreement.

Liquidated damages for delay in Completion of the Work within the Contract Time will accrue and may be assessed as provided in the Contract Documents, including Article III of the Agreement and Article 8 of the General Conditions.



# **BID FORM**

TULARE CITY SCHOOL DISTRICT  
District Office  
600 North Cherry St.  
Tulare, CA 93274

Dear Board Members:

The undersigned doing business under the firm name of:

\_\_\_\_\_ hereby propose and agree to enter into a Contract, to furnish any and all labor, materials, applicable taxes, equipment and services for the Completion of Work described hereinafter and in the Contract Documents:

**LIVE OAK MIDDLE SCHOOL LOCKER ROOM REMODEL**

prepared by:

TETER, LLP  
7535 N. Palm Ave., Suite 201  
Fresno, CA 93711

for the amount of \_\_\_\_\_ Dollars (\$\_\_\_\_\_).

The low bid shall be determined as described in the Notice to Bidders.

If written notice of the Award of Contract is mailed, faxed, or delivered to the undersigned at any time before this bid is withdrawn, the undersigned shall, within ten (10) days after the date of such mailing, faxing, or delivering of such notice, execute and deliver an agreement in the form of agreement present in these Contract Documents and give Performance and Payment Bonds in accordance with the specifications and bid as accepted.

The undersigned hereby designates as the office to which such Notice of Award of Contract may be mailed, faxed, or delivered:

\_\_\_\_\_  
\_\_\_\_\_

Our Public Liability and Property Damage Insurance is placed with:

\_\_\_\_\_  
\_\_\_\_\_

Our Workers' Compensation Insurance is placed with:

\_\_\_\_\_  
\_\_\_\_\_

Circular letters, bulletins, addenda, etc., bound with the specifications or issued during the time of bidding are included in the bid, and, in Completing the Contract, they are to become a part thereof.

The receipt of the following addenda to the specifications is acknowledged:

Addendum No. \_\_\_\_\_ Date \_\_\_\_\_ Addendum No. \_\_\_\_\_ Date \_\_\_\_\_

Addendum No. \_\_\_\_\_ Date \_\_\_\_\_ Addendum No. \_\_\_\_\_ Date \_\_\_\_\_

Addendum No. \_\_\_\_\_ Date \_\_\_\_\_ Addendum No. \_\_\_\_\_ Date \_\_\_\_\_

This bid may be withdrawn at any time prior to the scheduled time for the opening of bids or any authorized postponement thereof.

A bidder shall not submit a bid unless the bidder's California contractor's license number appears clearly on the bid, the license expiration date and class are stated, and the bid contains a statement that the representations made therein are made under penalty of perjury. Any bid submitted by a contractor who is not licensed pursuant to Business and Professions Code section 7028.15 shall be considered nonresponsive and shall be rejected. Any bid not containing the above information may be considered nonresponsive and may be rejected.

**NOTE:** Each bid must give the full business address of the bidder and be signed by bidder with bidder's usual signature. Bids by partnerships must furnish the full name of all partners and must be signed in the partnership name by a general partner with authority to bind the partnership in such matters, followed by the signature and designation of the person signing. The name of the person signing shall also be typed or printed below the signature. Bids by corporations must be signed with the legal name of the corporation, followed by the name of the state of incorporation and by the signature and designation of the chairman of the board, president or any vice president, and then followed by a second signature by the secretary, assistant secretary, the chief financial officer or assistant treasurer. All persons signing must be authorized to bind the corporation in the matter. The name of each person signing shall also be typed or printed below the signature. Satisfactory evidence of the authority of the officer signing on behalf of a corporation shall be furnished.

The undersigned declares under penalty of perjury under the laws of the State of California that the representations made in this bid are true and correct.

Print or Type Name: \_\_\_\_\_

Title: \_\_\_\_\_

Name of Company as Licensed: \_\_\_\_\_

Business Address: \_\_\_\_\_

Telephone Number: \_\_\_\_\_

California Contractor License No.: \_\_\_\_\_

Class and Expiration Date: \_\_\_\_\_

Public Works Contractor Registration No. (if applicable): \_\_\_\_\_

State of Incorporation, if Applicable: \_\_\_\_\_

( ) Evidence of authority to bind corporation is attached.

Dated: \_\_\_\_\_, \_\_\_\_\_

Signed: \_\_\_\_\_



# **DESIGNATION OF SUBCONTRACTORS**

TULARE CITY SCHOOL DISTRICT  
District Office  
600 North Cherry St.  
Tulare, CA 93274

Each bidder shall set forth below the name and the location of the place of business of each subcontractor and the California contractor license number, and public works contractor registration number (for all projects over Twenty-five Thousand Dollars (\$25,000)), of each subcontractor who will perform work or labor or render service to the Contractor in or about the construction of the Work or improvement, or to a subcontractor licensed by the State of California who, under subcontract to the Contractor, specially fabricates and installs a portion of the Work or improvement according to detailed drawings contained in the plans and specifications, in an amount in excess of one-half of 1 percent (0.5%) of the bidder's total bid, and the portion of the Work which will be done by each subcontractor. An inadvertent error in listing a California contractor's license number shall not be grounds for filing a bid protest or for considering the bid nonresponsive if the bidder submits the corrected contractor's license number to the Owner within 24 hours after the bid opening, or any continuation thereof, so long as the corrected contractor's license number corresponds to the submitted name and location for that subcontractor. If the Contractor fails to specify a subcontractor for any portion of the Work to be performed under the Contract in excess of one-half of 1 percent (0.5%) of the Contractor's total bid, the Contractor shall be deemed to have agreed to perform such portion itself, and shall not be permitted to subcontract that portion of the Work except under the conditions hereinafter set forth.

Subletting or subcontracting of any portion of the Work as to which no subcontractor was designated in the original bid shall only be permitted in cases of public emergency or necessity, and then only after a finding reduced to writing as a public record of the legislative body of the Owner.

For all projects over Twenty-five Thousand Dollars (\$25,000): for any bid proposal submitted and for any contract for public work entered into, an inadvertent error in listing a subcontractor who is not registered under Labor Code section 1725.5 shall not be grounds for filing a bid protest or grounds for considering the bid nonresponsive, provided that either: the subcontractor is registered prior to the bid opening; or the subcontractor is registered and has paid the penalty registration fee specified in Labor Code section 1725.5(a)(2)(E), if applicable, within 24 hours after the bid opening; or the subcontractor is replaced by another registered subcontractor under Public Contract Code section 4107. Failure of a listed subcontractor to be registered shall be grounds under Public Contract Code section 4107 for the Contractor, with the Owner's consent, to substitute a registered subcontractor for the unregistered subcontractor.

Failure to provide this information in a legible manner may result in the rejection of an otherwise acceptable bid.

**NOTE:** *Reproduce page two of this section for additional listings needed beyond the length of this form.*

<b>Portion of Work</b>	<b>Name of Subcontractor &amp; Phone No.</b>	<b>Location of Subcontractor</b>	<b>California Contractor License Number</b>	<b>Public Works Contractor Registration Number (if applicable)</b>

I am the authorized representative of the Bidder submitting this Designation of Subcontractors and I declare that each subcontractor listed holds a valid and current contractor license in good standing in California to perform the portion of work for which the subcontractor is listed.

I declare under penalty of perjury under the laws of the State of California that the foregoing is true and correct and that this declaration is executed on \_\_\_\_\_, 2021, at \_\_\_\_\_[city],\_\_\_\_\_ [state].

Signature: \_\_\_\_\_

Print Name: \_\_\_\_\_

Title: \_\_\_\_\_



# **BID BOND**

TULARE CITY SCHOOL DISTRICT

District Office  
600 North Cherry St.  
Tulare, CA 93274

KNOW ALL MEN BY THESE PRESENTS that we the undersigned \_\_\_\_\_ as Principal and \_\_\_\_\_ as Surety, are hereby held and firmly bound unto the TULARE CITY SCHOOL DISTRICT "Owner" in the sum of \_\_\_\_\_ Dollars (\$\_\_\_\_\_) for payment of which sum, well and truly to be made, we hereby jointly and severally bind ourselves, our heirs, executors, administrators, successors and assigns.

The condition of the above obligation is such that whereas the Principal has submitted to the Owner a certain bid, attached hereto and hereby made a part hereof, to enter into a Contract in writing for the construction of \_\_\_\_\_ in strict accordance with Contract Documents.

NOW, THEREFORE,

- a. If said bid shall be rejected, or, in the alternative;
- b. If said bid shall be accepted and the Principal shall execute and deliver a contract in the form of agreement attached hereto and shall execute and deliver Performance and Payment Bonds in the forms attached hereto (all properly completed in accordance with said bid), and shall in all other respects perform the agreement created by the acceptance of said bid;

Then this obligation shall be void, otherwise the same shall remain in full force and effect, it being expressly understood and agreed that the liability of the Surety for any and all default of the Principal hereunder shall be the amount of this obligation as herein stated.

Surety, for value received, hereby stipulates and agrees that no change, extension of time, alteration or addition to the terms of the Contract on the call for bids, or to the Work to be performed hereunder, or the specifications accompanying the same, shall in any way affect its obligation under this bond, and it does hereby waive notice of any such change, extension of time, alteration or addition to the terms of said Contract or the call for bids, or to the Work, or to the specifications.

IN WITNESS WHEREOF, the above-bounden parties have executed this instrument under several seals this \_\_\_\_ day of \_\_\_\_\_, \_\_\_\_\_, the name and corporate party being hereto affixed and these presents duly signed by its

undersigned representative, pursuant to authority of its governing body. In the presence of:

(Notary Seal)

\_\_\_\_\_  
(Principal)

\_\_\_\_\_  
(Business Address)

\_\_\_\_\_

\_\_\_\_\_  
(Corporate Surety)

\_\_\_\_\_  
Business Address)

By: \_\_\_\_\_

\_\_\_\_\_

The rate or premium of this bond is \_\_\_\_\_ per thousand, the total amount of premium charged, \$\_\_\_\_\_.

(The above must be filled in by Corporate Surety).

# NONCOLLUSION DECLARATION

TULARE CITY SCHOOL DISTRICT  
District Office  
600 North Cherry St.  
Tulare, CA 93274

*Note: This document must be executed and submitted with the bid.*

Owner: **Tulare City School District**

Contract for: **Live Oak Middle School Locker Room Remodel Project**

The undersigned declares:

I am the \_\_\_\_\_ of \_\_\_\_\_, the party making the foregoing bid.

The bid is not made in the interest of, or on behalf of, any undisclosed person, partnership, company, association, organization, or corporation. The bid is genuine and not collusive or sham. The bidder has not directly or indirectly induced or solicited any other bidder to put in a false or sham bid. The bidder has not directly or indirectly colluded, conspired, connived, or agreed with any bidder or anyone else to put in a sham bid, or to refrain from bidding. The bidder has not in any manner, directly or indirectly, sought by agreement, communication, or conference with anyone to fix the bid price of the bidder or any other bidder, or to fix any overhead, profit, or cost element of the bid price, or of that of any other bidder. All statements contained in the bid are true. The bidder has not, directly or indirectly, submitted his or her bid price or any breakdown thereof, or the contents thereof, or divulged information or data relative thereto, to any corporation, partnership, company, association, organization, bid depository, or to any member or agent thereof, to effectuate a collusive or sham bid, and has not paid, and will not pay, any person or entity for such purpose.

Any person executing this declaration on behalf of a bidder that is a corporation, partnership, joint venture, limited liability company, limited liability partnership, or any other entity, hereby represents that he or she has full power to execute, and does execute, this declaration on behalf of the bidder.

I declare under penalty of perjury under the laws of the State of California that the foregoing is true and correct and that this declaration is executed on \_\_\_\_\_, 2021, at \_\_\_\_\_ [city], \_\_\_\_\_ [state].

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Print Name



# WORKERS' COMPENSATION CERTIFICATE

TULARE CITY SCHOOL DISTRICT  
District Office  
600 North Cherry St.  
Tulare, CA 93274

Labor Code Section 3700, in relevant part, provides:

"Every employer except the state shall secure the payment of compensation in one or more of the following ways:

(a) By being insured against liability to pay compensation in one or more insurers duly authorized to write compensation insurance in this state.

(b) By securing from the Director of Industrial Relations a certificate of consent to self-insure either as an individual employer or as one employer in a group of employers. Said certificate may be given upon furnishing proof satisfactory to the Director of Industrial Relations of ability to self-insure and to pay any compensation that may become due to his or her employees, ... "

I am aware of the provisions of the Labor Code Section 3700 which require every employer to be insured against liability for workers' compensation or to undertake self-insurance in accordance with the provisions of that code, and I will comply with such provisions before commencing the performance of the work of this contract. I shall supply the Owner with certificates of insurance evidencing that Workers' Compensation Insurance is in effect and providing that the Owner will receive thirty (30) days' notice of cancellation.

---

Name of Contractor

---

Signature

---

Print Name

---

Date

(In accordance with Article 5 (commencing at Section 1860), Chapter 1, Part 7, Division 2 of the Labor Code, the above certificate must be signed and filed with the awarding body prior to performing any work under the contract.)



**PRIME BIDDER CERTIFICATION OF DISABLED VETERAN BUSINESS ENTERPRISE PARTICIPATION**

*To be completed by the Prime Bidder*

**PART I – IDENTIFICATION INFORMATION**

BIDDER'S NAME	BUSINESS ADDRESS	TELEPHONE NUMBER
SCHOOL DISTRICT	COUNTY	APPLICATION NO.

**PART II – METHOD OF COMPLIANCE WITH DVBE PARTICIPATION GOALS** – Include this form and any other applicable documents listed in this table with your bid/proposal. Read the three columns in the table below as sentences from left to right. Check the appropriate box to indicate your method of committing the contract dollar amount.

**NOTE:** *Architectural, engineering, environmental, land surveying or construction management firms must indicate their method of compliance by marking the appropriate box A, B, C, or D after selection by the District and before the contract is signed.*

<b>YOUR BUSINESS ENTERPRISE</b>	<b>AND YOU</b>	<b>AND YOU</b>
<b>A.</b> <input type="checkbox"/> <i>is Disabled Veteran owned and your forces, will perform at least 3 percent of this contract</i>	<i>will include a copy of your DVBE letter from the Office of Small Business and Disabled Veteran Business Enterprise Services (OSDS).</i>	
<b>B.</b> <input type="checkbox"/> <i>is Disabled Veteran owned <b>but is unable</b> to perform the 3 percent of this contract with your forces</i>	<i>will use DVBE subcontractors/ suppliers to bring the contract participation to at least 3 percent</i>	<i>will include a copy of each DVBE's letter from OSDS (including yours, if applicable).</i>
<b>C.</b> <input type="checkbox"/> <i>is <b>not</b> Disabled Veteran owned</i>	<i>will use DVBE subcontractors/ suppliers for at least 3 percent of this contract</i>	
<b>D.</b> <input type="checkbox"/> <i>is unable to meet the required participation goals</i>	<i>will complete a Good Faith Effort to obtain DVBE participation</i>	<i>will include the Prime Bidder's Good Faith Effort Worksheet.</i>

**Note:** An Office of Small Business and Disabled Veteran Business Enterprise Services (OSDS) letter must be attached for each DVBE participating in the contract. The DVBE letter is obtained by application through the OSDS and must be provided at the time of bid opening. If the letter is not provided, the bid may be deemed nonresponsive and may be ineligible for award of the contract.

*Continued on reverse side*

**PART III – DVBE DOLLAR PARTICIPATION OF BID/PROPOSAL** – *Architectural, engineering, environmental, land surveying or construction management firms complete this part **after** selection by the district and before the contract is signed.*

Show deductive alternate(s) in parenthesis. For more alternates/base bids, use a separate page to show items.

- A. If your business enterprise is a DVBE, list in the appropriate column the total dollar amount of your bid to be performed by your own participation.
- B. List all your DVBE subcontractors/suppliers. Enter in the appropriate column the dollar amount for each of your subcontractors/suppliers.
- C. Enter the total of Lines A and B for each column.
- D. Enter the dollar amount of the bid/proposal to be performed by **non-DVBE** firms. Note: This line is the sum of the prime and subcontractor(s) **non-DVBE** dollar participation.
- E. Enter the sum of the column totals from Line C and Line D. Note: Please be aware that the final determination of DVBE compliance is made based on the contract amount resulting from the district’s acceptance or rejection of alternates.

	<b>BASE BID/PROPOSAL</b>	<b>ALTERNATE #1</b>	<b>ALTERNATE #2</b>	<b>ALTERNATE #3 OR BASE BID B</b>	<b>ALTERNATE #4 OR BASE BID C</b>	<b>ALTERNATE #5 (Modernization or Reconstruction Only)</b>
A. Prime Bidder, <i>if DVBE (own participation)</i>	\$	\$	\$	\$	\$	\$
B. DVBE Subcontractor or Supplier						
1.						
2.						
3.						
4.						
C. Subtotal (A & B)						
D. Non-DVBE						
E. Total Bid						



# PRIME BIDDER GOOD FAITH EFFORT WORKSHEET

*This worksheet is to be used to assist the Prime Bidder in meeting the 3% DVBE participation goal*

PAGE 1 OF 2

BIDDER'S NAME	BUSINESS ADDRESS	CONTACT PERSON
TELEPHONE NUMBER	OWNER	COUNTY

### GENERAL INSTRUCTIONS:

This worksheet is to be used to assist you in meeting the 3 percent DVBE participation goal. If specific information is not provided for Parts I through III, you do not meet the test of the "Good Faith Effort" and cannot so certify. If you are qualifying based on a "Good Faith Effort" you must include this form with your bid/proposal to the Owner.

### PART I – CONTACTS

To identify DVBE subcontractors/suppliers for participation in your bid/proposal, contact must be made with each of the following categories. It is recommended that you contact several DVBE organizations.

CATEGORY	TELEPHONE NUMBER	DATE CONTACTED	PERSON CONTACTED
1. Owner			
2. Office of Small Business and Disabled Veteran Business Enterprise Services (OSDS). OSDS provides assistance locating DVBEs at <a href="https://caleprocure.ca.gov/pages/PublicSearch/supplier-search.aspx">https://caleprocure.ca.gov/pages/PublicSearch/supplier-search.aspx</a> .	(916) 375-4940		
3. DVBE Organizations ( <i>List</i> ):			
4. Write "recorded message" in this column, if applicable.			

**PART II – ADVERTISEMENTS** You must make at least two (2) advertisements, one (1) in a paper that focuses on DVBE and one (1) in a trade paper. Advertisements should be published at least 14 days prior to bid/proposal opening; if you cannot advertise 14 days prior, advertise as soon as possible and provide an explanation. (Advertisements must be published in time to allow for a reasonable response). Advertisements must include that your firm is seeking DVBE participation, the project name and location, your firm’s name, your firm’s contact person, and phone number.

*Attach copies of advertisements to this form.*

FOCUS/TRADE PAPER NAME	CHECK ONE		DATE OF ADVERTISEMENT
	TRADE	FOCUS	

**PART III – DVBE SOLICITATIONS** List DVBE subcontractors/suppliers that were invited to bid. Use the following instructions to complete the remainder of this section (read the three columns as a sentence from left to right). If you need additional space to list DVBE solicitations, please use a separate page and attach to this form.

IF THE DVBE.....	THEN.....	AND.....		
Was selected to participate	Check "yes" in the "SELECTED" column, include the applicable dollar amount in Part III of the Prime Bidder Certification	Include a copy of their DVBE letter from OSDS.		
Was <b>not</b> selected to participate	Check "no" in the "SELECTED" column	State why in the "REASON NOT SELECTED" column.		
Did not respond to your solicitation	Check the "NO RESPONSE" column			
DISABLED VETERANS BUSINESS ENTERPRISES CONTACTED	SELECTED		REASON NOT SELECTED <i>This section must be completed</i>	NO RESPONSE
	YES	NO		

**IMPORTANT NOTE:**

Please be aware that certification of the "Good Faith Effort" may only be made if you fully complete Parts I, II, and III on both sides of this form. A copy of this form must be retained by you and may be subject to a future audit.

**CERTIFICATION**

I, \_\_\_\_\_ certify that I am the bidder's Chief Executive Officer and that I have made a diligent effort to ascertain the facts with regard to the representations made herein. In making this certification, I am aware of Section 12650 et seq. of the Government Code providing for the imposition of treble damages for making false claims.

SIGNATURE OF CHIEF EXECUTIVE OFFICER	DATE
--------------------------------------	------

# **SUFFICIENT FUNDS DECLARATION**

(Labor Code section 2810)

TULARE CITY SCHOOL DISTRICT

District Office  
600 North Cherry St.  
Tulare, CA 93274

*Note: This document must be executed and submitted with the bid.*

Owner: **Tulare City School District**

Contract for: **Live Oak Middle School Locker Room Remodel Project**

I, \_\_\_\_\_, declare that I am the \_\_\_\_\_ of \_\_\_\_\_, the entity making and submitting the bid for the above Project that accompanies this Declaration, and that such bid includes sufficient funds to permit \_\_\_\_\_ [insert name of entity] to comply with all local, state or federal labor laws or regulations during the performance of the Contract for the Project, including payment of prevailing wage, and that \_\_\_\_\_ [the entity] will comply with the provisions of Labor Code section 2810(d) if awarded the Contract.

I declare under penalty of perjury under the laws of the State of California that the foregoing is true and correct and executed on \_\_\_\_\_ 2021, at \_\_\_\_\_ [city], \_\_\_\_\_ [state].

Date: \_\_\_\_\_  
Signature

Print Name: \_\_\_\_\_ Print Title: \_\_\_\_\_



# **FINGERPRINTING NOTICE AND** **ACKNOWLEDGMENT**

(Education Code Section 45125.2(a))

TULARE CITY SCHOOL DISTRICT  
District Office  
600 North Cherry St.  
Tulare, CA 93274

***Note: This document must be executed and submitted with the bid.***

Business entities entering into contracts with the Owner for the construction, reconstruction, rehabilitation or repair of a facility must comply with Education Code sections 45125.1 and 45125.2. Such entities are responsible for ensuring full compliance with the law and should therefore review all applicable statutes and regulations. The following information is provided simply to assist such entities with compliance with the law.

1. If the Owner determines your employee(s) or you as a sole proprietorship will have more than limited contact with students, then you must take one or more of the following steps:
  - a. Install a physical barrier at the worksite to limit contact with pupils.
  - b. Have an employee (if not a sole proprietorship), who the Department of Justice has ascertained has not been convicted of a violent or serious felony, continually monitor and supervise employees. The entity shall verify in the Independent Contractor Student Contact Form to the Owner that the employee charged with monitoring and supervising its employees has no such convictions. (See attached.)
  - c. Arrange, with Owner's approval, for surveillance by Owner's personnel.

If one or more of these steps is taken, you are not required to comply with Education Code section 45125.1.

2. If you are providing the services in an emergency or exceptional situation, you are not required to comply with Education Code section 45125.2. An "emergency or exceptional" situation is one in which pupil health or safety is endangered or when repairs are needed to make a facility safe and habitable. Owner shall determine whether an emergency or exceptional situation exists.

**[Signature Page Follows]**

I have read the foregoing and agree to comply with the requirements of Education Code §§ 45125.1 and 45125.2 as applicable.

Dated: \_\_\_\_\_

\_\_\_\_\_  
Signature

Name: \_\_\_\_\_

Title: \_\_\_\_\_

# ATTACHMENT

## TULARE CITY SCHOOL DISTRICT

District Office  
600 North Cherry St.  
Tulare, CA 93274

Under Education Code section 45125.1, no employee of a contractor or subcontractor, and no sole proprietor, who has been convicted of or has criminal proceedings pending for a violent or serious felony may come into contact with any student. A violent felony is any felony listed in subdivision (c) of Section 667.5 of the Penal Code. Those felonies are presently defined as:

- (1) Murder or voluntary manslaughter.
- (2) Mayhem.
- (3) Rape as defined in paragraph (2) or (6) of subdivision (a) of Section 261 or paragraph (1) or (4) of subdivision (a) of Section 262.
- (4) Sodomy as defined in subdivision (c) or (d) of Section 286.
- (5) Oral copulation as defined in subdivision (c) or (d) of Section 288a.
- (6) Lewd or lascivious act as defined in subdivision (a) or (b) of Section 288.
- (7) Any felony punishable by death or imprisonment in the state prison for life.
- (8) Any felony in which the defendant inflicts great bodily injury on any person other than an accomplice which has been charged and proved as provided for in Section 12022.7, 12022.8, or 12022.9 on or after July 1, 1977, or as specified prior to July 1, 1977, in Sections 213, 264, and 461, or any felony in which the defendant uses a firearm which use has been charged and proved as provided in subdivision (a) of Section 12022.3, or Section 12022.5 or 12022.55.
- (9) Any robbery.
- (10) Arson, in violation of subdivision (a) or (b) of Section 451.
- (11) Sexual penetration as defined in subdivision (a) or (j) of Section 289.
- (12) Attempted murder.
- (13) A violation of Section 18745, 18750, or 18755.
- (14) Kidnapping.

- (15) Assault with the intent to commit a specified felony, in violation of Section 220.
- (16) Continuous sexual abuse of a child, in violation of Section 288.5.
- (17) Carjacking, as defined in subdivision (a) of Section 215.
- (18) Rape, spousal rape, or sexual penetration, in concert, in violation of Section 264.1.
- (19) Extortion, as defined in Section 518, which would constitute a felony violation of Section 186.22 of the Penal Code.
- (20) Threats to victims or witnesses, as defined in Section 136.1, which would constitute a felony violation of Section 186.22 of the Penal Code.
- (21) Any burglary of the first degree, as defined in subdivision (a) of Section 460, wherein it is charged and proved that another person, other than an accomplice, was present in the residence during the commission of the burglary.
- (22) Any violation of Section 12022.53.
- (23) A violation of subdivision (b) or (c) of Section 11418.

A serious felony is any felony listed in subdivision (c) Section 1192.7 of the Penal Code. Those felonies are presently defined as:

- (1) Murder or voluntary manslaughter; (2) Mayhem; (3) Rape; (4) Sodomy by force, violence, duress, menace, threat of great bodily injury, or fear of immediate and unlawful bodily injury on the victim or another person; (5) Oral copulation by force, violence, duress, menace, threat of great bodily injury, or fear of immediate and unlawful bodily injury on the victim or another person; (6) Lewd or lascivious act on a child under the age of 14 years; (7) Any felony punishable by death or imprisonment in the state prison for life; (8) Any felony in which the defendant personally inflicts great bodily injury on any person, other than an accomplice, or any felony in which the defendant personally uses a firearm; (9) Attempted murder; (10) Assault with intent to commit rape, or robbery; (11) Assault with a deadly weapon or instrument on a peace officer; (12) Assault by a life prisoner on a non-inmate; (13) Assault with a deadly weapon by an inmate; (14) Arson; (15) Exploding a destructive device or any explosive with intent to injure; (16) Exploding a destructive device or any explosive causing bodily injury, great bodily injury, or mayhem; (17) Exploding a destructive device or any explosive with intent to murder; (18) Any burglary of the first degree; (19) Robbery or bank robbery; (20) Kidnapping; (21) Holding of a hostage by a person confined in a state prison; (22) Attempt to commit a felony punishable by death or imprisonment in the state prison for life; (23) Any felony in which the



defendant personally used a dangerous or deadly weapon; (24) Selling, furnishing, administering, giving, or offering to sell, furnish, administer, or give to a minor any heroin, cocaine, phencyclidine (PCP), or any methamphetamine-related drug, as described in paragraph (2) of subdivision (d) of Section 11055 of the Health and Safety Code, or any of the precursors of methamphetamines, as described in subparagraph (A) of paragraph (1) of subdivision (f) of Section 11055 or subdivision (a) of Section 11100 of the Health and Safety Code; (25) Any violation of subdivision (a) of Section 289 where the act is accomplished against the victim's will by force, violence, duress, menace, or fear of immediate and unlawful bodily injury on the victim or another person; (26) Grand theft involving a firearm; (27) carjacking; (28) any felony offense, which would also constitute a felony violation of Section 186.22; (29) assault with the intent to commit mayhem, rape, sodomy, or oral copulation, in violation of Section 220; (30) throwing acid or flammable substances, in violation of Section 244; (31) assault with a deadly weapon, firearm, machine gun, assault weapon, or semiautomatic firearm or assault on a peace officer or firefighter, in violation of Section 245; (32) assault with a deadly weapon against a public transit employee, custodial officer, or school employee, in violation of Sections 245.2, 245.3, or 245.5; (33) discharge of a firearm at an inhabited dwelling, vehicle, or aircraft, in violation of Section 246; (34) commission of rape or sexual penetration in concert with another person, in violation of Section 264.1; (35) continuous sexual abuse of a child, in violation of Section 288.5; (36) shooting from a vehicle, in violation of subdivision (c) or (d) of Section 26100; (37) intimidation of victims or witnesses, in violation of Section 136.1; (38) criminal threats, in violation of Section 422; (39) any attempt to commit a crime listed in this subdivision other than an assault; (40) any violation of Section 12022.53; (41) a violation of subdivision (b) or (c) of Section 11418; and (42) any conspiracy to commit an offense described in this subdivision.

# INDEPENDENT CONTRACTOR STUDENT CONTACT FORM

TULARE CITY SCHOOL DISTRICT  
District Office  
600 North Cherry St.  
Tulare, CA 93274

*Note: This document must be executed and submitted with the executed Agreement between Owner and Contractor.*

Contractor Name: \_\_\_\_\_  
Supervisor/Foreman Name: \_\_\_\_\_  
Start Date: \_\_\_\_\_  
Completion Date: \_\_\_\_\_  
Location of Work: \_\_\_\_\_  
Hours of Work: \_\_\_\_\_  
Length of Time on Grounds: \_\_\_\_\_  
Number of Employees on the Job: \_\_\_\_\_

Yes No

Employees or sole proprietor will have more than limited contact with students as determined by Owner, or if by Contractor, please explain:

\_\_\_\_\_  
\_\_\_\_\_

If yes, the following steps will be taken to ensure student safety (check):

A physical barrier will be installed at the worksite to limit contact with pupils.

Employees (if not a sole proprietorship) will be continually monitored and supervised by an employee who has not been convicted of a violent or serious felony.

Name of Supervising Employee:

\_\_\_\_\_

Date of Department of Justice verification that supervising employee has not been convicted of a violent or serious felony:

\_\_\_\_\_

Name of employee who is the custodian of the Department of Justice verification information:

\_\_\_\_\_

Owner agrees: Employees or sole proprietor will be surveilled by Owner's personnel.

**[Signature Page Follows]**

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge.

Dated: \_\_\_\_\_

\_\_\_\_\_  
Signature

Typed Name: \_\_\_\_\_

Title: \_\_\_\_\_



# **DRUG-FREE WORKPLACE CERTIFICATION**

TULARE CITY SCHOOL DISTRICT

District Office  
600 North Cherry St.  
Tulare, CA 93274

This Drug-Free Workplace Certification is required pursuant to Government Code Sections 8350 *et seq.*, the Drug-Free Workplace Act of 1990. The Drug-Free Workplace Act of 1990 requires that every person or organization awarded a contract or grant for the procurement of any property or services from any State agency must certify that it will provide a drug-free workplace by doing certain specified acts. In addition, the Act provides that each contract awarded by a State agency may be subject to suspension of payments or termination of the contract, or both, and the contractor may be subject to debarment from future contracting if the state agency determines that specified acts have occurred.

Pursuant to Government Code Section 8355, every person or organization awarded a contract or grant from a State agency shall certify that it will provide a drug-free workplace by doing all of the following:

- (a) Publishing a statement notifying employees that the unlawful manufacture, distribution, dispensation, possession or use of a controlled substance is prohibited in the person's or organization's workplace and specifying actions which will be taken against employees for violations of the prohibition;
- (b) Establishing a drug-free awareness program to inform employees about all of the following:
  - (1) The dangers of drug abuse in the workplace;
  - (2) The person's or organization's policy of maintaining a drug-free workplace;
  - (3) The availability of drug counseling, rehabilitation and employee-assistance programs;
  - (4) The penalties that may be imposed upon employees for drug abuse Violations;
- (c) Requiring that each employee engaged in the performance of the contract or grant be given a copy of the statement required by subdivision (a) and that, as a condition of employment on the contract or grant, the employee agrees to abide by the terms of the statement.

I, the undersigned, agree to fulfill the terms and requirements of Government Code Section 8355 listed above and will publish a statement notifying employees concerning (a) the prohibition of controlled substance at the workplace, (b) establishing a drug-free awareness program, and (c) requiring that each employee engaged in the performance of the contract or grant be given a copy of the statement required by Section 8355(a) and requiring that the employee agree to abide by the terms of that statement.

I also understand that if the Owner determines that I have either (a) made a false certification herein, or (b) violated this certification by failing to carry out the requirements of Section 8355, that the contract or grant awarded herein is subject to suspension of payments, termination, or both. I further understand that should I violate the terms of the Drug-Free Workplace Act of 1990, I may be subject to debarment in accordance with the requirements of Section 8350 *et seq.*

[Signature Page Follows]

I acknowledge that I am aware of the provisions of Government Code Section 8350 *et seq.* and hereby certify that I will adhere to the requirements of the Drug-Free Workplace Act of 1990.

-----  
Name of Contractor

-----  
Signature

-----  
Print Name

-----  
Date

# **IRAN CONTRACTING ACT CERTIFICATION**

(Public Contract Code sections 2202-2208)

TULARE CITY SCHOOL DISTRICT

District Office  
600 North Cherry St.  
Tulare, CA 93274

**Note: This document must be executed and submitted with the bid.**

As required by Public Contract Code (“PCC”) section 2204 for contracts of \$1,000,000 or more, please insert bidder’s or financial institution’s name and Federal ID Number (if available) and complete **one** of the options below. Please note that California law establishes penalties for providing false certifications, including civil penalties equal to the greater of \$250,000 or twice the amount of the contract for which the false certification was made; contract termination; and three-year ineligibility to bid on contracts. (PCC §2205.)

## **OPTION #1 - CERTIFICATION**

I, the official named below, certify I am duly authorized to execute this certification on behalf of the bidder/financial institution identified below, and the bidder/financial institution identified below is **not** on the current list of persons engaged in investment activities in Iran created by California Department of General Services (“DGS”) and is not a financial institution extending twenty million dollars (\$20,000,000) or more in credit to another person/bidder, for 45 days or more, if that other person/bidder will use the credit to provide goods or services in the energy sector in Iran and is identified on the current list of persons engaged in investment activities in Iran created by DGS. (PCC §2204(a).)

<i>Bidder Name/Financial Institution (Printed)</i>		<i>Federal ID Number (or n/a)</i>
<i>By (Authorized Signature)</i>		
<i>Printed Name and Title of Person Signing</i>		
<i>Date Executed</i>	<i>Executed in</i>	

[Continue to next page]

**OPTION #2 – EXEMPTION**

Pursuant to Public Contract Code sections 2203(c) and (d), a public entity may permit a bidder/financial institution engaged in investment activities in Iran, on a case-by-case basis, to be eligible for, or to bid on, submit a proposal for, or enters into or renews, a contract for goods and services. If you have obtained an exemption from the certification requirement under the Iran Contracting Act, please fill out the information below, and attach documentation demonstrating the exemption approval.

<i>Bidder Name/Financial Institution (Printed)</i>	<i>Federal ID Number (or n/a)</i>
<i>By (Authorized Signature)</i>	
<i>Printed Name and Title of Person Signing</i>	<i>Date Executed</i>



**AGREEMENT BETWEEN OWNER AND CONTRACTOR**

This Agreement between Owner and Contractor (the “Agreement”) is effective \_\_\_\_\_, 2021, between Tulare City School District (the “Owner”) and \_\_\_\_\_ (the “Contractor”), each a “Party” and together, the “Parties” to this Agreement.

**WITNESSETH:** That the Contractor and the Owner for the consideration hereinafter named agree as follows:

**ARTICLE I. SCOPE OF WORK.** The Contractor agrees to furnish all labor, equipment and materials, including tools, implements, and appliances required, and to perform all the Work in a good and workmanlike manner, free from any and all liens and claims from mechanics, material suppliers, subcontractors, artisans, machinists, teamsters, freight carriers, and laborers required for:

**LIVE OAK MIDDLE SCHOOL LOCKER ROOM REMODEL AT  
980 N. LASPINA, TULARE, CA**

all in strict compliance with the plans, drawings and specifications therefore prepared by:

TETER, LLP  
7535 N. Palm Ave., Suite 201  
Fresno, CA 93711  
(559) 437-0887

and other Contract Documents relating thereto.

**ARTICLE II. CONTRACT DOCUMENTS.** The Contractor and the Owner agree that all of the documents listed in Article 1.1.1 of the General Conditions form the Contract Documents which form the Contract.

**ARTICLE III. TIME TO COMPLETE AND LIQUIDATED DAMAGES.**

Time is of the essence in this Contract, and the time of Completion for the Work (“the Contract Time”) shall be One Hundred and Ten (110) calendar days from (a) the date of commencement of the Work as established in the Owner’s Notice to Proceed, or (b) if no other date is established in a Notice to Proceed from Owner, the date of Contractor’s actual commencement of the Work (including mobilization).

Failure to Complete the Work within the time and in the manner provided for by the Contract Documents shall subject the Contractor to liquidated damages. The actual occurrence of damages and the actual amount of the damages which the Owner would

suffer if the Work were not Completed within the Contract Time are dependent upon many circumstances and conditions which could prevail in various combinations and, from the nature of the case, it is impracticable and extremely difficult to fix the actual damages. Damages which the Owner would suffer in the event of such delay include, but are not limited to, loss of the use of the Work, disruption of activities, costs of administration and supervision, and the incalculable inconvenience and loss suffered by the public.

Accordingly, the parties agree that the amount herein set forth shall be the amount of damages which the Owner shall directly incur upon failure of the Contractor to Complete the Work within the Contract Time: \$500.00 for each calendar day by which Completion of the Work is delayed beyond the Contract Time as adjusted by Change Orders.

If Contractor causes delay to any other contractor's work on the Project that results in delayed *completion* of the Project, Contractor shall be subject to liquidated damages in the amount set forth above for each calendar day Contractor delayed *completion* of the Project. The actual occurrence of damages and the actual amount of the damages which the Owner would suffer for such delayed *completion* of the Project are dependent upon many circumstances and conditions which could prevail in various combinations and, from the nature of the case, it is impracticable and extremely difficult to fix the actual damages. Damages which the Owner would suffer in the event of such delay include, but are not limited to, loss of the use of the other contractor's work and the Project, disruption of activities, costs of administration and supervision, and the incalculable inconvenience and loss suffered by the public.

Accordingly, the parties agree that the amount set forth herein shall be presumed to be the amount of damages which the Owner shall directly incur for each calendar day that *completion* of the Project is delayed because of Contractor caused delays to the work of other contractors.

For Contractor's obligations regarding claims against Owner from other contractors on the Project alleging that Contractor caused delays to their work, see General Conditions sections 3.7.4, 3.16 and 6.2.3.

If liquidated damages accrue as described above, the Owner, in addition to all other remedies provided by law, shall have the right to assess the liquidated damages at any time, and to withhold liquidated damages (and any interest thereon) at any time from any and all retention or progress payments, which would otherwise be or become due the Contractor. In addition, if it is reasonably apparent to the Owner before liquidated damages begin to accrue that Contractor cannot or will not Complete the Work within the Contract Time, Owner may assess and withhold, from retention or progress payments, the estimated amount of liquidated damages that will accrue in the future. If the retained percentage or withheld progress payments are not sufficient to discharge all liabilities of the Contractor incurred under this Article, the Contractor and its sureties shall continue to remain liable to the Owner until all such liabilities are satisfied in full.

If Owner accepts any work or makes any payment under this Agreement after a default by

reason of delays, the payment or payments shall in no respect constitute a waiver or modification of any Agreement provisions regarding time of Completion and liquidated damages.

**ARTICLE IV. PAYMENT AND RETENTION.** The Owner agrees to pay the Contractor in current funds \_\_\_\_\_ Dollars (\$\_\_\_\_\_) for work satisfactorily performed after receipt of properly documented and submitted Applications for Payment and to make payments on account thereof, as provided in the General Conditions.

**ARTICLE V. CHANGES.** Changes in this Agreement or in the Work to be done under this Agreement shall be made as provided in the General Conditions.

**ARTICLE VI. TERMINATION.** The Owner or Contractor may terminate the Contract as provided in the General Conditions.

**ARTICLE VII. PREVAILING WAGES.** The Project is a public work, the Work shall be performed as a public work and pursuant to the provisions of Section 1770 et seq. of the Labor Code of the State of California, which are hereby incorporated by reference and made a part hereof, the Director of Industrial Relations has determined the general prevailing rate of per diem wages and the general prevailing rate for holiday and overtime work in the locality in which the Work is to be performed, for each craft, classification or type of worker needed to execute this Contract. Per diem wages shall be deemed to include employer payments for health and welfare, pension, vacation, apprenticeship or other training programs, and similar purposes. Copies of the rates are on file at the Owner's principal office. The rate of prevailing wage for any craft, classification or type of workmanship to be employed on this Project is the rate established by the applicable collective bargaining agreement which rate so provided is hereby adopted by reference and shall be effective for the life of this Agreement or until the Director of the Department of Industrial Relations determines that another rate be adopted. It shall be mandatory upon the Contractor and on any subcontractor to pay not less than the said specified rates to all workers employed in the execution of this Agreement.

The Contractor and any subcontractor under the Contractor as a penalty to the Owner shall forfeit not more than Two Hundred Dollars (\$200.00) for each calendar day or portion thereof for each worker paid less than the stipulated prevailing rates for such work or craft in which such worker is employed. The difference between such stipulated prevailing wage rates and the amount paid to each worker for each calendar day or portion thereof for which each worker was paid less than the stipulated prevailing wage rate shall be paid to each worker by the Contractor.

The Contractor and each Subcontractor shall keep or cause to be kept an accurate record for Work on this Contract and Project showing the names, addresses, social security numbers, work classification, straight time and overtime hours worked and occupations of all laborers, workers and mechanics employed by them in connection with the performance of this Contract or any subcontract thereunder, and showing also the actual per diem wage

paid to each of such workers, which records shall be open at all reasonable hours to inspection by the Owner, its officers and agents and to the representatives of the Division of Labor Standards Enforcement of the State Department of Industrial Relations. The Contractor and each subcontractor shall furnish a certified copy of all payroll records directly to the Labor Commissioner.

Public works projects shall be subject to compliance monitoring and enforcement by the Department of Industrial Relations. For all projects over Twenty-five Thousand Dollars (\$25,000), a contractor or subcontractor shall not be qualified to submit a bid or to be listed in a bid proposal subject to the requirements of Public Contract Code section 4104 unless currently registered and qualified under Labor Code section 1725.5 to perform public work as defined by Division 2, Part 7, Chapter 1 (§§ 1720 et seq.) of the Labor Code. For all projects over Twenty-five Thousand Dollars (\$25,000), a contractor or subcontractor shall not be qualified to enter into, or engage in the performance of, any contract of public work (as defined by Division 2, Part 7, Chapter 1 (§§ 1720 et seq.) of the Labor Code) unless currently registered and qualified under Labor Code section 1725.5 to perform public work.

**ARTICLE VIII. WORKING HOURS.** In accordance with the provisions of Sections 1810 to 1815, inclusive, of the Labor Code of the State of California, which are hereby incorporated and made a part hereof, the time of service of any worker employed by the Contractor or a Subcontractor doing or contracting to do any part of the Work contemplated by this Agreement is limited and restricted to eight hours during any one calendar day and forty hours during any one calendar week, provided, that work may be performed by such employee in excess of said eight hours per day or forty hours per week provided that compensation for all hours worked in excess of eight hours per day, and forty hours per week, is paid at a rate not less than one and one-half (1½) times the basic rate of pay. The Contractor and every Subcontractor shall keep an accurate record showing the name of and the actual hours worked each calendar day and each calendar week by each worker employed by them in connection with the Work. The records shall be kept open at all reasonable hours to inspection by representatives of the Owner and the Division of Labor Standards Enforcement. The Contractor shall as a penalty to the Owner forfeit Twenty-five Dollars (\$25.00) for each worker employed in the execution of this Agreement by the Contractor or by any subcontractor for each calendar day during which such worker is required or permitted to work more than eight hours in any one calendar day, and forty hours in any one calendar week, except as herein provided.

**ARTICLE IX. APPRENTICES.** The Contractor agrees to comply with Chapter 1, Part 7, Division 2, Sections 1777.5 and 1777.6 of the California Labor Code, which are hereby incorporated and made a part hereof. These sections require that contractors and subcontractors employ apprentices in apprenticeable occupations in a ratio of not less than one hour of apprentice's work for each five hours of work performed by a journeyman (unless an exemption is granted in accordance with Section 1777.5) and that contractors and subcontractors shall not discriminate among otherwise qualified employees as indentured apprentices on any public works solely on the ground of sex, race, religious creed, national origin, ancestry or color. Only apprentices as defined in Labor Code

Section 3077, who are in training under apprenticeship standards and who have signed written apprentice agreements, will be employed on public works in apprenticeable occupations. The responsibility for compliance with these provisions is fixed with the Contractor for all apprenticeable occupations.

**ARTICLE X. DSA OVERSIGHT PROCESS.** The Contractor must comply with the applicable requirements of the Division of State Architect (“DSA”) Construction Oversight Process (“DSA Oversight Process”), including but not limited to (a) notifying the Owner’s Inspector of Record/Project Inspector (“IOR”) upon commencement and completion of each aspect of the Work as required under DSA Form 156; (b) coordinating the Work with the IOR’s inspection duties and requirements; (c) submitting verified reports under DSA Form 6-C; and (d) coordinating with the Owner, Owner’s Architect, any Construction Manager, any laboratories, and the IOR to meet the DSA Oversight Process requirements without delay or added costs to the Work or Project.

Contractor shall be responsible for any additional DSA fees related to review of proposed changes to the DSA-approved construction documents, to the extent the proposed changes were caused by Contractor’s wrongful act or omissions. If inspected Work is found to be in non-compliance with the DSA-approved construction documents or the DSA-approved testing and inspection program, then it must be removed and corrected. Any construction that covers unapproved or uninspected Work is subject to removal and correction, at Contractor’s expense, in order to permit inspection and approval of the covered work in accordance with the DSA Oversight Process.

**ARTICLE XI. INDEMNIFICATION AND INSURANCE.** The Contractor will defend, indemnify and hold harmless the Owner, its governing board, officers, agents, trustees, employees and others as provided in the General Conditions.

By this statement the Contractor represents that it has secured the payment of Workers' Compensation in compliance with the provisions of the Labor Code of the State of California and during the performance of the work contemplated herein will continue so to comply with said provisions of said Code. The Contractor shall supply the Owner with certificates of insurance evidencing that Workers' Compensation Insurance is in effect and providing that the Owner will receive thirty (30) days' notice of cancellation.

Contractor shall provide the insurance set forth in the General Conditions. The amount of general liability insurance shall be \$2,000,000 per occurrence for bodily injury, personal injury and property damage and the amount of automobile liability insurance shall be \$2,000,000 per accident for bodily injury and property damage combined single limit.

**ARTICLE XII. ENTIRE AGREEMENT.** The Contract constitutes the entire agreement between the parties relating to the Work, and supersedes any prior or contemporaneous agreement between the parties, oral or written, including the Owner's award of the Contract to Contractor, unless such agreement is expressly incorporated herein. The Owner makes no representations or warranties, express or implied, not specified in the Contract. The Contract is intended as the complete and exclusive statement of the parties’ agreement pursuant to Code of Civil Procedure section 1856.

**ARTICLE XIII. EXECUTION OF OTHER DOCUMENTS.** The parties to this Agreement shall cooperate fully in the execution of any and all other documents and in the completion of any additional actions that may be necessary or appropriate to give full force and effect to the terms and intent of the Contract.

**ARTICLE XIV. EXECUTION IN COUNTERPARTS.** This Agreement may be executed in counterparts such that the signatures may appear on separate signature pages. A copy, or an original, with all signatures appended together, shall be deemed a fully executed Agreement.

**ARTICLE XV. BINDING EFFECT.** Contractor, by execution of this Agreement, acknowledges that Contractor has read this Agreement and the other Contract Documents, understands them, and agrees to be bound by their terms and conditions. The Contract shall inure to the benefit of and shall be binding upon the Contractor and the Owner and their respective successors and assigns.

**ARTICLE XVI. SEVERABILITY; GOVERNING LAW; CHOICE OF FORUM.** If any provision of the Contract shall be held invalid or unenforceable by a court of competent jurisdiction, such holding shall not invalidate or render unenforceable any other provision hereof. The Contract shall be governed by the laws of the State of California. Any action or proceeding seeking any relief under or with respect to this Agreement shall be brought solely in the Superior Court of the State of California for the County of Tulare, subject to transfer of venue under applicable State law, provided that nothing in this Agreement shall constitute a waiver of immunity to suit by Owner.

**ARTICLE XVII. AMENDMENTS.** The terms of the Contract shall not be waived, altered, modified, supplemented or amended in any manner whatsoever except by written agreement, including change orders, signed by the parties and approved or ratified by the Governing Board.

**ARTICLE XVIII. ASSIGNMENT OF CONTRACT.** The Contractor shall not assign or transfer by operation of law or otherwise any or all of its rights, burdens, duties or obligations without the prior written consent of the surety on the payment bond, the surety on the performance bond and the Owner.

**ARTICLE XIX. WRITTEN NOTICE.** Written notice shall be deemed to have been duly served if delivered in person to the individual or member of the firm or to an officer of the corporation for whom it was intended, or if delivered at or sent by registered or certified or overnight mail to the last business address known to the person who gives the notice.

**(CONTRACTOR)**

**(OWNER)**

TULARE CITY SCHOOL DISTRICT

\_\_\_\_\_  
SIGNED BY (Contractor)

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
(Title)

\_\_\_\_\_  
CALIFORNIA CONTRACTOR'S  
LICENSE NO.

\_\_\_\_\_  
LICENSE EXPIRATION DATE

**NOTE:** Contractor must give the full business address of the Contractor and sign with Contractor's usual signature. Partnerships must furnish the full name of all partners and the Agreement must be signed in the partnership name by a general partner with authority to bind the partnership in such matters, followed by the signature and designation of the person signing. The name of the person signing shall also be typed or printed below the signature. Corporations must sign with the legal name of the corporation, followed by the name of the state of incorporation and by the signature and designation of the chairman of the board, president or any vice president, and then followed by a second signature by the secretary, assistant secretary, the chief financial officer or assistant treasurer. All persons signing must be authorized to bind the corporation in the matter. The name of each person signing shall also be typed or printed below the signature. Satisfactory evidence of the authority of the officer signing on behalf of a corporation shall be furnished.





**GENERAL CONDITIONS**  
**for**  
**CONTRACT OF CONSTRUCTION**

**FOR LIVE OAK MIDDLE SCHOOL LOCKER ROOM REMODEL PROJECT**

**TULARE CITY SCHOOL DISTRICT**

**JANUARY 5, 2021**

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## **ARTICLE 1**

### **GENERAL CONDITIONS**

#### **1.1 BASIC DEFINITIONS**

##### **1.1.1 THE CONTRACT DOCUMENTS**

The “Contract Documents” consist of the Agreement between Owner and Contractor (hereinafter the Agreement), Conditions of the Contract (General, Supplementary and other Conditions), Drawings, Specifications, addenda issued prior to bid, Instructions to Bidders, Notice to Bidders, the Bid Form, Payment Bond, Performance Bond, required insurance certificates, additional insured endorsement and declarations page, Designation of Subcontractors, Noncollusion Declaration, Roof Project Certification (where applicable), Sufficient Funds Declaration (Labor Code section 2810) and the Fingerprinting Notice and Acknowledgment and Independent Contractor Student Contact Form, other documents referred to in the Agreement, and Modifications issued after execution of the Agreement. A Modification is a written amendment to the Contract signed by both parties, a Change Order, a Construction Change Directive, or a written order for a minor change in the Work issued by the Owner. The Contract Documents are complementary, and each obligation of the Contractor, Subcontractors, material or equipment suppliers in any one shall be binding as if specified in all.

##### **1.1.2 THE CONTRACT**

The Contract Documents form the Contract. The “Contract” represents the entire and integrated agreement between the parties hereto and supersedes prior negotiations, representations, or agreements, either written or oral. The Contract may be amended or modified only by a written Modification. The Contract Documents shall not be construed to create a contractual relationship of any kind between the Architect and Contractor, any Construction Manager and Contractor, between the Owner and any Subcontractor or Sub-subcontractor, or between any persons or entities other than the Owner and the Contractor. The terms of the Contract shall not be waived, altered, modified, supplemented or amended in any manner whatsoever except by written agreement signed by the parties and approved or ratified by the Governing Board.

##### **1.1.3 THE WORK**

The “Work” shall include all labor, materials, services and equipment necessary for the Contractor to fulfill all of its obligations pursuant to the Contract Documents, including but not limited to punch list items and submission of documents. It shall include the initial obligation of any Contractor or Subcontractor, who performs any portion of the Work, to visit the Site of the proposed Work with Owner’s representatives, a continuing obligation after the commencement of the Work to fully acquaint and familiarize itself with the conditions as they exist and the character of the operations to be carried on under the Contract Documents, and make such investigation as it may see fit so that it shall fully understand the facilities, physical conditions, and restrictions attending the Work under the Contract Documents. Each such Contractor or Subcontractor shall also thoroughly examine and become familiar with the Drawings,

Specifications, and associated bid documents. The “Site” refers to the grounds of the Project as defined in the Contract Documents and such adjacent lands as may be directly affected by the performance of the Work. The Work shall constitute a “work of improvement” under Civil Code section 8050 and Public Contract Code section 7107.

#### **1.1.4 THE PROJECT**

The “Project” is the total construction of the Work performed in accordance with the Contract Documents. However, where applicable, the Project may also include construction by the Owner or by separate contractors.

#### **1.1.5 THE DRAWINGS**

The “Drawings” are graphic and pictorial portions of the Contract Documents prepared for the Project and approved changes thereto, wherever located and whenever issued, showing the design, location, and scope of the Work, generally including plans, elevations, sections, details, schedules, and diagrams as drawn or approved by the Architect.

#### **1.1.6 THE SPECIFICATIONS**

The “Specifications” are that portion of the Contract Documents consisting of the written requirements for material, equipment, construction systems, instructions, quality assurance standards, workmanship, and performance of related services.

#### **1.1.7 THE PROJECT MANUAL**

The “Project Manual” is the volume usually assembled for the Work which may include, without limitation, the bidding requirements, sample forms, Agreement, Conditions of the Contract, and Specifications.

#### **1.1.8 OR**

“Or” shall include “and/or.”

#### **1.1.9 COMPLETION**

Statutory definitions of “Completion” and “Complete” shall apply for those statutory purposes. For all other purposes, including accrual of liquidated damages, Claims and warranties, “Completion” and “Complete” mean the point in the Work where (1) Contractor has fully and correctly performed all Work in all parts and requirements, including corrective and punch list work, and (2) Owner’s representatives have conducted a final inspection that confirmed this performance. Substantial, or any other form of partial or non-compliant, performance shall not constitute “Completion” or “Complete”.

### 1.1.10 COMPLETION OF THE PROJECT

For purposes of accrual of liquidated damages for delays to the Project, *completion* shall mean the point in the Project where (1) all contractors and Owner have fully and correctly performed all work of the entire Project in all parts and requirements, including corrective and punch list work, and (2) Owner's representatives have conducted a final inspection of the entire Project that confirmed this performance. Substantial, or any other form of partial or non-compliant, performance of the entire Project shall not constitute *completion* or *complete*.

## 1.2 EXECUTION, CORRELATION AND INTENT

### 1.2.1 CORRELATION AND INTENT

1.2.1.1 *Documents Complementary and Inclusive.* The Contract Documents are complementary and are intended to include all items required for the proper execution and Completion of the Work. Any item of work mentioned in the Specifications and not shown on the Drawings, or shown on the Drawings and not mentioned in the Specifications, shall be provided by Contractor as if shown or mentioned in both.

1.2.1.2 *Coverage of the Drawings and Specifications.* The Drawings and Specifications generally describe the work to be performed by Contractor. Generally, the Specifications describe work which cannot be readily indicated on the Drawings and indicate types, qualities, and methods of installation of the various materials and equipment required for the Work. It is not intended to mention every item of Work in the Specifications, which can be adequately shown on the Drawings, or to show on the Drawings all items of Work described or required by the Specifications even if they are of such nature that they could have been shown. All materials or labor for Work, which is shown on the Drawings or the Specifications (or is reasonably inferable therefrom as being necessary to Complete the Work), shall be provided by the Contractor whether or not the Work is expressly covered in the Drawings or the Specifications. It is intended that the Work be of sound, quality construction, and the Contractor shall be responsible for the inclusion of adequate amounts to cover installation of all items indicated, described, or implied in the portion of the Work to be performed by Contractor.

1.2.1.3 *Conflicts.* Without limiting Contractor's obligation to identify conflicts for resolution by the Owner, it is intended that the more stringent, higher quality, and greater quantity of Work shall apply.

1.2.1.4 *Conformance With Laws.* Each and every provision of law required by law to be inserted in this Contract shall be deemed to be inserted herein, and the Contract shall be read and enforced as though it were included herein, and if through mistake or otherwise any such provision is not inserted, or is not correctly inserted, then upon application of either party the Contract shall be amended in writing to make such insertion or correction.

Before commencing any portion of the Work, Contractor shall check and review the Drawings and Specifications for such portion for conformance and compliance with all laws, ordinances, codes, rules and regulations of all governmental authorities and public utilities

affecting the construction and operation of the physical plant of the Project, all quasi-governmental and other regulations affecting the construction and operation of the physical plant of the Project, and other special requirements, if any, designated in the Contract Documents. In the event Contractor observes any violation of any law, ordinance, code, rule or regulation, or inconsistency with any such restrictions or special requirements of the Contract Documents, Contractor shall promptly notify Architect and Owner in writing of same and shall ensure that any such violation or inconsistency shall be corrected in the manner provided hereunder prior to the construction of that portion of the Work. Where requirements of the Contract Documents exceed those of the applicable building codes and ordinances, the Contract Documents shall govern. Contractor shall comply with all applicable Federal, State and local laws.

If, as and to the extent that Public Contract Code section 1104 is deemed to apply after the award of the Contract, Contractor shall not be required to assume responsibility for the completeness and accuracy of architectural or engineering plans and specifications, notwithstanding any other provision in the Contract Documents, except to the extent that Contractor discovered or should have discovered and reported any errors and omissions to the Architect and Owner, including but not limited to as the result of any review of the plans and specifications by Contractor required by the Instructions to Bidders or other Contract Documents, whether or not actually performed by Contractor.

**1.2.1.5 Ambiguity.** Before commencing any portion of the Work, Contractor shall carefully examine all Drawings and Specifications and other information given to Contractor as to materials and methods of construction and other Project requirements. Contractor shall immediately notify Architect and Owner in writing of any perceived or alleged error, inconsistency, ambiguity, or lack of detail or explanation in the Drawings and Specifications in the manner provided herein. If the Contractor or its Subcontractors, material or equipment suppliers, or any of their officers, agents, and employees performs, permits, or causes the performance of any Work under the Contract Documents, which it knows or should have known to be in error, inconsistent, or ambiguous, or not sufficiently detailed or explained, Contractor shall bear any and all costs arising therefrom including, without limitation, the cost of correction thereof without increase or adjustment to the Contract Sum or the time for performance. If Contractor performs, permits, or causes the performance of any Work under the Contract Documents prepared by or on behalf of Contractor which is in error, inconsistent or ambiguous, or not sufficiently detailed or explained, Contractor shall bear any and all resulting costs, including, without limitation, the cost of correction, without increase to or adjustment in the Contract Sum or the time for performance. In no case shall any Subcontractor proceed with the Work if uncertain without the Contractor's written direction and/or approval.

**1.2.1.6 Execution.** Execution of the Agreement Between Owner and Contractor by the Contractor is a representation that the Contractor has visited the Site, become familiar with the local conditions under which the Work is to be performed and has correlated personal observations with the requirements of the Contract Documents.

## 1.2.2 ADDENDA AND DEFERRED APPROVALS

1.2.2.1 *Addenda.* Subsequent addenda issued shall govern over prior addenda only to the extent specified. In accordance with Title 24, California Code of Regulations, addenda shall be approved by the Division of the State Architect (“DSA”).

1.2.2.2 *Deferred Approvals.* The requirements approved by the DSA on any item submitted as a deferred approval in accordance with Title 24, California Code of Regulations, shall take precedence over any previously issued addenda, drawing or specification.

## 1.2.3 SPECIFICATION INTERPRETATION

1.2.3.1 *Titles.* The Specifications are separated into titled sections for convenience only and not to dictate or determine the trade or craft involved. Organization of the Specifications into divisions, sections and articles, and arrangement of Drawings shall not control the Contractor in dividing the Work among Subcontractors or in establishing the extent of work to be performed by any trade.

1.2.3.2 *As Shown, Etc.* Where “as shown,” “as indicated,” “as detailed,” or words of similar import are used, reference is made to the Drawings accompanying the Specifications unless otherwise stated. Where “as directed,” “as required,” “as permitted,” “as authorized,” “as accepted,” “as selected,” or words of similar import are used, the direction, requirement, permission, authorization, approval, acceptance, or selection by Architect is intended unless otherwise stated.

1.2.3.3 *Provide.* “Provide” means “provided complete in place,” that is, furnished, installed, tested, and ready for operation and use.

1.2.3.4 *General Conditions.* The General Conditions and any supplementary general conditions are a part of each and every section of the Specifications.

1.2.3.5 *Abbreviations.* In the interest of brevity, the Specifications are written in an abbreviated form and may not include complete sentences. Omission of words or phrases such as “Contractor shall,” “shall be,” etc., are intentional. Nevertheless, the requirements of the Specifications are mandatory. Omitted words or phrases shall be supplied by inference in the same manner as they are when a “note” occurs on the Drawings.

1.2.3.6 *Plural.* Words in the singular shall include the plural whenever applicable or the context so indicates.

1.2.3.7 *Metric.* The Specifications may indicate metric units of measurement as a supplement to U.S. customary units. When indicated thus: 1” (25 mm), the U. S. customary unit is specific, and the metric unit is nonspecific. When not shown with parentheses, the unit is specific. The metric units correspond to the “International System of Units” (SI) and generally follow ASTM E 380, “Standard for Metric Practice.”

1.2.3.8 *Standard Specifications.* Any reference to standard specifications of any society, institute, association, or governmental authority is a reference to the organization's standard specifications, which are in effect as of the date the Notice to Bidders is first published. If applicable specifications are revised prior to completion of any part of the Work, the Contractor may, if acceptable to Owner and Architect, perform such Work in accordance with the revised specifications. The standard specifications, except as modified in the Specifications for the Project, shall have full force and effect as though printed in the Specifications. Architect will furnish, upon request, information as to how copies of the standard specifications referred to may be obtained.

1.2.3.9 *Absence of Modifiers.* In the interest of brevity, the Contract Documents frequently omit modifying words such as "all" and "any" and articles such as "the" and "an," but the fact that a modifier or an article is absent from one statement and appears in another is not intended to affect the interpretation of either statement.

### 1.3 **OWNERSHIP AND USE OF ARCHITECT'S DRAWINGS, SPECIFICATIONS AND OTHER DOCUMENTS**

The Drawings, Specifications, and other documents prepared on behalf of the Owner are instruments of the services of the Architect and its consultants and are the property of the Owner. The Contractor may retain one contract record set. Neither the Contractor nor any Subcontractor, Sub-subcontractor, or material or equipment supplier shall own or claim a copyright in the Drawings, Specifications, and other documents prepared by the Architect, and unless otherwise indicated the Architect shall be deemed the author of them. All copies of them, except the Contractor's record set, shall be returned or suitably accounted for to the Owner, upon request upon Completion of the Work. The Drawings, Specifications, and other documents prepared by the Architect, and copies thereof furnished to the Contractor, are for use solely with respect to this Contract. They are not to be used by the Contractor or any Subcontractor, Sub-subcontractor, or material or equipment supplier on other contracts or projects or for additions to this Contract or Project outside the scope of the Work without the specific written consent of the Owner and the Architect. The Contractor, Subcontractors, Sub-subcontractors, and material or equipment suppliers are granted a limited license to use and reproduce applicable portions of the Drawings, Specifications, and other documents prepared by the Architect appropriate to and for use in the execution of their Work under the Contract Documents. Submittal or distribution to meet official regulatory requirements or for other purposes in connection with this Project is not to be construed as publication in derogation of the Owner's property interest or other reserved right. All copies made under this license shall bear appropriate attribution and the statutory copyright notice, if any, shown on the Drawings, Specifications and other documents prepared by the Architect.

## ARTICLE 2

### OWNER

#### 2.1 DEFINITION

The term “Owner” means the person or entity identified as such in the Agreement and is referred to throughout the Contract Documents as if singular in number. The term “Owner” means the Owner and/or the Owner’s authorized representatives, including but not limited to architects and construction managers. To the extent the Contract Documents indicate that Owner has assigned duties to particular representatives of the Owner (such as the Architect, or any construction manager), Owner reserves the right at all times to reassign such duties to different Owner representatives.

#### 2.2 INFORMATION AND SERVICES REQUIRED OF THE OWNER

##### 2.2.1 INTENTIONALLY LEFT BLANK

##### 2.2.2 SITE SURVEY

When required by the scope of the Project, the Owner will furnish, at its expense, a legal description or a land survey of the Site, giving, as applicable, grades and lines of streets, alleys, pavements, adjoining property, rights-of-way, restrictions, easements, encroachments, zoning, deed restrictions, boundaries, and contours of the Site. Surveys to determine locations of construction, grading, and Site work shall be provided by the Contractor.

##### 2.2.3 SOILS

**2.2.3.1 *Owner Furnished Services.*** When required by the scope of the Project, the Owner will furnish, at its expense, the services of geotechnical engineers or consultants when reasonably required or as required by local or state codes. Such services with reports and appropriate professional recommendations shall include test boring, test pits, soil bearing values, percolation tests, air and water pollution tests, and ground corrosion and resistivity tests, including necessary operations for determining subsoil, air, and water conditions.

**2.2.3.2 *Contractor Reliance.*** Test borings and soils reports for the Project have been made for the Owner to indicate the subsurface materials that might be encountered at particular locations on the Project. The Owner has made these documents available to the Contractor and the Contractor has studied the results of such test borings and information that it has as to the subsurface conditions and Site geology as set forth in the test borings and soils reports. The Owner does not assume any responsibility whatsoever with respect to the sufficiency or accuracy of the borings made, or of the logs of the test borings, or of other investigations, or of the soils reports furnished pursuant hereto, or of the interpretations to be made beyond the location or depth of the borings. There is no warranty or guarantee, either express or implied that the conditions indicated by such investigations, borings, logs, soil reports or other information are representative of those existing throughout the Site of the Project, or any part thereof, or that



unforeseen developments may not occur. At the Owner's request, the Contractor shall make available to the Owner the results of any Site investigation, test borings, analyses, studies or other tests conducted by or in the possession of the Contractor or any of its agents. Nothing herein contained shall be deemed a waiver by the Contractor to pursue any available legal right or remedy it may have at any time against any third party who may have prepared any report and/or test relied upon by the Contractor.

#### 2.2.4 UTILITY SURVEY

When required by the scope of the Project, the Owner will furnish, at its expense, all information regarding known existing utilities on or adjacent to the Site, including location, size, inverts, and depths.

#### 2.2.5 INFORMATION

Upon the request of the Contractor, Owner will make available such existing information regarding utility services and Site features, including existing construction, related to the Project as is available from Owner's records. The Contractor may not rely upon the accuracy of any such information, other than that provided under Sections 2.2.2 and 2.2.4 (except that the Contractor may not rely upon and must question in writing to the Owner and the Architect any information which appears incorrect based upon Contractor's Site inspection, knowledge of the Work and Project, and prior experience with similar projects), unless specifically stated in writing that the Contractor may rely upon the designated information.

#### 2.2.6 EXISTING UTILITY LINES; REMOVAL, RELOCATION

**2.2.6.1 *Removal, Relocation.*** Pursuant to Government Code section 4215, the Owner assumes the responsibility for removal, relocation, and protection of utilities located on the Site at the time of commencement of construction under this Contract with respect to any such utility facilities which are not identified in the drawings and specifications made part of the invitation to bid. The Contractor shall not be assessed for liquidated damages for delay in Completion of the Work caused by failure of the Owner to provide for removal or relocation of such utility facilities. Owner shall compensate the Contractor for the costs of locating, repairing damage not due to the failure of the Contractor to exercise reasonable care, removing or relocating such utility facilities, and for equipment necessarily idle during such work.

**2.2.6.2 *Assessment.*** These subparagraphs shall not be construed to preclude assessment against the Contractor for any other delays in Completion of the Work. Nothing in these subparagraphs shall be deemed to require the Owner to indicate the presence of existing service laterals or appurtenances whenever the presence of such utilities on the Site can be inferred from the presence of other visible facilities, such as buildings, or meter junction boxes on or adjacent to the Site.

**2.2.6.3 *Notification.*** If the Contractor, while performing work under this Contract, discovers utility facilities not identified by the Owner in the Contract plans or specifications, Contractor shall immediately notify the Owner and the utility in writing.

2.2.6.4 ***Underground Utility Clearance.*** It shall be Contractor's sole responsibility to timely notify all public and private utilities serving the Site prior to commencing work. The Contractor shall notify and receive clearance from any cooperative agency, such as Underground Service Alert, in accordance with Government Code section 4216, et seq. Contractor shall promptly provide a copy of all such notifications to the Owner.

#### 2.2.7 **EASEMENTS**

Owner shall secure and pay for easements for permanent structures or permanent changes in existing facilities, if any, unless otherwise specified in the Contract or Contract Documents.

#### 2.2.8 **REASONABLE PROMPTNESS**

Information or services under Owner's control will be furnished by the Owner with reasonable promptness. The Owner shall not be liable for any delays caused by factors beyond the Owner's control including but not limited to DSA's or any other local, State or federal agency's review of bids, change order requests, RFI's or any other documents.

#### 2.2.9 **COPIES FURNISHED**

The Contractor will be furnished such copies of Drawings and Project Manuals as are stated in the Contract Documents.

#### 2.2.10 **DUTIES CUMULATIVE**

The foregoing are in addition to other duties and responsibilities of the Owner enumerated herein, and especially those in Article 6 (Construction by Owner or by Separate Contractors), Article 9 (Payments and Completion), and Article 11 (Insurance and Bonds).

### 2.3 **OWNER'S RIGHT TO STOP THE WORK**

If the Contractor fails to correct Work which is not in accordance with the requirements of the Contract Documents, or persistently fails to carry out Work in accordance with the Contract Documents, the Owner, after providing Notice pursuant to paragraph 2.4, may order the Contractor to stop the Work or any portion thereof, until the Contractor corrects the deficiencies. The right of the Owner to stop the Work shall not give rise to a duty on the part of the Owner to exercise this right for the benefit of the Contractor or any other person or entity, except to the extent required by Article 6.

### 2.4 **OWNER'S RIGHT TO CARRY OUT THE WORK**

If the Contractor fails or refuses to carry out the Work in accordance with the Contract Documents, Owner may correct such deficiencies by whatever reasonable method the Owner may deem expedient without prejudice to other remedies the Owner may have, including but not limited to having another contractor perform some or all of the Work without terminating the

Contract with Contractor. Owner may exercise this right at any time during the Contractor's Work.

Owner shall first provide written notice to Contractor of Contractor's failure or refusal to perform. The notice will provide the time period within which Contractor must begin correction of the failure or refusal to perform. If the Contractor fails to begin correction within the stated time, or fails to continue correction, the Owner may proceed to correct the deficiencies. In the event the Owner bids the work, Contractor shall not be eligible for the award of the contract. The Contractor may be invoiced the cost to Owner of the work, including compensation for additional professional and internally generated services and expenses made necessary by Contractor's failure or refusal to perform. Owner may withhold that amount from the retention, or progress payments due the Contractor, pursuant to Section 9.5. If retention and payments withheld then or thereafter due the Contractor are not sufficient to cover that amount, the Contractor shall pay the difference to the Owner.

### **ARTICLE 3**

#### **THE CONTRACTOR**

##### **3.1 DEFINITION**

The Contractor is the person or entity identified as such in the Agreement and is referred to throughout the Contract Documents as if singular in number. The term "Contractor" means the Contractor or the Contractor's authorized representative. To the extent that any portion of the Work is provided with the Contractor's own forces, any reference to Subcontractors shall be equally applicable to the Contractor.

##### **3.2 SUPERVISION AND CONSTRUCTION PROCEDURES**

###### **3.2.1 CONTRACTOR**

The Contractor shall supervise and direct the Work using the Contractor's best skill and attention, which shall meet or exceed the standards in the industry. The Contractor shall be solely responsible for and have control over construction means, methods, techniques, sequences, procedures, and coordinating all portions of the Work under the Contract, unless Contract Documents give other specific instructions concerning these matters.

If part of the Project is performed by other contractors Owner directly retains, and the Owner does not retain a construction manager for the Project, Contractor shall be responsible for the coordination and sequencing of its Work with those other contractors so as to avoid any impact on the Contract schedule pursuant to the requirements of Article 6. If Contractor fails to fulfill these obligations, Owner may exercise its rights under section 2.4. The right of Owner to carry out the Work under section 2.4 shall not give rise to a duty on the part of Owner to exercise this right for the benefit of Contractor or any other person or entity, except to the extent required by section 6.1.4.

If part of the Project is performed by other contractors Owner directly retains, and Owner retains a construction manager, the construction manager shall schedule and coordinate the activities of Contractor with the other contractors and Owner. Contractor agrees to accept the Owner's, and any construction manager's, construction schedules, schedule updates, overall sequence and coordination of construction for the Project.

Contractor realizes that work by other contractors or Owner may occur simultaneously with Contractor's Work in any given area. Contractor is responsible for its own sequences within a given activity or set of activities. Contractor shall not commit, or permit, any act which will adversely affect the work of any other contractor or Owner. Contractor shall provide layout of its Work at the request of any other contractor or Owner.

Specific duties of the Contractor shall be in accordance with Title 24 of the California Code of Regulations. Contractor shall fully comply with any and all reporting requirements of Education Code sections 17309 and 81141 in the manner prescribed by Title 24.

### **3.2.2 CONTRACTOR RESPONSIBILITY**

The Contractor shall be responsible to the Owner for acts and omissions of the Contractor's employees, Subcontractors, material and equipment suppliers, and their agents, employees, invitees, and other persons performing portions of the Work under direct or indirect contract with the Contractor or any of its Subcontractors.

### **3.2.3 OBLIGATIONS NOT CHANGED BY OTHERS' ACTIONS**

The Contractor shall not be relieved of obligations to perform the Work in accordance with the Contract Documents by the activities or duties of the Owner's representatives, including but not limited to any construction manager and the Architect, or the Inspector of Record; or by tests, inspections, or approvals required or performed by persons other than the Contractor.

### **3.2.4 CONTRACTOR RESPONSIBILITY FOR READINESS FOR WORK**

The Contractor shall be responsible for inspection of Work already performed under the Contract Documents to determine that such portions are in proper condition to receive subsequent work.

### **3.2.5 PROJECT MEETINGS**

During its Work, Contractor shall attend Owner's Project meetings as scheduled by the Contract Documents, or as otherwise instructed by Owner, to discuss the current status of the Work and Project and the future progress of the Work and the Project. Contractor shall have five (5) days after receipt of Owner's Project meeting minutes to provide written objections and suggested corrections.

### **3.3 SUPERINTENDENT**

#### **3.3.1 FULL TIME SUPERINTENDENT**

The Contractor shall provide a competent superintendent and assistants as necessary, all of whom shall be reasonably proficient in speaking, reading and writing English and, who shall be in attendance at the Project Site during performance of the Work. The superintendent shall represent the Contractor, and communications given to the superintendent shall be as binding as if given to the Contractor.

#### **3.3.2 STAFF**

The Contractor and each Subcontractor shall: furnish a competent and adequate staff as necessary for the proper administration, coordination, supervision, and superintendence of its portion of the Work; organize the procurement of all materials and equipment so that the materials and equipment will be available at the time they are needed for the Work; and keep an adequate force of skilled workers on the job to Complete the Work in accordance with all requirements of the Contract Documents.

#### **3.3.3 RIGHT TO REMOVE**

Owner shall have the right, but not the obligation, to require the removal from the Project of any superintendent, staff member, agent, or employee of any Contractor, Subcontractor, material or equipment supplier, etc., for cause.

### **3.4 LABOR AND MATERIALS**

#### **3.4.1 CONTRACTOR TO PROVIDE**

Unless otherwise provided in the Contract Documents, the Contractor shall provide and pay for labor, material, equipment, tools, construction equipment and machinery, water, heat, utilities, transportation, and other facilities and services necessary for proper execution and Completion of the Work whether temporary or permanent and whether or not incorporated or to be incorporated in the Work. Owner shall have no responsibility for security of, or repair or replacement costs of, any and all material, equipment, tools, construction equipment, and machinery provided by Contractor pursuant to this Subsection.

#### **3.4.2 QUALITY**

Unless otherwise specified, all materials and equipment to be permanently installed in the Project shall be new and shall be of such quality as required to satisfy the standards of the Contract Documents. The Contractor shall, if requested, promptly furnish satisfactory evidence as to kind and quality of all materials and equipment. All labor shall be performed by workers skilled in their respective trades, and the quality of their work shall meet whichever is the higher standard for their work: the standard in the industry or the standard in the Contract Documents.

### **3.4.3 REPLACEMENT**

Any work, materials, or equipment, which does not conform to these standards may be disapproved and rejected by the Owner, in which case, they shall be removed and replaced by the Contractor at no cost to the Owner.

### **3.4.4 DISCIPLINE**

The Contractor shall enforce strict discipline and good order among the Contractor's employees and other persons carrying out the Contract in accordance with paragraph 5.5.1 including, but not limited to, Subcontractors, and material or equipment suppliers retained for the Project.

### **3.5 WARRANTY**

For the period of one (1) year after Completion of the Work (see Sections 9.7.1, 12.2.5 and 12.2.6), the Contractor warrants to the Owner that material and equipment furnished under the Contract will be of good quality and new unless otherwise required or permitted by the Contract Documents, that the Work will be free from defects not inherent in the quality required or permitted, and that the Work will conform with the requirements of the Contract Documents. Work not conforming to these requirements, including substitutions not properly approved and authorized, may be considered defective. The Contractor's warranty does not cover damage or defect caused by abuse, modifications not executed by the Contractor, improper or insufficient maintenance, improper operation, or normal wear and tear under normal usage. If required by the Owner, the Contractor shall furnish satisfactory evidence as to the kind and quality of materials and equipment.

### **3.6 TAXES**

Contractor will pay all applicable Federal, State, and local taxes on all materials, labor, or services furnished by it, and all taxes arising out of its operations under the Contract Documents. Owner is exempt from Federal Excise Tax, and a Certificate of Exemption shall be provided upon request.

### **3.7 PERMITS, FEES AND NOTICES**

#### **3.7.1 PAYMENT**

The Contractor shall secure and pay for all permits and governmental fees, licenses, and inspections necessary for proper execution and Completion of the Work which are customarily secured after execution of the Contract and are legally required by any authority having jurisdiction over the Project, except those required by the Division of the State Architect (DSA). Owner shall be responsible for all testing and inspection as required by the DSA on-Site or within the distance limitations set forth in paragraph 13.5.2, unless a different mileage range is specified in the Contract Documents.

### 3.7.2 COMPLIANCE

The Contractor shall comply with and give notices required by any law, ordinance, rule, regulation, and lawful order of public authorities bearing on performance of the Work.

### 3.7.3 CONTRACT DOCUMENTS

It is not the Contractor's responsibility to ascertain that the Contract Documents are in accordance with any applicable law, statute, ordinance, building codes, rule, or regulation. However, if the Contractor knew, or should have known, or observes that portions of the Contract Document are at variance therewith, the Contractor shall promptly notify the Architect, any construction manager, and Owner in writing, and necessary changes shall be accomplished by appropriate modification.

### 3.7.4 RESPONSIBILITY

If the Contractor performs any work that it knows, or should have known, is contrary to any law, statute, ordinance, building code, rule or regulation, the Contractor shall assume full responsibility for such work, and shall bear the attributable cost of correction and delays to the Work, other contractors' work, and the Project.

## 3.8 ALLOWANCES

### 3.8.1 CONTRACT

The Contractor shall include in the Contract Sum all allowances stated in the Contract Documents. Items covered by allowances shall be supplied for such amounts and by such persons or entities as the Owner may direct, but the Contractor shall not be required to employ persons or entities against whom the Contractor makes reasonable and timely objection.

### 3.8.2 SCOPE

3.8.2.1 **Prompt Selection.** Materials and equipment under an allowance shall be selected promptly by the Owner to avoid delay to the Work.

3.8.2.2 **Cost.** Allowances shall cover the cost to the Contractor of materials and equipment delivered at the Site and all required taxes, less applicable trade discounts, etc., as delineated in paragraph 7.7.4.

3.8.2.3 **Cost Included in Contract Sum.** Contractor's costs for unloading and handling at the Site, labor, installation costs, overhead, profit, and other expenses contemplated for stated allowance amounts shall be included in the Contract Sum and not in the allowances.

3.8.2.4 **Contract Sum Adjustment.** Whenever costs are more than or less than allowances, the Contract Sum shall be adjusted accordingly by Change Order. The amount of

the Change Order shall reflect the difference between actual cost and the allowances under paragraph 3.8.2.2 and the change in the Contractor's costs under paragraph 3.8.2.3.

### **3.9 CONTRACTOR'S CONSTRUCTION SCHEDULES**

#### **3.9.1 REQUIREMENTS**

Before the Contractor's commencement of Work or within two (2) weeks of award of the Contract, whichever is earlier, Contractor shall prepare and submit for the Owner's, and any construction manager's, information the baseline construction schedule for the Work, which shall conform to the Contract Documents' requirements.

Contractor shall submit a monthly updated schedule of the Work that will include an accurate as-built schedule and the current as-planned schedule, both of which shall conform to the Contract Documents' requirements. Contractor shall submit its daily logs for the prior month with the updated schedule.

The schedule and updates shall conform, at a minimum, to industry standards for critical path scheduling and shall facilitate Owner's Project management and evaluation of Contractor Claims for additional money or time.

The schedule and updates shall not exceed time limits (including milestone deadlines) under the Contract Documents and shall comply with the Contract Documents scheduling requirements and with any scheduling requirements the Owner provides to the Contractor at the beginning of the Work. The original schedule and all updates shall accurately reflect work performed to date, all construction tasks (including procurement), the critical path schedule for Completion of the remainder of the Work, and the percentage of the Work completed. The original schedule and updates shall include all delay days for weather not unusually severe, even though that weather will not entitle Contractor to additional time or money.

The construction schedule shall be in the form of either a tabulation, chart, or graph, unless otherwise stated in Division 1 of the Specifications, and shall be in sufficient detail to show the chronological relationship of all activities of the Project including, but not limited to, estimated starting and completion dates of various activities, (including early and late dates and reasonable float for each activity), procurement of materials, the critical path, and scheduling of equipment. Float suppression techniques such as preferential sequencing, special lead/lag logic restraints, extended activity durations, or imposed dates shall be apportioned for the benefit of the Project. Whenever in the Contract Documents Contractor is required to provide a schedule and/or schedule updates, the Contractor shall provide the schedule and updates in electronic format as well as hard copy. Contractor shall be solely responsible for the accuracy, utility and reasonableness of all of its schedules. Owner's acceptance, approval or non-rejection of Contractor's schedules shall not affect Contractor's responsibility for its schedules.

The Contractor and Owner shall use any float on a "first come, first served" basis. The original schedule and updates shall reflect Contractor's and Owner's use of float. Float is not for the exclusive use or benefit of either Owner or Contractor, but it is a jointly owned expiring Project



resource available to both parties as needed to meet schedule milestones. For the original schedule and updates, Contractor shall use a critical path network format with the critical paths clearly indicated. Contractor shall use an MS Project, Primavera, or an equivalent or better program. Contractor shall include reports that sort and list the activities in order of increasing float and by early and late start dates. Contractor shall endeavor to label ten to thirty percent (10-30%) of the tasks as critical, but shall not label less than five (5%) or more than fifty (50%) as critical. Contractor shall use calendar days.

If any change in Contractor's method of operations will cause a change in the construction schedule, Contractor shall submit to Owner, Architect, and any construction manager, a revised construction schedule within seven (7) days of the change, unless a different time period is stated in Division 1 of the Specifications.

If, in the Owner's opinion, the Contractor is not prosecuting the Work at a rate sufficient to meet the Work schedule or a contractual milestone, or to Complete the Work within the Contract Time (as adjusted by change orders) or if the Contractor's actual progress falls behind the Work schedule or it is apparent to Owner or Contractor that Contractor will not meet contractual milestones or Complete the Work within the Contract Time (as adjusted by change orders), the Owner may require that the Contractor prepare and submit a recovery plan. Contractor must submit a recovery plan within seven (7) days of a demand for the plan, unless a different time period is stated in Division 1 of the Specifications. At a minimum, the recovery plan must include a revised schedule that gets the Work back on schedule and Completes all Work by the contractual milestones and within the Contract Time (as adjusted by change orders) or by other dates Owner specifies in the demand for a recovery plan. The recovery plan shall state the corrective actions Contractor will undertake to implement it. The recovery plan shall also list any additional money that Contractor believes it should receive if Owner orders Contractor to fully or partially implement the recovery plan. If the Owner orders Contractor to implement the recovery plan, Contractor shall do so, but the order shall not constitute an admission by Owner that Contractor is entitled to additional money. To recover additional money, Contractor must comply with General Conditions Articles 4.5, 7 and 8.

All schedules Contractor submits shall be certified as true and correct, as follows:

I, \_\_\_\_\_[name of declarant], declare the following:

\_\_\_\_\_ [Contractor company name] has entered into a Contract with \_\_\_\_\_ [public entity name] on the \_\_\_\_\_ [name of project] Project. \_\_\_\_\_ [Contractor company name] authorized me to prepare the schedules for \_\_\_\_\_ [public entity name] for \_\_\_\_\_ [Contractor company name] Work on the Contract, and I prepared the attached schedule. I am the most knowledgeable person at \_\_\_\_\_ [Contractor company name] regarding the scheduling of the Work for this Contract.

The attached schedule does not breach the Contract between \_\_\_\_\_ [Contractor company name] and \_\_\_\_\_ [public entity name] for this Project, does not violate any applicable law, satisfies all provisions of the Contract

applicable to submission of schedules, only contains truthful and accurate as-built and as-planned dates of work on the Contract (including supporting data), and is not a false claim.

The attached schedule is submitted in compliance with all laws applicable to submission of a Claim, including but not limited to California Penal Code section 72 (Fraudulent Claims), Government Code sections 12650 et seq. (False Claims Act; for example, Government Code section 12651(a)(7)), and Business and Professions Code sections 17200 et seq. (Unfair Business Practices Act). I am aware that submission or certification of false claims, or other Claims that violate law or the Contract, may lead to fines, imprisonment, and/or other serious legal consequences for myself and/or \_\_\_\_\_ [Contractor company name].

While preparing this declaration and schedule I consulted with others (including attorneys, consultants, or others who work for \_\_\_\_\_[Contractor company name]) when necessary to ensure that the statements were true and correct.

I declare under the penalty of perjury under the laws of the State of California that the foregoing is true and correct. Executed \_\_\_\_\_, 20\_\_, at \_\_\_\_\_, California.

\_\_\_\_\_  
\_\_\_\_\_[name of declarant]

### 3.9.2 DSA OVERSIGHT PROCESS

In connection with the DSA Construction Oversight Process which includes inspection cards and review of changes to the DSA-approved construction documents, the Contractor must (a) include specific tasks in its baseline schedule to take into account these procedures since they are critical path issues; and (b) include a reasonable amount of float in the baseline schedule to accommodate the additional time required by these DSA procedures.

### 3.9.3 FAILURE TO MEET REQUIREMENTS

Failure of the Contractor to provide proper schedules may, at the sole discretion of Owner, constitute either grounds to withhold, in whole or in part, progress payments to the Contractor, or a breach of contract allowing Owner to terminate the Contract.

### 3.10 DOCUMENTS AND SAMPLES AT THE SITE

The Contractor shall maintain at the Site for the Owner one applicable copy of Titles 19 and 24 and record copy of the Drawings, Specifications, Addenda, Change Orders, and other Modifications, in good order and marked currently to record changes and selections made during construction. In addition, the Contractor shall maintain at the Site approved Shop Drawings,

Product Data, Samples, and similar required submittals. These documents shall be available to the Owner and shall be delivered to the Owner, or the Architect for delivery to the Owner, upon Completion of the Work.

### 3.11 SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES

#### 3.11.1 SUBMITTALS DEFINED

3.11.1.1 *Shop Drawings.* The term “shop drawings” as used herein means drawings, diagrams, schedules, and other data, which are prepared by Contractor, Subcontractors, manufacturers, suppliers, or distributors illustrating some portion of the Work, and includes: illustrations; fabrication, erection, layout and setting drawings; manufacturer’s standard drawings; schedules; descriptive literature, instructions, catalogs, and brochures; performance and test data including charts; wiring and control diagrams; and all other drawings and descriptive data pertaining to materials, equipment, piping, duct and conduit systems, and methods of construction as may be required to show that the materials, equipment, or systems and their position conform to the requirements of the Contract Documents. The Contractor shall obtain and submit with the shop drawings all seismic and other calculations and all product data from equipment manufacturers. “Product data” as used herein are illustrations, standard schedules, performance charts, instructions, brochures, diagrams, and other information furnished by the Contractor to illustrate a material, product, or system for some portion of the Work. As used herein, the term “manufactured” applies to standard units usually mass-produced, and “fabricated” means items specifically assembled or made out of selected materials to meet individual design requirements. Shop drawings shall: establish the actual detail of all manufactured or fabricated items, indicate proper relation to adjoining work, amplify design details of mechanical and electrical systems and equipment in proper relation to physical spaces in the structure, and incorporate minor changes of design or construction to suit actual conditions.

3.11.1.2 *Samples.* The term “samples” as used herein are physical examples furnished by Contractor to illustrate materials, equipment, or quality and includes natural materials, fabricated items, equipment, devices, appliances, or parts thereof as called for in the Specifications, and any other samples as may be required by the Owner to determine whether the kind, quality, construction, finish, color, and other characteristics of the materials, etc., proposed by the Contractor conform to the required characteristics of the various parts of the Work. All Work shall be in accordance with the approved samples.

3.11.1.3 *Contractor’s Responsibility.* Contractor shall obtain and shall submit to Architect all required shop drawings and samples in accordance with Contractor’s “Schedule for

Submission of Shop Drawings and Samples” provisions in Division 1 of the Specifications and in accordance with the Contractor’s original and updated schedules, and with such promptness as to cause no delay in its own Work or in that of any other contractor, Owner or subcontractor but in no event later than ninety (90) days after the execution of the Agreement. Contractor may be assessed \$100 a day for each day it is late in submitting a shop drawing or sample. No extensions of time will be granted to Contractor or any Subcontractor because of its failure to have shop drawings and samples submitted in accordance with the Schedule. Each Subcontractor shall submit all shop drawings, samples, and manufacturer’s descriptive data for the review of the Owner, the Contractor, and the Architect through the Contractor. By submitting shop drawings, product data, and samples, the Contractor or submitting party (if other than Contractor) represents that it has determined and verified all materials, field measurements, field conditions, catalog numbers, related field construction criteria, and other relevant data in connection with each such submission, and that it has checked, verified, and coordinated the information contained within such submittals with the requirements of the Work and of the Contract Documents. At the time of submission, any deviation in the shop drawings, product data, or samples from the requirements of the Contract Documents shall be narratively described in a transmittal accompanying the submittal. However, submittals shall not be used as a means of requesting a substitution, the procedure for which is defined in paragraph 3.11.4, “Substitutions.” Review by Owner and Architect shall not relieve the Contractor or any Subcontractor from its responsibility in preparing and submitting proper shop drawings in accordance with the Contract Documents. Contractor shall stamp, sign, and date each submittal indicating its representation that the submittal meets all of the requirements of the Contract Documents. Any submission, which in Owner’s or Architect’s opinion is incomplete, contains numerous errors, or has been checked only superficially by Contractor will be returned unreviewed for resubmission by the Contractor.

3.11.1.4 ***Extent of Review.*** In reviewing shop drawings, the Owner will not verify dimensions and field conditions. The Architect will review and approve shop drawings, product data, and samples for aesthetics and for conformance with the design concept of the Work and the information given in the Contract Documents. The Architect’s review shall neither be construed as a complete check nor relieve the Contractor, Subcontractor, manufacturer, fabricator, or supplier from responsibility for any deficiency that may exist or from any departures or deviations from the requirements of the Contract Documents unless the Contractor has, in writing, called the Architect’s attention to the deviations at the time of submission and the Architect has given specific written approval. The Architect’s review shall not relieve the Contractor or Subcontractors from responsibility for errors of any sort in shop drawings or schedules, for proper fitting of the Work, or from the necessity of furnishing any Work required by the Contract Documents, which may not be indicated on shop drawings when reviewed. Contractor and Subcontractors shall be solely responsible for determining any quantities, whether or not shown on the shop drawings.

### 3.11.2 **DRAWING SUBMISSION PROCEDURE**

3.11.2.1 ***Transmittal Letter and Other Requirements.*** All shop drawings must be properly identified with the name of the Project and Contractor’s name and dated, and each lot submitted must be accompanied by a letter of transmittal referring to the name of the Project and

Contractor and to the Specification section number for identification of each item clearly stating in narrative form, as well as “clouding” on the submissions, all qualifications, departures, or deviations from the Contract Documents, if any. Shop drawings, for each section of the Work, shall be numbered consecutively, and the numbering system shall be retained throughout all revisions. All Subcontractor submissions shall be made through the Contractor. Each drawing shall have a clear space for the stamps of Architect and Contractor. Only shop drawings required to be submitted by the Contract Documents shall be reviewed.

3.11.2.2 **Copies Required.** Each submittal shall include one (1) legible, reproducible sepia and five (5) legible prints of each drawing, including fabrication, erection, layout and setting drawings, and such other drawings as required under the various sections of the Specifications until final acceptance thereof is obtained. Subcontractor shall submit copies, in an amount as requested by the Contractor, of: manufacturers’ descriptive data for materials, equipment, and fixtures, including catalog sheets showing dimensions, performance, characteristics, and capacities; wiring diagrams and controls; schedules; all seismic calculations and other calculations; and other pertinent information as required.

3.11.2.3 **Corrections.** The Contractor shall make any corrections required by Architect and shall resubmit as required by Architect the required number of corrected copies of shop drawings or new samples until approved. Contractor shall direct specific attention in writing or on resubmitted shop drawings to revisions other than the corrections required by the Architect on previous submissions. Professional services required for more than one (1) re-review of required submittals of shop drawings, product data, or samples are subject to charge to the Contractor pursuant to paragraph 4.4.

3.11.2.4 **Approval Prior to Commencement of Work.** No portion of the Work requiring a shop drawing or sample submission shall be commenced until the submission has been reviewed by Owner and approved by Architect unless specifically directed in writing by the Owner. All such portions of the Work shall be in accordance with approved shop drawings and samples.

### 3.11.3 **SAMPLE SUBMISSIONS PROCEDURE**

3.11.3.1 **Samples Required.** In case a considerable range of color, graining, texture, or other characteristics may be anticipated in finished products, a sufficient number of samples of the specified materials shall be furnished by the Contractor to indicate the full range of characteristics, which will be present in the finished products; and products delivered or erected without submittal and approval of full range samples shall be subject to rejection. Except for range samples, and unless otherwise called for in the various sections of the Specifications, samples shall be submitted in duplicate. All samples shall be marked, tagged, or otherwise properly identified with the name of the submitting party, the name of the Project, the purpose for which the samples are submitted, and the date and shall be accompanied by a letter of transmittal containing similar information, together with the Specification section number for identification of each item. Each tag or sticker shall have clear space for the review stamps of Contractor and Architect.

3.11.3.2 **Labels and Instructions.** Samples of materials, which are generally furnished in containers bearing the manufacturers' descriptive labels and printed application instructions, shall, if not submitted in standard containers, be supplied with such labels and application instructions.

3.11.3.3 **Architect's Review.** The Architect will review and, if appropriate, approve submissions and will return them to the Contractor with the Architect's stamp and signature applied thereto, indicating the appropriate action in compliance with the Architect's standard procedures.

3.11.3.4 **Record Drawings and Annotated Specifications.** The Contractor will prepare and maintain on a current basis an accurate and complete set of Record Drawings showing clearly all changes, revisions, and substitutions during construction, including, without limitation, field changes and the final location of all mechanical equipment, utility lines, ducts, outlets, structural members, walls, partitions, and other significant features, and Annotated Specifications showing clearly all changes, revisions, and substitutions during construction. A copy of such Record Drawings and Annotated Specifications will be delivered to Owner in accordance with the schedule prepared by Contractor. In the event of a specification that allows Contractor to elect one of several brands, makes, or types of material or equipment, the annotations shall show which of the allowable items the Contractor has furnished. The Contractor will update the Record Drawings and Annotated Specifications as often as necessary to keep them current but no less often than weekly. The Record Drawings and Annotated Specifications shall be kept at the Site and available for inspection by the Owner, Inspector of Record and the Architect. On Completion of the Contractor's Work and prior to Application for Final Progress Payment, the Contractor will provide one complete set of Record Drawings and Annotated Specifications to the Owner, certifying them to be a complete and accurate reflection of the actual construction conditions of the Work.

3.11.3.5 **Equipment Manuals.** Contractor shall obtain and furnish to the Owner three (3) complete sets of manuals containing the manufacturers' instructions for maintenance and operation of each item of equipment and apparatus furnished under the Contract Documents and any additional data specifically requested under the various sections of the Specifications for each division of the Work. The manuals shall be arranged in proper order, indexed, and placed in three-ring binders. At the Completion of its Work, the Contractor shall certify, by endorsement thereon, that each of the manuals is complete, accurate, and covers all of its Work. Prior to submittal of Contractor's Application for Final Progress Payment, and as a further condition to its approval by the Architect, each Subcontractor shall deliver the manuals, arranged in proper order, indexed, endorsed, and placed in three-ring binders, to the Contractor, who shall assemble these manuals for all divisions of the Work, review them for completeness, and submit them to the Owner through the Architect.

3.11.3.6 **Owner's Property.** All shop drawings and samples submitted shall become the Owner's property.

#### 3.11.4 SUBSTITUTIONS

3.11.4.1 **One Product Specified.** Unless the Specifications state that no substitution is permitted, whenever in the Contract Documents any specific article, device, equipment, product, material, fixture, patented process, form, method, or type of construction is indicated or specified by name, make, trade name, or catalog number, with or without the words “or equal,” such specification shall be deemed to be used for the purpose of facilitating description of material, process, or article desired and shall be deemed to be followed by the words “or equal.” Contractor may, unless otherwise stated, offer any material, process, or article, which shall be substantially equal or better in every respect to that so indicated or specified and will completely accomplish the purpose of the Contract Documents.

3.11.4.2 **Two or More Products Specified.** When two or more acceptable products are specified for an item of the Work, the choice will be up to the Contractor. Contractor shall utilize the same product throughout the Project. If a timely substitution request as set forth in Section 3.11.4.3 is not provided and an “or equal” substitution is requested, the Owner may consider the substitution if the product specified is no longer commercially available. If the Owner allows the substitution to be proposed pursuant to such an untimely request, the Contractor will be responsible for the professional fees incurred by the Architect or Architect’s consultants in reviewing the proposed substitution which fees may be withheld from progress payments and/or retention.

3.11.4.3 **Substitution Request Form.** Requests for substitutions of products, materials, or processes other than those specified must be made on the Substitution Request form available from the Owner prior to the date of the bid opening. Any Requests submitted less than fourteen (14) days prior to the date of the bid opening will not be considered, except as noted in paragraph 3.11.4.2. A Substitution Request must be accompanied by evidence as to whether or not the proposed substitution: is equal in quality and serviceability to the specified item; will entail no changes in detail and construction of related work; will be acceptable in consideration of the required design and artistic effect; will provide no cost disadvantage to Owner; and will require no excessive or more expensive maintenance, including adequacy and availability of replacement parts. The burden of proof of these facts shall be upon the Contractor. The Contractor shall furnish with its request sufficient information to determine whether the proposed substitution is equivalent including but not limited to all drawings, specifications, samples, performance data, calculations, and other information as may be required to assist the Architect and the Owner in determining whether the proposed substitution is acceptable. The final decision shall be the Owner’s. The written approval of the Owner, consistent with the procedure for Change Orders, shall be required for the use of a proposed substitute material. Owner may condition its approval of the substitution upon delivery to Owner of an extended warranty or other assurances of adequate performance of the substitution. If Contractor requests substitutions that require approval by the Division of the State Architect (“DSA”) or another governmental entity with jurisdiction, Contractor shall bear all risks of delay.

3.11.4.4 **List of Manufacturers and Products Required.** The Subcontractor shall prepare and submit to the Contractor within thirty (30) days of execution of the Subcontract comprehensive lists, in quadruplicate, of the manufacturers and products proposed for the

Project, including information on materials, equipment, and fixtures required by the Contract Documents, as may be required for Contractor's or Architect's preliminary approval. Approval of such lists of products shall not be construed as a substitute for the shop drawings, manufacturer's descriptive data, and samples, which are required by the Contract Documents, but rather as a base from which more detailed submittals shall be developed for the final review of the Contractor and the Architect.

#### **3.11.5 DEFERRED APPROVALS**

Deferred approvals shall be submitted and processed pursuant to the requirements of Division 1 of the Specifications. All risks of delay due to the Division of the State Architect's, or any other governmental agency having jurisdiction, approval of a deferred approval shall be on the requesting party.

### **3.12 CUTTING AND PATCHING**

#### **3.12.1 SCOPE**

The Contractor shall be responsible for cutting, fitting, or patching required to Complete the Work or to make its parts fit together properly.

#### **3.12.2 CONSENT**

The Contractor shall not damage or endanger a portion of the Work or fully or partially completed construction of the Owner or a separate contractor by cutting, patching, or otherwise altering such construction, or by excavation. The Contractor shall not cut or otherwise alter such construction by the Owner or a separate contractor except with written consent of the Owner and of such separate contractor; such consent shall not be unreasonably withheld. The Contractor shall not unreasonably withhold from the Owner or a separate contractor the Contractor's consent to cutting or otherwise altering the Work. All cutting shall be done promptly, and all repairs shall be made as necessary.

#### **3.12.3 STRUCTURAL MEMBERS**

New or existing structural members and elements, including reinforcing bars and seismic bracing, shall not be cut, bored, or drilled except by written authority of the Architect. Work done contrary to such authority is at the Contractor's risk, subject to replacement at its own expense and without reimbursement under the Contract. Agency approvals shall be obtained by the Architect, not by the Contractor.

#### **3.12.4 SUBSEQUENT REMOVAL**

Permission to patch any areas or items of the Work shall not constitute a waiver of the Owner's or the Architect's right to require complete removal and replacement of the areas or items of the Work if, in the opinion of the Architect or the Owner, the patching does not satisfactorily restore quality and appearance of the Work or does not otherwise conform to the Contract Documents.



Any costs caused by defective or ill-timed cutting or patching shall be borne by the person or entity responsible.

### **3.13 CLEANING UP**

#### **3.13.1 CONTRACTOR'S RESPONSIBILITY**

The Contractor shall keep the Site and surrounding area free from accumulation of waste material or rubbish caused by operations under the Contract. The Site shall be maintained in a neat and orderly condition. All crates, cartons, paper, and other flammable waste materials shall be removed from Work areas and properly disposed of at the end of each day. The Contractor shall continuously remove from and about the Site the waste materials, rubbish, tools, construction equipment, machinery, and materials no longer required for the Work.

#### **3.13.2 FAILURE TO CLEANUP**

If the Contractor fails to clean up as provided in the Contract Documents, the Owner may do so, without prior notice to the Contractor and the cost thereof shall be invoiced to the Contractor and withheld from progress payments and/or retention. Each Subcontractor shall have the responsibility for the cleanup of its own Work. If the Subcontractor fails to clean up, the Contractor must do so.

#### **3.13.3 CONSTRUCTION BUILDINGS**

When directed by the Owner or the Architect, Contractor and Subcontractor shall dismantle temporary structures, if any, and remove from the Site all construction and installation equipment, fences, scaffolding, surplus materials, rubbish, and supplies belonging to Contractor or Subcontractor. If the Contractor does not remove the tools, equipment, machinery, and materials within fifteen (15) days after Completion of its Work, then they shall be deemed abandoned, and the Owner can dispose of them for its own benefit in whatever way it deems appropriate. Contractor shall pay for any costs to dispose of the items.

### **3.14 ACCESS TO WORK**

The Contractor shall provide the Owner, the Architect, and the Inspector of Record, access to the Work in preparation and progress wherever located.

### **3.15 ROYALTIES AND PATENTS**

#### **3.15.1 PAYMENT AND INDEMNITY**

The Contractor shall pay all royalties and license fees. The Contractor shall defend suits or claims of infringement of patent rights and shall hold the Owner and the Architect harmless and indemnify them, to the extent not caused by the Owner's active negligence, sole negligence or willful misconduct, from loss on account thereof but shall not be responsible for such defense or loss when a particular design, process, or product of a particular manufacturer is required by the

Contract Documents. However, if the Contractor has reason to believe the required design, process, or product is an infringement of a patent, the Contractor shall be responsible for such loss unless such information is promptly furnished to the Owner and Architect.

### **3.15.2 REVIEW**

The review by the Owner or Architect of any method of construction, invention, appliance, process, article, device, or material of any kind shall be for its adequacy for the Work and shall not be an approval for the use by the Contractor in violation of any patent or other rights of any person or entity.

## **3.16 INDEMNIFICATION**

### **3.16.1 SCOPE: CONTRACTOR**

To the fullest extent permitted by law, the Contractor shall defend, indemnify, and hold harmless the Owner, any construction manager, Architect, Architect's consultants, the Inspector of Record, the State of California, and their respective agents, employees, officers, volunteers, Boards of Trustees, members of the Boards of Trustees, and directors ("Indemnitees"), from and against claims, actions, damages, liabilities, losses (including but not limited to injury or death of persons, property damage, and compensation owed to other parties), and expenses (including but not limited to attorneys' fees and costs including fees of consultants) alleged by third parties against Indemnitees arising out of or resulting from the following: Contractor's, its Subcontractors', or its suppliers' performance of the Work, including but not limited to the Contractor's or its Subcontractors' use of the Site; the Contractor's or its Subcontractors' construction of the Project, or failure to construct the Project, or any portion thereof; the use, misuse, erection, maintenance, operation, or failure of any machinery or equipment including, but not limited to, scaffolds, derricks, ladders, hoists, and rigging supports, whether or not such machinery or equipment was furnished, rented, or loaned by any of the Indemnitees; or any act, omission, negligence, or willful misconduct of the Contractor or its Subcontractors or their respective agents, employees, material or equipment suppliers, invitees, or licensees but only to the extent caused in whole or in part by the acts or omissions of the Contractor, its Subcontractors, its suppliers, anyone directly or indirectly employed by any of them, or anyone for whose acts they may be liable, regardless of whether or not such claim, damage, loss, or expense is caused in part by a party indemnified hereunder. Such obligation shall not be construed to negate, abridge, or reduce other rights or obligations of indemnity, which would otherwise exist as to a party, person, or entity described in this paragraph. The obligation to defend, indemnify and hold harmless includes any claims or actions by third parties arising out of or resulting from Labor Code section 2810. Contractor shall have no obligation to defend or indemnify the Indemnitees against claims, actions, damages, liabilities, losses, and expenses caused by the active negligence, sole negligence or willful misconduct of Indemnitees. This indemnification shall apply to all liability, as provided for above, regardless of whether any insurance policies are applicable, and insurance policy limits do not act as a limitation upon the amount of the indemnification to be provided by the Contractor.

### 3.16.2 SCOPE: SUBCONTRACTORS

3.16.2.1 **Indemnity.** The Subcontractors shall defend, indemnify, and hold harmless the Indemnitees from and against claims, actions, damages, liabilities, and losses (including but not limited to injury or death of persons, property damage, and compensation owed to other parties), and expenses (including but not limited to attorneys' fees and costs including fees of consultants) alleged by third parties against Indemnitees arising out of or resulting from the following: Subcontractors' performance of the Work, including but not limited to the Subcontractors' use of the Site; the Subcontractors' construction of the Project or failure to construct the Project or any portion thereof; the use, misuse, erection, maintenance, operation, or failure of any machinery or equipment, including, but not limited to, scaffolds, derricks, ladders, hoists, and rigging supports, whether or not such machinery or equipment was furnished, rented, or loaned by any of the Indemnitees; or any act, omission, negligence, or willful misconduct of the Subcontractors or their respective agents, employees, material or equipment suppliers, invitees, or licensees but only to the extent caused in whole or in part by the acts or omissions of the Subcontractors, anyone directly or indirectly employed by any of them, or anyone for whose acts they may be liable, regardless of whether or not such claim, damage, loss, or expense is caused in part by a party indemnified hereunder. Such obligation shall not be construed to negate, abridge, or reduce other rights or obligations of indemnity, which would otherwise exist as to a party, person, or entity described in this paragraph. This obligation to defend, indemnify and hold harmless includes any claims or actions by third parties arising out of or resulting from Labor Code section 2810. Subcontractors shall have no obligation to defend or indemnify the Indemnitees against claims, actions, damages, liabilities, losses, and expenses caused by the active negligence, sole negligence or willful misconduct of Indemnitees. This indemnification shall apply to all liability, as provided for above, regardless of whether any insurance policies are applicable, and insurance policy limits do not act as a limitation upon the amount of the indemnification to be provided by the Subcontractors.

3.16.2.2 **Joint and Several Liability.** In the event more than one Subcontractor is connected with an accident or occurrence covered by this indemnification, then all such Subcontractors shall be jointly and severally responsible to each of the Indemnitees for indemnification, and the ultimate responsibility among such indemnifying Subcontractors for the loss and expense of any such indemnification shall be resolved without jeopardy to any Indemnitee. The provisions of the indemnity provided for herein shall not be construed to indemnify any Indemnitee for its own negligence if not permitted by law or to eliminate or reduce any other indemnification or right which any Indemnitee has by law or equity.

### 3.16.3 NO LIMITATION

The Contractor's and the Subcontractor's obligation to indemnify and defend the Indemnitees hereunder shall include, without limitation, any and all claims, damages, and costs: for injury to persons and property (including loss of use), and sickness, disease or death of any person; for breach of any warranty, express or implied; for failure of the Contractor or the Subcontractor to comply with any applicable governmental law, rule, regulation, or other requirement; and for products installed in or used in connection with the Work.

### **3.17 OWNER AS INTENDED BENEFICIARY**

The Owner is an intended beneficiary of any architectural or engineering work secured by, or performed by, the Contractor to fulfill its obligations under the Contract. Contractor shall state in its contracts with architectural or engineering consultants that their work is for the intended benefit of the Owner.

### **3.18 NOTICE OF EXCUSE FOR NONPERFORMANCE**

If Contractor believes that acts or omissions of Owner (including but not limited to Owner caused delay) have prevented Contractor from performing the Work as required by the Contract Documents and Contractor intends to rely on Owner's acts or omissions and Civil Code section 1511(1) as reasons to excuse Contractor's nonperformance or to support, among other things, Contractor's requests for time extensions under section 4.5, below, Contractor shall provide written notice of the excuse within five (5) days of the Owner's acts or omissions. If Contractor fails to timely submit the written notice, Contractor shall have waived any right to later rely on the acts or omissions as a defense to Contractor's nonperformance or as the basis for a time extension, regardless of the merits of the defense or time extension. Contractor will not have satisfied a condition precedent or exhausted administrative remedies. Contractor acknowledges that these written notices are of critical importance to the Owner's management of the Work and Project and the mitigation of costs and delays to the Work and Project.

### **3.19 RECOVERY OF DAMAGES FROM OWNER.**

Notwithstanding any other provisions of the Contract Documents, Contractor expressly waives its right to recover any special, consequential, or indirect damages from Owner in relation to this Contract or the Project. Contractor may only recover general (also known as direct) damages from Owner to the extent allowed by the Contract Documents.

## **ARTICLE 4**

### **ADMINISTRATION OF THE CONTRACT**

#### **4.1 ARCHITECT**

##### **4.1.1 DEFINITION**

The Architect is the person lawfully licensed to practice architecture or an entity lawfully practicing architecture identified as such in the Agreement and is referred to throughout the Contract Documents as if singular in number. The term "Architect" means the Architect or the Architect's authorized representative, and shall also refer to all consultants under the Architect's direction and control.

##### **4.1.2 MODIFICATION**

To the extent the Contract Documents indicate that Owner has assigned duties or responsibilities

to the Architect, Owner reserves the right at all times to reassign such duties or responsibilities to different Owner representatives.

#### **4.1.3 TERMINATION**

In the case of the termination of the Architect, the Owner may appoint an architect or another construction professional or may perform such functions with its own licensed professional personnel. The status of the replacement Architect under the Contract Documents shall be that of the former architect.

### **4.2 ARCHITECT'S ADMINISTRATION OF THE CONTRACT**

#### **4.2.1 STATUS**

The Architect will provide administration of the Contract and may be one of several Owner's representatives during construction, through release of all retention, and during the one (1) year period following the commencement of any warranties. The Architect will advise and consult with the Owner. The Architect will have authority to act on behalf of the Owner only to the extent set forth in the Owner/Architect agreement. The Architect will have all responsibilities and power established by law, including California Code of Regulations, Title 24, to the extent set forth in the Owner/Architect agreement.

#### **4.2.2 SITE VISITS**

The Architect will visit the Site at intervals necessary in the judgment of the Architect or as otherwise agreed by the Owner and the Architect in writing to become generally familiar with the progress and quality of the completed Work and to determine in general if the Work is being performed in a manner indicating that the Work, when Completed, will be in accordance with the Contract Documents.

#### **4.2.3 LIMITATIONS OF CONSTRUCTION RESPONSIBILITY**

The Contractor shall not be relieved of obligations to perform the Work in accordance with the Contract Documents either by activities or duties of the Architect in the Architect's administration of the Contract Documents, or by tests, inspections, or approvals required or performed by persons other than the Contractor.

#### **4.2.4 COMMUNICATIONS FACILITATING CONTRACT ADMINISTRATION**

The Owner and the Contractor shall communicate through the Architect, unless there is a construction manager for the Project or the Owner directs otherwise. Communications between Owner and Subcontractors or material or equipment suppliers shall be through the Contractor.

#### **4.2.5 PAYMENT APPLICATIONS**

The Contractor shall submit payment applications to the Architect, unless there is a construction

manager for the Project or the Owner directs otherwise.

#### **4.2.6 REJECTION OF WORK**

The Architect, Inspector of Record, any construction manager and others may recommend to the Owner that the Owner reject Work which does not conform to the Contract Documents or that the Owner require additional inspection or testing of the Work in accordance with paragraph 13.5.5, whether or not the Work is fabricated, installed, or completed. However, no recommendation shall create a duty or responsibility to the Contractor, Subcontractors, material and equipment suppliers, their agents or employees, or other persons performing portions of the Work.

#### **4.2.7 CHANGE ORDERS**

The Architect will prepare change orders and construction change directives and may authorize minor changes in the Work.

#### **4.2.8 WARRANTIES UPON COMPLETION**

The Architect in conjunction with the Inspector of Record, or as otherwise directed by Owner, will conduct field reviews of the Work to determine the date of Completion, shall receive and forward to the Owner for the Owner's review and records, written warranties and related documents required by the Contract and assembled by the Contractor. The handling by the Architect of such warranties, maintenance manuals, or similar documents shall not diminish or transfer to the Architect any responsibilities or liabilities required by the Contract Documents of the Contractor or other entities, parties, or persons performing or supplying the Work.

Except as may be otherwise directed by Owner, the Architect will conduct a field review of the Contractor's comprehensive list of items to be completed or corrected for development of a punch list and one (1) follow-up field review if required. The cost incurred by the Owner for further field reviews or the preparation of further punch lists by the Architect shall be invoiced to the Contractor and withheld from payment and/or retention.

#### **4.2.9 INTERPRETATION**

The Architect, Inspector of Record, any construction manager, the Owner or any independent consultant of Owner, as Owner deems appropriate, will interpret and decide matters concerning performance under and requirements of the Contract Documents on written request of the Contractor. The Owner's response to such requests will be made with reasonable promptness, while allowing sufficient time to permit adequate review and evaluation of the request.

#### **4.2.10 ADDITIONAL INSTRUCTIONS**

4.2.10.1 *Architect's Interpretations and Decisions.* Interpretations and decisions of the Architect will be consistent with the intent of and reasonably inferable from the Contract Documents and will be in writing or in the form of drawings. When making such interpretations

of and decisions regarding the Contract Documents, the Architect will endeavor to secure faithful performance under the Contract Documents by both the Owner and the Contractor and will not show partiality to either. The Work shall be executed in conformity with, and the Contractor shall do no work without, approved drawings, Architect's clarifying instructions, and/or submittals.

4.2.10.2 **Typical Parts and Sections.** Whenever typical parts or sections of the Work are completely detailed on the Drawings, and other parts or sections which are essentially of the same construction are shown in outline only, the complete details shall apply to the Work which is shown in outline.

4.2.10.3 **Dimensions.** Dimensions of Work shall not be determined by scale or rule. Figured dimensions shall be followed at all times. If figured dimensions are lacking on Drawings, Architect shall supply them on request. The Owner's decisions on matters relating to aesthetic effect will be final if consistent with the Contract Documents.

### 4.3 INSPECTOR OF RECORD

#### 4.3.1 GENERAL

One or more Project inspectors ("Inspector of Record") employed by the Owner and approved by the Division of the State Architect will be assigned to the Work in accordance with the requirements of Title 24 of the California Code of Regulations. The Inspector of Record's duties will be as specifically defined in Title 24.

#### 4.3.2 INSPECTOR OF RECORD'S DUTIES

All Work shall be under the observation of or with the knowledge of the Inspector of Record. The Inspector of Record shall have free access to any or all parts of the Work at any time. The Contractor shall furnish the Inspector of Record such information as may be necessary to keep the Inspector of Record fully informed regarding progress and manner of work and character of materials. Such observations shall not, in any way, relieve the Contractor from responsibility for full compliance with all terms and conditions of the Contract, or be construed to lessen to any degree the Contractor's responsibility for providing efficient and capable superintendence. The Inspector of Record is not authorized to make changes in the drawings or specifications nor shall the Inspector of Record's approval of the Work and methods relieve the Contractor of responsibility for the correction of subsequently discovered defects, or from its obligation to comply with the Contract Documents.

#### 4.3.3 INSPECTOR OF RECORD'S AUTHORITY TO REJECT OR STOP WORK

The Inspector of Record shall have the authority to reject work that does not comply with the provisions of the Contract Documents. In addition, the Inspector of Record may stop any work which poses a probable risk of harm to persons or property. The Contractor shall instruct its employees, Subcontractors, material and equipment suppliers, etc., accordingly. The absence of any Stop Work order or rejection of any portion of the Work shall not relieve the Contractor

from any of its obligations pursuant to the Contract Documents.

#### 4.3.4 INSPECTOR OF RECORD'S FACILITIES

Within seven (7) days after notice to proceed, the Contractor shall provide the Inspector of Record with temporary facilities, including any requirements stated in Division 1 of the Specifications.

#### 4.4 RESPONSIBILITY FOR ADDITIONAL CHARGES INCURRED BY THE OWNER FOR PROFESSIONAL SERVICES

If at any time prior to the Completion of the requirements under the Contract Documents, through no fault of its own, the Owner is required to provide or secure additional professional services for any reason by any act or omission of the Contractor, the Contractor shall be invoiced by the Owner for any actual costs incurred for any such additional services, which costs may, among other remedies, be withheld from the progress payments and/or retention. Such invoicing shall be independent from any other Owner remedies, including but not limited to liquidated damages. If payments then or thereafter due to the Contractor are not sufficient to cover such amounts, the Contractor shall pay the difference to the Owner. Additional services shall include, but shall not be limited to, the following:

- A. Services made necessary by the default of the Contractor.
- B. Services made necessary due to the defects or deficiencies in the Work of the Contractor.
- C. Services required by failure of the Contractor to perform according to any provision of the Contract Documents.
- D. Services in connection with evaluating substitutions of products, materials, equipment, Subcontractors proposed by the Contractor, and making subsequent revisions to drawings, specifications, and providing other documentation required (except for the situation where the specified item is no longer manufactured or available).
- E. Services for evaluating and processing Claims submitted by the Contractor in connection with the Work outside the established Change Order process.
- F. Services required by the failure of the Contractor to prosecute the Work in a timely manner in compliance within the specified time for Completion.
- G. Services in conjunction with the testing, adjusting, balancing and start-up of equipment other than the normal amount customarily associated for the type of Work involved.



- H. Services in conjunction with more than one (1) re-review of required submittals of shop drawings, product data, and samples.

#### **4.5 NOTICES OF POTENTIAL CHANGE, CHANGE ORDER REQUESTS, AND CLAIMS**

If the Contractor identifies the potential for extra work, delay in the critical path schedule, or the need for additional money or time, or if the Contractor requests additional money or time, or if the Contractor believes that Owner has failed to pay amounts due or otherwise breached the Contract, or otherwise believes that it is entitled to a modification of the Contract terms and conditions, then Contractor shall follow the procedures in this Section 4.5 and Article 7, otherwise Contractor shall have waived its rights to pursue those issues and any later attempts to recover money or obtain a modification shall be barred. Contractor specifically acknowledges the Owner's and public's interest in, and need to know of, potential changes and disputes as early as possible so Owner can investigate, mitigate and resolve adverse cost and time impacts, if any. It is Contractor's obligation to know and comply with the requirements of Section 4.5 and Article 7, and Owner has no obligation to notify Contractor of any failure to comply with those requirements.

##### **4.5.1 NOTICE OF POTENTIAL CHANGE**

Contractor shall submit a written Notice of Potential Change for extra work, critical path delay, or additional money or time. Contractor shall submit written Notices of Potential Change to Owner within five (5) days of Contractor becoming aware of the issues creating the potential for change, unless the issues are, or may soon be, adversely affecting the costs or critical path of the Work, in which case the Contractor must submit the written notice without delay so the Owner may take immediate action to mitigate cost and schedule impacts of the change, if any. The written notice shall explain the nature of the potential change so the Owner may take action to mitigate costs and schedule impacts, if necessary.

When submitting a written Notice of Potential Change based on extra work, Contractor shall not perform the extra work until directed in writing to do so by Owner. When submitting a written Notice of Potential Change for an issue of critical path delay, Contractor shall proactively mitigate the effects of the alleged delay as much as reasonably possible so as to minimize any impact to the schedule, until otherwise directed by Owner. If Contractor intends to rely on Owner's acts or omissions in support of a request for a time extension, then Contractor must also provide the notice set forth in section 3.18, above.

Failure to timely submit a written Notice of Potential Change shall constitute a complete waiver by Contractor of any right to later submit a change order request or pursue a Claim on that issue, or to later pursue any additional money or time extensions in any manner related to that issue, regardless of the merits. Contractor will not have satisfied a condition precedent or exhausted administrative remedies. Contractor acknowledges that these written notices are of critical importance to the Owner's Work and Project management and the mitigation of Work and Project costs and delays.

#### 4.5.2 CHANGE ORDERS REQUESTS

If, after submitting a written Notice of Potential Change pursuant to Section 4.5.1, Contractor continues to believe that it is entitled to additional money or time (including but not limited to grant of a time extension; payment of money or damages arising from work done by, or on behalf of, the Contractor, payment of which is not otherwise expressly provided for or the claimant is not otherwise entitled to; or an amount the payment of which is disputed by the Owner) based on an issue, then Contractor shall submit a Change Order Request (“COR”) to Owner within twenty (20) days of (i) becoming aware of the issues creating a potential change, or (ii) the date by which it should have become aware of the issues creating a potential change. A rejection at any time or a lack of a rejection by Owner of a Notice of Potential Change does not affect the timeline for submitting a COR.

Failure to timely submit a COR related to an issue, or failure to comply with any of the COR requirements in the Contract shall constitute a complete waiver by Contractor of any right to later submit a COR or Claim on that issue, or to later pursue any additional money (including time extensions) in any manner related to that issue, regardless of the merits. Contractor will not have satisfied a condition precedent or exhausted administrative remedies.

The COR shall state the grounds for the additional money or time requested and the amount of money or time requested, and Contractor shall include all information and documentation supporting the COR, including but not limited to calculations and analysis that demonstrate that the requested money or time is allowed by the applicable Contract provisions and law. Contractor will have completely waived its rights to recover any additional time or money other than that time or money specifically requested in the COR. If the COR requests time, then the COR must identify the number of days of time being requested and must include some critical path schedule analysis to support the number of days requested. Contractor may not reserve its rights, whether in a COR or other document, to submit a COR at a later time or in a manner other than as required by the Contract Documents. Any inclusion of a reservation of rights in a COR shall be grounds for rejection of the COR.

In the event that costs or delay are continuing to accrue at the time that a COR is required to be submitted, Contractor must still timely submit the COR with all available information and documentation supporting the COR as described above, and Contractor shall identify the costs or delay that are continuing. For continuing costs, the COR must include an estimate of when the extra work is expected to conclude and the total costs that will be incurred by the time that the extra work is expected to conclude. For continuing delay, the COR must include a schedule and delay analysis of when Contractor estimates that the delay will cease, what the final time extension request is estimated to be, and an estimate of the total delay of damages, if any, that will be requested. When the continuing cost or delay ends, within ten (10) days Contractor shall submit an updated COR that states the final dollar amount and/or time extension requested and that includes all required information and documentation. Failure to submit such final COR shall act as a waiver as described above.

Contractor shall certify each COR that it submits, including the initial COR and final COR for a continuing cost or delay, using the form set forth in Section 4.5.5.1, except that every reference to “Claim” shall be changed to “COR.” If a COR is submitted without certification, a certification can still be submitted within the timelines set forth in the first paragraph of section 4.5.2. If the COR is not timely certified, Contractor will have completely waived its rights to any money or time for that issue. Contractor will not have satisfied a condition precedent or exhausted administrative remedies. A certification of an initial COR for a continuing cost or delay shall include a statement that “Any estimates in the attached initial COR for a continuing cost or delay are based on true and correct facts and reasonable assumptions, as explained in the initial COR.”

The Owner may accept the entire COR, accept part of the COR and reject the remainder, reject the entire COR, or request additional information. If the Owner does not respond within thirty (30) days of the submission of the COR by accepting the entire COR, accepting part of the COR and rejecting the remainder, or requesting additional information, the entire COR shall be deemed rejected as of the thirtieth (30th) day. In the case of continuing costs or delay, the 30-day timeline will not begin to run until a final COR has been submitted. If the Owner requests additional information within thirty (30) days of submission, then the Contractor shall submit the information within fifteen (15) days of the date of the request and the Owner shall have fifteen (15) days after the receipt of the additional information to accept or reject (in whole or in part) the COR. If the Owner fails to respond within fifteen (15) days after the submission of additional information, the entire COR shall be deemed rejected as of the fifteenth (15th) day.

#### 4.5.3 DEFINITION OF CLAIM

A “Claim” is a separate demand by the Contractor sent by registered or certified mail, return receipt requested, for (a) a time extension, including, without limitation, a request for relief from damages or penalties for delay assessed by Owner under the Contract Documents; (b) payment by Owner of money or damages arising from work done by, or on behalf of, the Contractor pursuant to the Contract Documents, and payment of which is not otherwise expressly provided for or the claimant is not otherwise entitled to; or (c) an amount the payment of which is disputed by the Owner. A Claim includes any claim within the scope of Public Contract Code section 20104 et seq. Resubmittal in any manner of a COR which was previously rejected under Section 4.5.2 constitutes a Claim, whether the COR was rejected in whole or in part, and whether the COR was rejected expressly or deemed rejected by Owner inaction. A Claim includes any dispute Contractor may have with the Owner, including one which does not require a Notice of Potential Change or COR under Sections 4.5.1 and 4.5.2, and includes an alleged breach of contract by the Owner. A Claim under this Article 4.5 shall also constitute a claim for purposes of the California False Claims Act. In the event of a conflict between a Claims provision in Division 1 of the Specifications and Section 4.5, Section 4.5 shall take precedence.

The Notice of Potential Change and COR procedures above are less formal procedures which precede the more formal Claim. A Notice of Potential Change does not constitute a Claim. A COR does not constitute a Claim; **except that** if insufficient time remains before the Claim deadline (see Article 4.5.4) for Contractor to submit a COR and for Owner to process and reject the COR under Article 4.5.2, then either (1) Contractor may submit a COR which Owner shall

treat as a Claim, but only if the COR complies with all requirements in this Article 4.5 and Article 7 for COR's and Claims, or (2) a COR is not required so long as a Claim complying with this Article 4.5 is timely submitted.

A Claim does not include vouchers, invoices, progress payment applications, or other routine or authorized forms of requests for progress payments on the Contract; however, those documents remain "claims" for purposes of the California False Claims Act. A Claim does not include a Government Code Claim. ("Government Code Claim" means a claim under Government Code sections 900 et seq. and 910 et seq.)

#### **4.5.4 TIME FOR SUBMITTING CLAIM; WAIVER**

Contractor shall submit a Claim to the Owner's construction manager (or in the absence of a construction manager, to Architect and Owner) within fifteen (15) days of the earliest of the following events: (a) The Completion of the Work; (b) the thirtieth (30th) continuous day without labor by Contractor; or (c) Contractor's submission of a final progress payment application. The deadline for filing a Claim is the "Claim Deadline." Owner's rejection, or lack of rejection, of a COR at any time does not affect the requirement to submit a claim by the Claim Deadline.

In addition, on or before the Claim Deadline, Contractor shall submit to Owner, in writing, a list and a summary of all Claims for money or time extensions under or arising out of this Contract, which were timely filed and fully compliant with the Contract's requirements for Claims, and which the Contractor wishes to pursue in whole or in part. This Claim summary requirement shall not extend the time for submitting a Claim.

Failure to timely submit a Claim, failure to include a Claim in the Claim summary, or failure to comply with any of the Claim requirements in the Contract, including but not limited to this Article 4, will act as a complete waiver of Contractor's rights to (a) recover money or time on the issues for which a Claim was required, (b) submit a Government Code Claim for the money or time (see Section 4.5.6.3), and (c) initiate any action, proceeding or litigation for the money or time, regardless of the merits. Contractor will not have satisfied a condition precedent or exhausted administrative remedies. Owner does not have an obligation to reject the Claim for a failure to comply with any of the Claim requirements in the Contract, including the lack of certification, and any failure by Owner to reject, or any delay in rejecting, a Claim on that basis does not waive the Owner's right to reject the Claim on that basis at a later time. In no event may the Contractor reserve its rights to assert a Claim for a time extension or additional money beyond the timelines set forth in this provision unless the Owner agrees in writing to allow the reservation.

#### **4.5.5 CONTENT OF CLAIM**

##### ***4.5.5.1 Claim Format; Waiver***

Every Claim shall be in writing. All money or time extensions sought must be stated and itemized in the Claim at the time submitted. The responsibility to substantiate Claims shall rest

with the Contractor, and the Contractor shall furnish reasonable documentation to support each Claim, including as applicable, that documentation set forth in sections 4.5.5.2 through 4.5.5.4.

In addition, the Contractor shall include a certification with each and every Claim at the time of submission, as follows:

I, \_\_\_\_\_ [name of declarant], declare the following:

\_\_\_\_\_ [Contractor company name] has entered into a Contract with \_\_\_\_\_ [public entity name] on the \_\_\_\_\_ [name of project] Project. \_\_\_\_\_ [Contractor company name] authorized me to prepare the attached Claim for money and/or time extension) for \_\_\_\_\_ [public entity name] regarding \_\_\_\_\_ [Contractor company's name] Work on the Contract, and requesting \$ \_\_\_\_\_ and/or \_\_\_\_\_ additional days), and I prepared the attached Claim. I am the most knowledgeable person at \_\_\_\_\_ [Contractor company name] regarding this Claim.

The attached Claim complies with all laws applicable to submission of a Claim, including but not limited to California Penal Code section 72, Government Code sections 12650 et seq. (False Claims Act), and Business and Professions Code sections 17200 et seq. (Unfair Business Practices Act). I am aware that submission or certification of false claims, or other claims that violate law or the Contract, may lead to fines, imprisonment, and/or other serious legal consequences for myself or \_\_\_\_\_ [Contractor company name].

The attached Claim does not breach the Contract between \_\_\_\_\_ [Contractor company name] and \_\_\_\_\_ [public entity name] for this Project, is not a false claim, does not violate any applicable law, satisfies all provisions of the Contract applicable to submission of the Claim, only contains truthful and accurate supporting data, and only requests money and/or time extensions that accurately reflect the adjustments to money and time for which I believe that \_\_\_\_\_ [public entity name] is responsible under its Contract with \_\_\_\_\_ [Contractor company name].

While preparing this declaration and Claim, I consulted with others (including attorneys, consultants, or others who work for \_\_\_\_\_ [Contractor company name]) when necessary to ensure that the statements were true and correct.

Contractor understands and agrees that any Claim submitted without this certification does not meet the terms of the Contract Documents; that Owner, or Owner's representatives, may reject the Claim on that basis; and that unless Contractor properly and timely files the Claim with the certification, Contractor cannot further pursue the Claim in any forum and all rights to additional money or time for the issues covered by the Claim are waived due to a condition precedent not having been satisfied.

I declare under the penalty of perjury under the laws of the State of California that the foregoing is true and correct. Executed \_\_\_\_\_, 20\_\_, at \_\_\_\_\_, California.

\_\_\_\_\_  
\_\_\_\_\_ [name of declarant]

Contractor's failure to timely submit a certification will constitute a complete waiver of Contractor's rights to (a) recover money or time on the issues for which a Claim was required, (b) submit a Government Code Claim (see Section 4.5.6.3) for the money or time, and (c) initiate any action, proceeding or litigation for the money or time. Contractor will not have satisfied a condition precedent or exhausted administrative remedies.

#### **4.5.5.2 *Claims for Additional Money***

Each Claim for additional money (including but not limited to those described in (b) and (c) of the first paragraph of Section 4.5.3) must include all facts supporting the Claim, including but not limited to all supporting documentation plus a written analysis as to (a) why the claimed cost was incurred, (b) why Contractor could not mitigate its costs, (c) why the claimed cost is the responsibility of the Owner, and (d) why the claimed cost is a reasonable amount. In no event will the Contractor be allowed to reserve its rights, whether in a Claim or other document, to assert a Claim for money at a later time or in a manner other than as required by the Contract Documents. Any inclusion of a reservation of rights in a Claim shall be grounds for rejection of the Claim. Any costs not asserted shall be waived. A Claim may not include any costs incurred in preparation of the Claim or in preparation of any underlying COR, including but not limited to costs of delay analysis.

#### **4.5.5.3 *Claims for Additional Time***

##### **4.5.5.3.1 *Notice of Extent of Claim***

If the Contractor wishes to make a Claim for an increase in the Contract Time (including but not limited to Section 4.5.3(a)), the Claim shall include, but not be limited to, all facts supporting the Claim, all documentation of such facts, all information required by the Contract Documents, and a current schedule and delay analysis explaining (a) the nature of the delay, (b) the Owner's responsibility for the claimed delay, (c) the claimed delay's impact on the critical path, (d) the claimed delay's impact on the date of Completion (including an analysis of any float still remaining and whether the alleged delay in work exceeds such remaining float), and (e) why Contractor could not mitigate the delay impacts.

In no event will the Contractor be allowed to reserve its rights, whether in a Claim or other document, to assert a Claim for a time extension at a later time or in a manner other than as required by the Contract Documents. Any inclusion of a reservation of rights in a Claim shall be grounds for rejection of the Claim. Any time extension not timely asserted in a certified Claim shall be waived.

#### 4.5.5.3.2 *Unusually Severe Weather Claims*

If unusually severe weather is the basis for a Claim for additional time, Contractor must provide Owner data and facts showing that the weather conditions were abnormal for the period of time, could not have been reasonably anticipated or mitigated, and had an adverse effect on the critical path of the scheduled construction.

#### 4.5.5.4 *“Pass Through” Claims*

A Subcontractor or supplier to Contractor may not submit a request for additional time or money directly to the Owner. If a subcontractor or supplier submits a request for additional money or time to Contractor and Contractor wishes to pass it through to Owner, then Contractor must comply with all requirements of Section 4.5, including Notices of Potential Change, Change Order Requests, and Claims, and Public Contract Code section 9204, subdivision (d)(5). Contractor must prepare and submit its own analysis of the Subcontractor’s request, and the Claim must include a copy of the Subcontractor’s request along with any other necessary supporting documentation.

In addition to the other requirements in the Contract Documents, including but not limited to this Section 4.5, the Contractor’s analysis of the Subcontractor’s request must include Contractor’s detailed explanation as to why the Subcontractor or supplier’s request is the Owner’s responsibility, including Contractor’s analysis of (a) why the amount of damages the Subcontractor or supplier requests is justified and appropriate, (b) how Contractor’s breach of the subcontract caused the Subcontractor or supplier to incur these damages, and (c) how the Owner’s breach of the Contract caused the Contractor’s breach of the subcontract. Any Contractor Claim that fails to include the above information, or that states that Owner is responsible for the Subcontractor’s request only in the event that Contractor is found to owe money to Subcontractor, shall act as a complete waiver of Contractor’s rights to (a) recover money or time on the issues for which a Claim was required, (b) submit a Government Code Claim (see Section 4.5.6.3) for the money or time, and (c) initiate any action, proceeding or litigation for the money or time. Contractor will not have satisfied a condition precedent or exhausted administrative remedies.

#### 4.5.6 **PROCEDURES FOR CLAIMS (PUBLIC CONTRACT CODE SECTION 9204)**

Claims are subject to this section 4.5.6, the separate procedures and substantive provisions of Sections 4.5.1 through 4.5.5, all other applicable provisions in the Contract Documents, and Public Contract Code section 9204. In addition, for claims that are \$375,000 or less, the provisions of Public Contract Code section 20104 et. seq. also apply, to the extent they do not conflict with Public Contract Code section 9204.

##### 4.5.6.1 *Claims*

The Owner shall conduct a reasonable review of the Claim and shall respond in writing to any written Claim within 45 days of receipt of the Claim. During that 45 day period, plus any

extension, Owner may request in writing additional documentation supporting the Claim or relating to defenses to the Claim the Owner may have against the Contractor. Owner shall review any additional documentation Contractor supplies in response to that request within the 45 day, plus any extension, timeline.

After receipt of a Claim, the 45-day period may be extended by Owner and Contractor. The written response shall identify which portion of the Claim is disputed and what portion is undisputed. If Owner needs approval from its governing board to provide the written response, and the governing board does not meet within the 45 days or any extended period of time, then the Owner shall have up to three days after the next publicly noticed meeting of the governing board to provide the written response. Any payment due on an undisputed portion of the Claim shall be processed and made within sixty (60) days after the Owner issues the written response. Owner's failure to respond to a Claim within the above time periods or to otherwise meet the above time requirements shall result in the Claim being deemed rejected in its entirety.

#### 4.5.6.2 *Meet and Confer*

If the Contractor disputes the Owner's written response, or the Owner fails to respond within the time prescribed, the Contractor may so notify the Owner, in writing, either within 15 days of receipt of the Owner's response or within 15 days of the Owner's failure to respond within the time prescribed, respectively, and demand an informal conference to meet and confer for settlement of the issues in dispute. Upon a written demand sent by registered or certified mail return receipt requested, the Owner shall schedule a meet and confer conference for settlement of the dispute, which shall take place within 30 days of the demand. Upon written agreement of the Owner and Contractor, the conference may take place during regularly scheduled Project meetings.

If Contractor fails to timely notify the Owner that it wishes to meet and confer pursuant to the previous paragraph, then Contractor will have waived all rights to (a) recover money or time on the issues for which a Claim was required, (b) submit a Government Code Claim (see Section 4.5.6.3) for such money or time, and (c) initiate any action, proceeding or litigation for such money or time. Contractor will not have satisfied a condition precedent or exhausted administrative remedies.

Within ten (10) business days after the conclusion of the meet and confer conference, the Owner shall give a written statement to the Contractor identifying the portion of the Claim that remains in dispute and the portion that is undisputed. Any payment due on an undisputed portion of the Claim shall be processed and made within sixty (60) days after the Owner issues the written statement. Within ten (10) business days of issuance of Owner's written statement, Contractor shall identify in writing the disputed portion of the Claim that shall be submitted to non-binding mediation (which may consist of any nonbinding process, including but not limited to neutral evaluation or a dispute review board), with the Owner and Contractor sharing the costs equally. The Owner and Contractor shall mutually agree to a mediator within ten (10) business days after the Contractor has identified in writing the disputed portion of the Claim. If they cannot agree upon a mediator, then each shall select a mediator and those two mediators shall select a qualified neutral third party to mediate the disputed portion of the Claim. (Each party shall bear



the fees and costs its respective mediator charged in connection with the selection of the neutral mediator). The parties may mutually waive in writing the requirement for mediation. If Contractor fails to timely notify the Owner in writing that it wishes to mediate pursuant to this paragraph, Contractor will have waived all right to further pursue the Claim pursuant to section 4.5.4. The parties shall reasonably cooperate to schedule and attend a mediation as soon as reasonably possible. Owner's failure to respond to the Claim within the above time periods or to otherwise meet the above time requirements shall result in the Claim being deemed rejected in its entirety.

#### **4.5.6.3 *Government Code Claim***

If the Claim or any portion remains in dispute after the mediation and Contractor wishes to pursue it, the Contractor **must** file a timely and proper Government Code Claim. The filing of a Government Code Claim is specifically required in addition to all contractual procedures described in Sections 4.5 through 4.5.6.2. The above contractual procedures do not act as a substitute for the Government Code Claim process, and the two sets of procedures shall be sequential with the contractual procedures coming first.

Failure to timely file a Government Code Claim shall act as complete waiver of Contractor's rights to (a) recover money or time on the issues for which a Government Code Claim was required, and (b) initiate any action, proceeding or litigation for such money or time. Contractor will not have satisfied a condition precedent or exhausted administrative remedies.

Owner and Contractor shall proceed with the Government Code Claim according to Government Code, Section 900 et seq., and as otherwise permitted by law. For purposes of the applicable Government Code provisions, and as provided in Public Contract Code section 20104.2(e), the running of the time period within which a Contractor must file a Government Code Claim shall be tolled from the time the Contractor submits a written Claim under Article 4.5 until the time that the Claim is denied, in whole or in part, as a result of the meet and confer process in Section 4.5.6.2, including any period of time utilized by the meet and confer process.

#### **4.5.7 CONTINUING CONTRACT PERFORMANCE**

Despite submission or rejection of a Notice of Potential Change, COR or Claim, the Contractor shall proceed diligently with performance of the Contract as directed by Owner, and the Owner shall continue to make any undisputed payments in accordance with the Contract.

#### **4.5.8 CLAIMS FOR CONCEALED OR UNKNOWN CONDITIONS**

##### **4.5.8.1 *Trenches or Excavations Less Than Four Feet Below the Surface***

If Contractor encounters conditions at the Site which are subsurface or otherwise concealed physical conditions, which differ materially from those indicated in the Contract Documents, or unknown physical conditions of an unusual nature, which differ materially from those ordinarily found to exist and generally recognized as inherent in construction activities of the character provided for in the Contract Documents, the Contractor shall give notice to the Owner promptly

before conditions are disturbed and in no event later than ten (10) days after first observance of the conditions. If Contractor believes that such conditions differ materially and will cause an increase in the Contractor's cost of, time required for, or performance of any part of the Work, Contractor must comply with the provisions above for Notice of Potential Change, Change Order Request, and Claims (beginning with Section 4.5.1).

#### **4.5.8.2 *Trenches or Excavations Greater Than Four Feet Below the Surface***

Pursuant to Public Contract Code section 7104, when any excavation or trenching extends greater than four feet below the surface:

4.5.8.2.1 The Contractor shall promptly, and before the following conditions are disturbed, notify the public entity, in writing, of any:

(1) Material that the Contractor believes may be material that is hazardous waste, as defined in Section 25117 of the Health and Safety Code, that is required to be removed to a Class I, Class II, or Class III disposal site in accordance with the provisions of existing law.

(2) Subsurface or latent physical conditions at the site differing from those indicated by information about the site made available to bidders prior to the deadline for submitting bids.

(3) Unknown physical conditions at the site of any unusual nature, different materially from those ordinarily encountered and generally recognized as inherent in work of the character provided for in the Contract.

4.5.8.2.2 The public entity shall promptly investigate the conditions, and if it finds that the conditions do materially so differ, or do involve hazardous waste, and cause a decrease or increase in the Contractor's cost of, or the time required for, performance of any part of the Work shall issue a change order under the procedures described in the Contract.

4.5.8.2.3 In the event that a dispute arises between the public entity and the Contractor whether the conditions materially differ, or involve hazardous waste, or cause a decrease or increase in the Contractor's cost of, or time required for, performance of any part of the Work, the Contractor shall not be excused from the Contract Completion deadline, but shall proceed with all Work to be performed under the Contract. The Contractor shall retain any and all rights provided either by Contract or by law which pertain to the resolution of disputes and protests between the contracting parties.

#### **4.5.9 INJURY OR DAMAGE TO PERSON OR PROPERTY**

If either party to the Contract suffers injury or damage to person or property because of an act or omission of the other party, any of the other party's employees or agents, or others for whose

acts such party is legally liable, written notice of such injury or damage, whether or not insured, shall be given to the other party within a reasonable time not exceeding ten (10) days after first observance. The notice shall provide sufficient detail to enable the other party to investigate the matter. For a Notice of Potential Change, COR and Claim for additional cost or time related to this injury or damage, Contractor shall follow Section 4.5.

## **ARTICLE 5**

### **SUBCONTRACTORS**

#### **5.1 DEFINITIONS**

##### **5.1.1 SUBCONTRACTOR**

A Subcontractor is a person or entity, who has a contract with the Contractor to perform a portion of the Work at the Site. The term “Subcontractor” is referred to throughout the Contract Documents as if singular in number and means a Subcontractor or an authorized representative of the Subcontractor. The term “Subcontractor” does not include a separate contractor or subcontractors of a separate contractor. To the extent that the term Trade Contractor is utilized in the Contract Documents, it shall have the same meaning as the term “Subcontractor.”

##### **5.1.2 SUB-SUBCONTRACTOR**

A Sub-subcontractor is a person or entity who has a direct or indirect contract with a Subcontractor to perform a portion of the Work at the Site. The term “Sub-subcontractor” is referred to throughout the Contract Documents as if singular in number and means a Sub-subcontractor or an authorized representative of the Sub-subcontractor.

##### **5.1.3 SPECIALTY CONTRACTORS**

If a Subcontractor is designated as a “Specialty Contractor” as defined in section 7058 of the Business and Professions Code, all of the Work outside of that Subcontractor’s specialty shall be performed in compliance with the Subletting and Subcontracting Fair Practices Act, Public Contract Code sections 4100, et seq.

#### **5.2 AWARD OF SUBCONTRACTS AND OTHER CONTRACTS FOR PORTIONS OF THE WORK**

##### **5.2.1 ASSIGNMENT OR SUBSTITUTION - CONSENT OF OWNER**

In accordance with Public Contract Code sections 4107 and 4107.5, no Contractor whose bid is accepted shall, without the written consent of the Owner: substitute any person or entity as a Subcontractor in place of the Subcontractor designated in the original bid; permit any such Subcontract to be assigned or transferred, or allow it to be performed by any person or entity other than the original Subcontractor listed in the original bid; sublet or subcontract any portion of the Work in excess of one-half of one percent (0.5%) of the Contractor’s total bid as to which

its original bid did not designate a Subcontractor. Any assignment or substitution made without the prior written consent of the awarding authority shall be void, and the assignees shall acquire no rights in the Contract. Any consent, if given, shall not relieve Contractor or its Subcontractors from their obligations under the terms of the Contract Documents.

### 5.2.2 GROUND FOR SUBSTITUTION

Pursuant to Public Contract Code section 4107 and the procedure set forth therein, no Contractor whose bid is accepted may request to substitute any person or entity as a Subcontractor in place of a Subcontractor listed in the original bid except in the following instances:

- A. When the Subcontractor listed in the bid after having a reasonable opportunity to do so, fails or refuses to execute a written contract for the scope of work specified in the subcontractor's bid and at the price specified in the subcontractor's bid, when that written contract, based upon the general terms, conditions, plans and specifications for the Project involved or the terms of that Subcontractor's written bid, is presented to the Subcontractor by the Contractor;
- B. When the listed Subcontractor becomes insolvent or the subject of an order for relief in bankruptcy;
- C. When the listed Subcontractor fails or refuses to perform his or her Subcontract;
- D. When the listed Subcontractor fails or refuses to meet the bond requirements of the prime contractor set forth in Public Contract Code section 4108.
- E. When the Contractor demonstrates to the awarding authority, or its duly authorized officer, subject to the further provisions of Public Contract Code section 4107.5, that the name of the Subcontractor was listed as the result of inadvertent clerical error;
- F. When the listed Subcontractor is not licensed pursuant to the Contractor's License Law; or
- G. When the awarding authority, or its duly authorized officer, determines that the Work being performed by the listed Subcontractor is substantially unsatisfactory and not in substantial accordance with the plans and specifications, or the Subcontractor is substantially delaying or disrupting the progress of the Work.
- H. When the listed Subcontractor is ineligible to work on a public works project pursuant to Section 1777.1 of the Labor Code.
- I. When the awarding authority determines that a listed Subcontractor is not a responsible contractor.

5.2.2.1 **No Change in Contract.** Any substitutions of Subcontractors shall not result in any increase in the Contract Sum or result in the granting of any extension of time for Completion of the Work.

5.2.2.2 **Substitution Due to Clerical Error.** The Contractor, as a condition of asserting a claim of inadvertent clerical error in the listing of a Subcontractor, shall, pursuant to Public Contract Code section 4107.5, within two (2) working days after the time of the prime bid opening by the awarding authority, give written notice to the awarding authority and copies of such notice to both the Subcontractor it claims to have listed in error, and the intended Subcontractor who had bid to the Contractor prior to bid opening. Any listed Subcontractor who has been notified by the Contractor in accordance with the provisions of this section as to an inadvertent clerical error, shall be allowed six (6) working days from the time of the prime bid opening within which to submit to the awarding authority and to the Contractor written objection to the Contractor's claim of inadvertent clerical error.

In all other cases, the Contractor must make a request in writing to the awarding authority for the substitution of a subcontractor, giving reasons therefor. The awarding authority shall mail a written notice to the listed Subcontractor giving reasons for the proposed substitution. The listed Subcontractor shall have five (5) working days from the date of such notice within which to file with the awarding authority written objections to the substitution.

Failure to file written objections pursuant to the provisions of this section within the times specified herein shall constitute a complete waiver of objection to the substitution by the listed Subcontractor and, where the ground for substitution is an inadvertent clerical error, an agreement by the listed Subcontractor that an inadvertent clerical error was made.

If written objections are filed, the awarding authority shall give five (5) days' notice to the Contractor and to the listed Subcontractor of a hearing by the awarding authority on the Contractor's request for substitution as provided in Public Contract Code section 4107. The determination by the awarding authority shall be final.

### 5.3 **SUBCONTRACTUAL RELATIONS**

By appropriate agreement, written where legally required for validity, the Contractor shall require each Subcontractor, to the extent of the Work to be performed by the Subcontractor, to be bound to the Contractor by terms of the Contract Documents, and to assume toward the Contractor all obligations and responsibilities, which the Contractor, by the Contract Documents, assumes toward the Owner. Each subcontract agreement shall preserve and protect the rights of the Owner under the Contract Documents with respect to the Work to be performed by the Subcontractor so that subcontracting thereof will not prejudice such rights, and shall allow to the Subcontractor, unless specifically provided otherwise in the subcontract agreement, the benefit of all rights, remedies, and redress against the Contractor that the Contractor, by the Contract Documents, has against the Owner. Where appropriate, the Contractor shall require each Subcontractor to enter into similar agreements with Sub-subcontractors. The Contractor shall make available to each proposed Subcontractor, prior to the execution of the subcontract agreement, copies of the Contract Documents to which the Subcontractor will be bound. Upon

written request of the Subcontractor, the Contractor shall identify to the Subcontractor the terms and conditions of the proposed subcontract agreement, which may be at variance with the Contract Documents. Subcontractors shall similarly make copies of applicable portions of such documents available to their respective proposed Sub-subcontractors.

#### **5.4 CONTINGENT ASSIGNMENT OF SUBCONTRACTS**

Each subcontract agreement for a portion of the Work is assigned by the Contractor to the Owner provided that:

- A. Assignment is effective only after termination of the Contract with the Contractor by the Owner for cause pursuant to Article 14 and only for those subcontract agreements which the Owner accepts by notifying the Subcontractor in writing; and
- B. Assignment is subject to the prior rights of the surety, if any, obligated under any bond relating to the Contract.

#### **5.5 SUBCONTRACTOR'S RESPONSIBILITIES**

Every Subcontractor is bound to the following provisions, unless specifically noted to the contrary in the Subcontractor's contract subject to the limitations of section 5.3.

##### **5.5.1 SUPERVISION BY SUBCONTRACTORS**

Subcontractors shall efficiently supervise their Work, using their best skill and attention. Each of them shall carefully study and compare all Drawings, Specifications, and other instructions, shall at once report to Contractor any error or omission which any of them may discover, and shall subsequently proceed with the Work in accordance with instructions from the Contractor concerning such error or omission. Each Subcontractor shall be fully responsible for and shall bear the full risk of loss of all of its property.

##### **5.5.2 DISCIPLINE AND ORDER**

Each Subcontractor shall at all times enforce strict discipline and good order among its Subcontractors, material or equipment suppliers, or their agents, employees, and invitees, and shall establish and maintain surveillance over the activities of each of the foregoing to minimize any disturbance, damage, pollution, or unsightly conditions relative to property areas adjacent to or in the vicinity of the Site. The Contractor shall have the right to remove from the Work any employee of a Subcontractor for any reason including, without limitation, incompetence or carelessness.

##### **5.5.3 DEFECTS DISCOVERED**

Should the proper and accurate performance of the Work depend upon the proper and accurate performance of other work not included in its Contract, each Subcontractor shall use all

necessary means to discover any defect in such other work and shall allow the Contractor, the Owner and Architect, or other Subcontractors as Contractor elects, a reasonable amount of time to remedy such defects. If the Subcontractor should proceed with its Work, it shall be considered to have accepted such other work, unless the Subcontractor shall have proceeded pursuant to instructions in writing by the Contractor over its written objection.

#### **5.5.4 SUBCONTRACTOR INFORMATION**

Each Subcontractor shall submit to the Owner, the Contractor, or the Architect, as the case may be, promptly when requested by any of the foregoing, information with respect to the names, responsibilities, and titles of the principal members of its staff, the adequacy of the Subcontractor's equipment and the availability of necessary materials and supplies. Subcontractor shall fully cooperate with Contractor in its periodic review of the adequacy of Subcontractor's supervision, personnel, and equipment, and the availability of necessary materials and supplies and shall promptly comply with the requirements of the Contractor with respect thereto.

#### **5.5.5 TEMPORARY STRUCTURES**

Each Subcontractor shall furnish at its expense its own temporary facilities and storage except those specifically agreed to be furnished to it by the Contractor in the Subcontract Agreement. Subcontractor's material storage rooms and field offices, etc., will be placed in locations designated by the Contractor. When it becomes necessary due to the progress of the Work for the Subcontractor to relocate its field operations, it will do so in an expeditious manner and at no additional cost to Contractor or Owner. The construction of material storage rooms and field offices, etc., will be of fire resistive material only, such as concrete or gypsum block, rated drywall, or sheet metal.

#### **5.5.6 CHARGES TO SUBCONTRACTOR**

Each Subcontractor may be subject to the Contractor's reasonable charges for hoisting, repair to other work caused by the fault or negligence of Subcontractor, removal of Subcontractor's rubbish, and clean-up occasioned by Subcontractor.

#### **5.5.7 FINES IMPOSED**

Subcontractor shall comply with and pay any fines or penalties imposed for violation of any applicable law, ordinance, rule, regulation, Environmental Impact Report mitigation requirement, and lawful order of any public authority, including, without limitation, all OSHA and California OSHA requirements and those of other authorities having jurisdiction of the safety of persons or property.

#### **5.5.8 PROJECT SIGNS**

Each Subcontractor shall not display on or about the Project any sign, trademark, or other advertisement. The Owner will permit a single Project sign, which shall be subject to the

Owner's prior and sole discretion and approval, as to all matters including, without limitation, size, location, material, colors, style and size of printing, logos and trademarks (if any), text, and selection of names to be displayed.

#### **5.5.9 REMEDIES FOR FAILURE TO PERFORM**

Without limitation of any other right or remedy available to Contractor under the Contract Documents or at law, should: the Subcontractor fail to perform its portion of the Work in a skilled and expeditious manner in accordance with the terms of the Contract Documents with sufficient labor, materials, equipment, and facilities; delays the progress of the job or otherwise fail in any of its obligations; or either a receiver is appointed for the Subcontractor or the Subcontractor is declared to be bankrupt or insolvent, and such appointment, bankruptcy, or insolvency proceedings or declaration is not set aside within thirty (30) days, then the Contractor, upon three (3) days' notice to the Subcontractor (subject to the requirements of Pub. Contracts Code, § 4107), may provide such labor, materials, or perform such work and recover the cost plus profit and overhead from monies due or to become due thereafter to the Subcontractor. The Contractor may terminate the employment of the Subcontractor, taking possession of its tools, materials, and equipment related to the Work and cause the entire portion of the Subcontractor's Work to be finished either by another Subcontractor or through the Contractor's own forces.

#### **5.5.10 DISPUTES NOT TO AFFECT WORK**

In the event of any dispute as to whether or not any portion of the Work is within the scope of the Work to be performed by a Subcontractor, or any dispute as to whether or not the Subcontractor is entitled to a Change Order for any Work requested of it or entitled to payment, the Subcontractor shall continue to proceed diligently with the performance of the Work. Regardless of the size or nature of the dispute, the Subcontractor shall not under any circumstances cease or delay performance of its portion of the Work during the existence of the dispute. The Contractor shall continue to pay the undisputed amounts called for under the Subcontract Agreement during the existence of the dispute. Any party stopping or delaying the progress of the Work because of a dispute shall be responsible in damages to the Owner, the Architect, and the Contractor for any losses suffered as a result of the delay.

#### **5.5.11 APPLICATION FOR PAYMENT**

Contractor agrees to advise the Subcontractor if any documentation in connection with the Subcontractor's application for payment has not been accepted or is in any way unsatisfactory.



#### **5.5.12 COMPLIANCE WITH PROCEDURES**

Each Subcontractor shall comply with all procedures established by the Contractor for coordination among the Owner, the Owner's consultants, Architect, Contractor, and the various Subcontractors for coordination of the Work with all local municipal authorities, government agencies, utility companies, and any other agencies with jurisdiction over all or any portion of the Work. The Subcontractor shall cooperate fully with all of the foregoing parties and authorities.

#### **5.5.13 ON-SITE RECORD KEEPING**

Subcontractor shall comply with all on-Site record keeping systems established by the Contractor and shall, upon the request of the Contractor, provide the Contractor with such information and reports as the Contractor may deem appropriate. Without limitation of the foregoing, the Subcontractor shall assemble all required permits and certificates so that they are readily accessible at the Site.

#### **5.5.14 NON-EXCLUSIVE OBLIGATIONS**

The specific requirements of Article 5 are not intended to exclude the obligation of the Subcontractor to comply with any of the other provisions of the General Conditions and the other Contract Documents which are relevant to the proper performance of its portion of the Work.

### **ARTICLE 6**

#### **CONSTRUCTION BY OWNER OR BY SEPARATE CONTRACTORS**

##### **6.1 OWNER'S RIGHT TO PERFORM CONSTRUCTION AND TO AWARD SEPARATE CONTRACTS**

###### **6.1.1 OWNER'S RIGHTS**

The Owner reserves the right to perform Project work with the Owner's own forces, or to award separate contracts in connection with such other work or other construction or operations on the Site under contract conditions identical or substantially similar to these including those portions related to insurance. Upon the election to perform such work with its own forces or by separate contracts, the Owner shall notify the Contractor. If the Contractor claims that delay or additional cost is involved because of such action by the Owner, the Contractor shall proceed pursuant to Section 4.5 in the Contract Documents.

###### **6.1.2 DESIGNATION AS CONTRACTOR**

When separate contracts are awarded for different portions of the Project or other construction or operations on the Site, the term "Contractor" in the Contract Documents in each of those contracts shall mean the contractor who executes each separate Owner/Contractor agreement.

### **6.1.3 CONTRACTOR DUTIES**

The Contractor shall have overall responsibility for coordination and scheduling of the activities of the Owner's own forces and of each separate contractor with the Work of the Contractor, who shall cooperate with them. The Contractor shall participate with other separate contractors and the Owner in reviewing their construction schedules when directed to do so. The Contractor shall make any revisions to the construction schedule and Contract Sum deemed necessary after a joint review and mutual agreement. The construction schedules shall then constitute the schedules to be used by the Contractor, separate contractors, and the Owner until subsequently revised. If Contractor fails to fulfill these obligations, Owner may exercise its rights under section 2.4. The right of Owner to carry out the Work under section 2.4 shall not give rise to a duty on the part of Owner to exercise this right for the benefit of Contractor or any other person or entity, except to the extent required by section 6.1.4.

### **6.1.4 OWNER OBLIGATIONS**

Unless otherwise provided in the Contract Documents, when the Owner performs work related to the Project with the Owner's own forces, the Owner shall be deemed to be subject to the same obligations, and to have the same rights, which apply to the Contractor under the General Conditions, including, without excluding others, those stated in Article 3, this Article 6 and Articles 10 and 12.

## **6.2 MUTUAL RESPONSIBILITY**

### **6.2.1 DELIVERY AND STORAGE**

The Contractor shall afford the Owner and separate contractors reasonable opportunity for delivery and storage of their materials and equipment and performance of their activities, and shall connect and coordinate the separate contractors' construction and operations with theirs as required by the Contract Documents.

### **6.2.2 NOTICE BY CONTRACTOR**

If part of the Contractor's Work depends upon proper execution or results from work by the Owner or a separate contractor, the Contractor shall, prior to proceeding with that portion of the Work, promptly report to the Owner patent discrepancies or defects in such other construction that would render it unsuitable for such proper execution and results. Failure of the Contractor to so report shall constitute an acknowledgment that the Owner's or separate contractors' completed or partially completed construction is fit and proper to receive the Contractor's Work, except as to defects not then reasonably discoverable.

### **6.2.3 COSTS INCURRED**

Costs, expenses, and damages caused by delays, improperly timed activities, defective construction, or damages to another's work/Work or property shall be borne by the party responsible. Should Contractor cause damage to the work or property of any other contractor on

the Project, or to the Project or property of a third party, or cause any delay to any such contractor or third party, the Contractor shall defend, indemnify and hold Owner harmless for such damage or delay under Section 3.16, above. Owner may withhold from progress payments and/or retention the cost of delay or damage to another contractor's work or damage to another contractor's property or to the property of Owner caused by Contractor.

#### **6.2.4 CORRECTION OF DAMAGE**

The Contractor shall promptly remedy damage wrongfully caused by the Contractor to completed or partially completed construction or to property of the Owner or separate contractors.

#### **6.3 OWNER'S RIGHT TO CLEAN UP**

If a dispute arises among the Contractor, separate contractors, and the Owner as to the responsibility under their respective contracts for maintaining the premises and surrounding area free from waste materials and rubbish as described in Section 3.13, the Owner may clean up and allocate the cost among those responsible as the Owner determines to be just.

### **ARTICLE 7**

#### **CHANGES IN THE WORK**

##### **7.1 CHANGES**

###### **7.1.1 NO CHANGES WITHOUT AUTHORIZATION**

The Owner reserves the right to change the Work by making such alterations, deviations, additions to, or deletions from the plans and specifications, as may be deemed by the Owner to be necessary or advisable for the proper Completion or construction of the Work contemplated, and Owner reserves the right to require Contractor to perform such work. No adjustment will be made in the Contract unit price of any Contract item regardless of the quantity ultimately required.

Owner shall compensate Contractor with money or grant extra time for any extra work ordered by the Owner to be performed. Contractor shall follow the provisions of 7.6 and 7.7 when requesting additional money or additional time. Contractor shall expeditiously perform all extra work upon direction, even if no agreement has been reached on extra time or money. For all such changes resulting in a credit to Owner, Contractor shall follow 7.5 and 7.7 in providing the credit to Owner. Contractor shall bring all potential credits to the Owner's attention.

There shall be no change whatsoever in the drawings, specifications, or in the Work or payments under the Contract Documents without an executed Change Order, Construction Change Directive, or order by the Owner pursuant to Section 7.1.2. Owner shall not be liable for the cost of any extra work or any substitutions, changes, additions, omissions, or deviations from the Drawings and Specifications unless the same shall have been properly requested under Section

4.5 and authorized by, and the cost thereof approved in writing by, Change Order or Construction Change Directive. No extension of time for performance of the Work shall be allowed hereunder unless request for such extension is properly made under Section 4.5 and such time is thereof approved in writing by Change Order or Construction Change Directive. The provisions of the Contract Documents shall apply to all such changes, additions, and omissions with the same effect as if originally embodied in the Drawings and Specifications.

#### **7.1.2 AUTHORITY TO ORDER MINOR CHANGES**

The Owner has authority to order minor changes in the Work not involving any adjustment in the Contract Sum, an extension of the Contract Time, or a change which is inconsistent with the intent of the Contract Documents. Such changes shall be effected by written Construction Change Directive and shall be binding on the Contractor. The Contractor shall carry out such written orders promptly.

#### **7.2 CHANGE ORDERS (“CO”)**

A CO is a written instrument signed by the Owner and the Contractor, stamped (or sealed) and signed by Architect, and approved by the Owner’s Governing Board and DSA, stating the agreement of Owner and Contractor upon all of the following:

- A. A change in the Work;
- B. The amount of the adjustment in the Contract Sum, if any; and
- C. The extent of the adjustment in the Contract Time, if any.

Unless expressly stated otherwise in the CO, any CO executed by Owner and Contractor constitutes and includes full and complete money and time (including but not limited to, adjustments to money and time) for all costs and effects caused by any of the changes described within it. Unless expressly stated otherwise in the CO, in consideration for the money received for the changes described in the CO, Contractor waives all Claims for all costs and effects caused by any of the changes, including but not limited to labor, equipment, materials, delay, extra work, overhead (home and field), profit, direct costs, acceleration, disruption, impaired productivity, time extensions, and any the costs and effects on Subcontractors and suppliers of any tier.

### **7.3 CONSTRUCTION CHANGE DIRECTIVES (“CCD”)**

#### **7.3.1 DEFINITION**

A CCD is a written unilateral order signed by the Owner, and if necessary by the Architect, directing a change in the Work and stating an adjustment, if any, in the Contract Sum or Contract Time, or both. The Owner may by CCD, without invalidating the Contract, order changes in the Work within the general scope of the Contract consisting of additions, deletions, or other revisions pursuant to Section 7.1.1.

#### **7.3.2 USE TO DIRECT CHANGE**

A CCD shall be used in the absence of agreement on the terms of a CO. If Contractor disagrees with the terms of a CCD, it shall nevertheless perform the work directed by the CCD, but it may pursue the Notice of Potential Change, COR and Claim procedures of Section 4.5 if Contractor believes it is entitled to changes in the Contract Sum or Contract Time.

### **7.4 REQUEST FOR INFORMATION (“RFI”)**

#### **7.4.1 DEFINITION**

An RFI is a written request prepared by the Contractor asking the Owner to provide additional information necessary to clarify an item which the Contractor feels is not clearly shown or called for in the drawings or specifications, or to address problems which have arisen under field conditions.

#### **7.4.2 SCOPE**

The RFI shall reference all the applicable Contract Documents including specification section, detail, page numbers, drawing numbers, and sheet numbers, etc. The Contractor shall make suggestions and/or interpretations of the issue raised by the RFI. An RFI cannot modify the Contract Sum, Contract Time, or the Contract Documents.

#### **7.4.3 RESPONSE TIME**

Unless Owner expressly directs otherwise in writing, Contractor shall submit RFIs directly to the Architect, with copies forwarded to the Owner. Contractor shall submit a revised and updated priority schedule with each RFI. The Architect shall endeavor to follow the Contractor’s requested order of priorities. The Owner and Contractor agree that an adequate time period for the Architect (or other designated recipient of the RFI) to respond to an RFI is generally fourteen (14) calendar days after the Architect’s receipt of an RFI, unless the Owner and Contractor agree otherwise in writing. However, in all cases, the Architect shall take such time, whether more or less than 14 days, as is necessary in the Architect’s professional judgment to permit adequate review and evaluation of the RFI. If Contractor informs the Architect that it needs a response to an RFI expedited to avoid delay to the critical path, the Architect shall provide a response as quickly as reasonably possible. The total time required for the Architect to respond is subject to

the complexity of the RFI, the number of RFI's submitted concurrently and the reprioritization of pending RFI's submitted by the Contractor, among other things. If Contractor believes that the Architect's response results in a change in the Work that warrants additional money or time, or that Architect's response was unreasonably delayed and caused delay to the Work's critical path, Contractor shall follow the procedures for additional money or time under Section 4.5. No presumption shall arise as to the timeliness of the response if the response is more than fourteen (14) days after the Architect's receipt of the RFI. Contractor shall review the Contract Documents before submitting an RFI to ensure that the information is not already in the Contract Documents. To compensate the Owner for time and costs incurred for each time the information was already in the Contract Documents, Owner may withhold \$100 from progress payments or retention in addition to any other remedies which Owner may have the right to pursue.

#### **7.4.4 COSTS INCURRED**

The Contractor shall be invoiced by the Owner for any costs incurred for professional services, which shall be withheld from progress payments or retention, if an RFI requests an interpretation or decision of a matter where the information sought is equally available to the party making such request.

### **7.5 REQUEST FOR PROPOSAL ("RFP")**

#### **7.5.1 DEFINITION**

An RFP is Owner's written request asking the Contractor to submit to the Owner an estimate of the effect, including credits, of a proposed change on the Contract Sum and the Contract Time.

#### **7.5.2 SCOPE**

An RFP shall contain adequate information, including any necessary drawings and specifications, to enable Contractor to provide the cost breakdowns required by section 7.7. The Contractor shall not be entitled to any additional money for preparing a response to an RFP, whether ultimately accepted or not.

### **7.6 CHANGE ORDER REQUEST ("COR")**

#### **7.6.1 DEFINITION**

A COR is a written request prepared by the Contractor asking the Owner for additional money or time.

#### **7.6.2 CHANGES IN PRICE**

A COR shall include breakdowns per section 7.7 to validate any proposed change in Contract Sum.

### 7.6.3 CHANGES IN TIME

Where a change in Contract Time is requested, a COR shall also include delay analysis to validate any proposed change to the Contract Time, and shall meet all requirements in these General Conditions, including but not limited to Section 8.4. Any additional time requested shall not be the number of days to make the proposed change, but must be based upon the impact to the Work schedule as defined in section 3.9 and Division 1 of the Specifications.

## 7.7 PRICE OF CHANGE ORDERS

### 7.7.1 SCOPE

Any COR shall provide in writing to the Owner, the Architect and any construction manager, the effect of the proposed CO upon the Contract Sum and the actual cost of construction, which shall include a complete itemized cost breakdown of all labor and material showing actual quantities, hours, unit prices, wage rates, required for the change, and the effect upon the Contract Time of such CO.

### 7.7.2 DETERMINATION OF COST

The amount of the increase or decrease in the Contract Sum resulting from a CO, if any, shall be determined in one or more of the following ways as applicable to a specific situation:

- A. Mutual acceptance of a lump sum properly itemized and supported by sufficient substantiating data to permit evaluation;
- B. Unit prices stated in the Contractor's original bid, the Contract Documents, or subsequently agreed upon between the Owner and the Contractor;
- C. Cost to be determined in a manner agreed upon by the parties and a mutually acceptable fixed or percentage fee; or
- D. By cost of material and labor and percentage of overhead and profit. If the value is determined by this method the following requirements shall apply:

#### 1. **Daily Reports by Contractor.**

a) General: At the close of each working day, the Contractor shall submit a daily report to the Inspector of Record and any construction manager, on forms approved by the Owner, together with applicable delivery tickets, listing all labor, materials, and equipment involved for that day, the location of the work, and for other services and expenditures when authorized concerning extra work items. An attempt shall be made to reconcile the report daily, and it shall be signed by the Inspector of Record and the Contractor. In the event of disagreement, pertinent notes shall be entered by each party to explain points which cannot be resolved immediately. Each party shall retain a signed copy

of the report. Reports by Subcontractors or others shall be submitted through the Contractor.

- b) Labor: Show names of workers, classifications, and hours worked.
- c) Materials: Describe and list quantities of materials used.
- d) Equipment: Show type of equipment, size, identification number, and hours of operation, including, if applicable, loading and transportation.
- e) Other Services and Expenditures: Describe in such detail as the Owner may require.

2. **Basis for Establishing Costs.**

a) Labor will be the actual cost for wages prevailing locally for each craft or type of workers at the time the extra work is done, plus employer payments of payroll taxes and insurance, health and welfare, pension, vacation, apprenticeship funds, and other direct costs resulting from Federal, State, or local laws, as well as assessments or benefits required by lawful collective bargaining agreements. The use of a labor classification, which would increase the extra work cost, will not be permitted unless the Contractor establishes the necessity for such additional costs. Labor costs for equipment operators and helpers shall be reported only when such costs are not included in the invoice for equipment rental.

b) Materials shall be at invoice or lowest current price at which such materials are locally available and delivered to the Site in the quantities involved, plus sales tax, freight, and delivery.

The Owner reserves the right to approve materials and sources of supply or to supply materials to the Contractor if necessary for the progress of the Work. No markup shall be applied to any material provided by the Owner.

c) Tool and Equipment Rental. No payment will be made for the use of tools which have a replacement value of \$100 or less.

Regardless of ownership, the rates to be used in determining equipment rental costs shall not exceed listed rates prevailing locally at equipment rental agencies or distributors at the time the work is performed.

The rental rates paid shall include the cost of fuel, oil, lubrication, supplies, small tools, necessary attachments, repairs and maintenance of any kind, depreciation, storage, insurance, and all incidentals.

Necessary loading and transportation costs for equipment used on



the extra work shall be included. If equipment is used intermittently and, when not in use, could be returned to its rental source at less expense to the Owner than holding it at the work Site, it shall be returned unless the Contractor elects to keep it at the work Site at no expense to the Owner.

All equipment shall be acceptable to the Inspector of Record, in good working condition, and suitable for the purpose for which it is to be used. Manufacturer’s ratings and modifications shall be used to classify equipment, and equipment shall be powered by a unit of at least the minimum rating recommended by the manufacturer.

d) Other Items. The Owner may authorize other items which may be required on the extra work. Such items include labor, services, material, and equipment which are different in their nature from those required by the Work, and which are of a type not ordinarily available from the Contractor or any of the Subcontractors. Invoices covering all such items in detail shall be submitted with the Application for Payment.

e) Invoices. Vendors’ invoices for material, equipment rental, and other expenditures shall be submitted with the COR. If the Application for Payment is not substantiated by invoices or other documentation, the Owner may establish the cost of the item involved at the lowest price which was current at the time of the Daily Report.

f) Overhead, premiums and profit. For overhead, including direct costs, submit with the COR and include: home office overhead, off-Site supervision, CO preparation/negotiation/research for Owner initiated changes, time delays, project interference and disruption, additional guaranty and warranty durations, on-Site supervision, additional temporary protection, additional temporary utilities, additional material handling costs, and additional safety equipment costs.

**7.7.3 FORMAT FOR PROPOSED COST CHANGE**

The following format shall be used as applicable by the Owner and the Contractor to communicate proposed additions and deductions to the Contract.

	<u><b>EXTRA</b></u>	<u><b>CREDIT</b></u>
A. Material (attach itemized quantity and unit cost plus sales tax, invoices, receipts, truck tags, etc., for force account work)	_____	_____
B. Labor (attach itemized hours and rates, daily logs, certified payroll, etc.)	_____	_____

C.	Equipment (attach any invoices)	_____	_____
D.	Subtotal	_____	_____
E.	If Subcontractor performed Work, add Subcontractor's overhead and profit to portions performed by Subcontractor, not to exceed fifteen percent (15%) of item D.	_____	_____
F.	Liability and Property Damage Insurance, Worker's Compensation Insurance, Social Security, and Unemployment Taxes, not to exceed twenty-five percent (25%) of Item B.	_____	_____
G.	Subtotal	_____	_____
H.	General Contractor's Overhead and Profit, not to exceed fifteen percent (15%) of Item G; and for work performed by subcontractors, not to exceed five percent (5%).	_____	_____
I.	Subtotal	_____	_____
J.	Bond not to exceed one percent (1%) of Item I.	_____	_____
K.	TOTAL	_____	_____

It is expressly understood that the value of such extra work or changes, as determined by any of the aforementioned methods, expressly includes (1) any and all of the Contractor's costs and expenses resulting from additional time required on the project or resulting from delay to the project, and (2) any costs of preparing a COR, including but not limited to delay analysis. Any costs or expenses not included are deemed waived.

**7.7.4 DISCOUNTS, REBATES, AND REFUNDS**

For purposes of determining the cost, if any, of any change, addition, or omission to the Work hereunder, all trade discounts, rebates, refunds, and all returns from the sale of surplus materials and equipment shall accrue and be credited to the Contractor, and the Contractor shall make provisions so that such discounts, rebates, refunds, and returns may be secured, and the amount thereof shall be allowed as a reduction of the Contractor's cost in determining the actual cost of construction for purposes of any change, addition, or omissions in the Work as provided herein.

#### **7.7.5 ACCOUNTING RECORDS**

With respect to portions of the Work performed by COs and CCDs on a time-and-materials, unit-cost, or similar basis, the Contractor shall keep and maintain cost-accounting records satisfactory to the Owner, which shall be available to the Owner on the same terms as any other books and records the Contractor is required to maintain under the Contract Documents.

#### **7.7.6 NOTICE REQUIRED**

Contractor shall submit a written Notice of Potential Change for additional money or time pursuant to section 4.5.1.

#### **7.7.7 APPLICABILITY TO SUBCONTRACTORS**

Any requirements under this Article 7 shall be equally applicable to COs or CCDs issued to Subcontractors by the Contractor to the same extent required of the Contractor.

#### **7.8 WAIVER OF RIGHT TO CLAIM MONEY OR TIME**

Failure to demand money based on costs, or time extensions, as part of a COR constitutes a complete waiver of Contractor's right to claim the omitted money or time. All money or time for an issue must be included in the COR at the time submitted.

### **ARTICLE 8**

#### **TIME**

#### **8.1 DEFINITIONS**

##### **8.1.1 CONTRACT TIME**

Unless otherwise provided, Contract Time is the period of time, including authorized adjustments, allotted in the Contract Documents for Completion of the Work.

##### **8.1.2 NOTICE TO PROCEED**

Contractor shall not commence the Work until it receives a Notice to Proceed from Owner. The date of commencement of the Work is the date established in the Notice to Proceed. The date of commencement shall not be postponed by the failure to act of the Contractor or of persons or entities for whom the Contractor is responsible.

##### **8.1.3 DAYS**

The term "day" as used in the Contract Documents shall mean calendar day unless otherwise specifically defined.

## 8.2 HOURS OF WORK

### 8.2.1 SUFFICIENT FORCES

Contractors and Subcontractors shall furnish sufficient forces to ensure the prosecution of the Work in accordance with the Construction Schedule.

### 8.2.2 PERFORMANCE DURING WORKING HOURS

Work shall be performed during regular working hours except that in the event of an emergency or when required to complete the Work in accordance with job progress, work may be performed outside of regular working hours with the advance written consent of the Owner.

### 8.2.3 LABOR CODE APPLICATION

As provided in Article 3 (commencing at § 1810), Chapter 1, Part 7, Division 2 of the Labor Code, eight (8) hours of labor shall constitute a legal day's work. The time of service of any worker employed at any time by the Contractor or by any Subcontractor on any subcontract under this Contract, upon the work or upon any part of the work contemplated by this Contract, is limited and restricted to eight (8) hours during any one calendar day and forty (40) hours during any one calendar week, except as hereinafter provided. Notwithstanding the provision hereinabove set forth, work performed by employees of Contractors in excess of eight (8) hours per day and forty (40) hours during any one week shall be permitted upon this public work with compensation provided for all hours worked in excess of eight (8) hours per day at not less than one and one-half (1-1/2) times the basic rate of pay.

Contractor or subcontractor shall pay to the Owner a penalty of Twenty-five Dollars (\$25.00) for each worker employed in the execution of this Contract by the Contractor, or by any Subcontractor, for each calendar day during which such worker is required or permitted to work more than eight (8) hours in any calendar day and forty (40) hours in any one (1) calendar week, in violation of the provisions of Article 3 (commencing at § 1810), Chapter 1, Part 7, Division 2 of the Labor Code, unless compensation for the workers so employed by Contractor is not less than one and one-half (1-1/2) times the basic rate of pay for all hours worked in excess of eight (8) hours per day.

### 8.2.4 COSTS FOR AFTER HOURS INSPECTIONS

If the work done after hours is required by the Contract Documents to be done outside the Contractor's or the Inspector of Record's regular working hours, the costs of any inspections, if required to be done outside normal working hours, shall be borne by the Owner.

If the Owner allows the Contractor to do work outside regular working hours for the Contractor's own convenience, the costs of any inspections required outside regular working hours, among other remedies, shall be invoiced to the Contractor by the Owner and withheld from progress payments and/or retention. Contractor shall give Owner at least 48 hours' notice prior to working outside regular working hours.

If the Contractor elects to perform work outside the Inspector of Record's regular working hours, costs of any inspections required outside regular working hours, among other remedies, may be invoiced to the Contractor by the Owner and withheld from progress payments and/or retention.

#### **8.2.5 TIME FOR COMMENCEMENT BY SUBCONTRACTORS**

Unless otherwise provided in the Contract Documents, all Subcontractors shall commence their Work within two (2) consecutive business days after notice to them by the Contractor and shall prosecute their Work in accordance with the progress of the Work.

### **8.3 PROGRESS AND COMPLETION**

#### **8.3.1 TIME OF THE ESSENCE**

Time limits stated in the Contract Documents are of the essence of the Contract. By executing the Agreement the Contractor confirms that the Contract Time is a reasonable period for performing the Work.

#### **8.3.2 NO COMMENCEMENT WITHOUT INSURANCE**

The Contractor shall not knowingly, except by agreement or instruction of the Owner, in writing, commence operations on the Site or elsewhere prior to the effective date of insurance required by Article 11 to be furnished by the Contractor. The date of commencement of the Work shall not be changed by the effective date of such insurance.

#### **8.3.3 EXPEDITIOUS COMPLETION**

The Contractor shall proceed expeditiously to perform the Work, with adequate forces, labor, materials, equipment, services and management, and shall achieve Completion within the Contract Time.

### **8.4 EXTENSIONS OF TIME - LIQUIDATED DAMAGES**

#### **8.4.1 CONDITIONS ALLOWING FOR EXTENSIONS OF TIME TO COMPLETE THE WORK, ONLY (EXCUSABLE DELAY)**

If Contractor exercises due diligence, but the critical path schedule of the Work is unavoidably delayed due to acts of God, acts of public enemy, acts of the Government, acts of the Owner or anyone employed by it, acts of another contractor in performance of a contract (other than this Contract) with the Owner, fires, floods, epidemics, quarantine restrictions, labor disputes, unusually severe weather, or delays of subcontractors due to such causes, the Owner shall extend the Contract Time if Contractor complies with Section 4.5 and Article 7. Owner shall take into consideration other relevant factors such as concurrent delays. Contractor has the burden of proving that any delay was excusable.

#### **8.4.2 COMPENSABLE DELAY (TIME AND MONEY)**

Compensable delays are those excusable delays for which Contractor is also entitled to money. To be compensable, an excusable delay must be one for which the Owner is responsible, where the delay was unreasonable under the circumstances involved, and where the delay was not within the contemplation of the parties; *however*, Contractor shall not be entitled to monetary compensation when (a) Contractor could have reasonably anticipated the delay and avoided or minimized the cost impacts of it, (b) there was a concurrent delay which does not qualify for monetary compensation under this paragraph, (c) the cause of the delay was reasonably unforeseen by the Owner or the delay was caused by factors beyond the control of the Owner, including but not limited to a delay under Section 2.2.8 above or a delay caused by a utility company's failure to perform despite Owner's reasonable arrangements for such performance; or (d) any other defense available to Owner under law or equity applies. Contractor has the burden of proving that any delay was excusable and compensable, including an analysis that establishes non-concurrency.

#### **8.4.3 NOTICE BY CONTRACTOR REQUIRED; PROCEDURES FOR DEMANDING ADDITIONAL TIME OR MONEY**

For notice and other required procedures related to requests by Contractor for additional time or money related to delay, Contractor shall comply with the Contract Documents, including but not limited to Sections 3.18 and 4.5, and Article 7, above.

#### **8.4.4 EARLY COMPLETION**

Regardless of the cause therefore, the Contractor may not maintain any Claim or cause of action against the Owner for damages incurred as a result of its failure or inability to Complete its Work on the Project in a shorter period than established in the Contract Documents, the parties stipulating that the period set forth in the Contract Documents is a reasonable time within which to perform the Work on the Project.

#### **8.4.5 LIQUIDATED DAMAGES**

Failure to Complete the Work within the time and in the manner provided for by the Contract Documents shall subject the Contractor to liquidated damages in the amount, and as described, in Article III of the Contractor's Agreement. The actual occurrence of damages and the actual amount of the damages which the Owner would suffer if the Work were not Completed within the Contract Time are dependent upon many circumstances and conditions which could prevail in various combinations and, from the nature of the case, it is impracticable and extremely difficult to fix the actual damages. Damages which the Owner would suffer in the event of such delay include, but are not limited to, loss of the use of the Work, disruption of activities, costs of administration and supervision, and the incalculable inconvenience and loss suffered by the public.

Accordingly, the parties agree that the amount set forth in the Contractor's Agreement shall be presumed to be the amount of damages which the Owner shall directly incur as a result of each

calendar day by which Completion of the Work is delayed beyond the Contract Time as adjusted by Change Orders.

If Contractor causes delay to any other contractor's work on the Project that results in delayed *completion* of the Project, Contractor shall be subject to liquidated damages for the delay in *completion* of the Project for each calendar day of delay in the amount set forth in Article III of the Contractor's Agreement. The actual occurrence of damages and the actual amount of the damages which the Owner would suffer for such delayed completion of the Project are dependent upon many circumstances and conditions which could prevail in various combinations and, from the nature of the case, it is impracticable and extremely difficult to fix the actual damages. Damages which the Owner would suffer in the event of such delay include, but are not limited to, loss of the use of the other contractor's work and the Project, disruption of activities, costs of administration and supervision, and the incalculable inconvenience and loss suffered by the public.

Accordingly, the parties agree that the amount set forth in the Contractor's Agreement shall be presumed to be the amount of damages which the Owner shall directly incur as a result of each calendar day that *completion* of the Project is delayed as a result of Contractor caused delays to any other contractor's completion of their work.

For Contractor's obligations regarding claims against Owner from other contractors on the Project alleging that Contractor caused delays to their work, see sections 3.7.4, 3.16 and 6.2.3 herein.

If liquidated damages accrue as described above, the Owner, in addition to all other remedies provided by law, shall have the right to assess the liquidated damages at any time, and to withhold liquidated damages (and any interest thereon) at any time from any and all retention or progress payments, which would otherwise be or become due the Contractor. In addition, if it is reasonably apparent to the Owner before liquidated damages begin to accrue that Contractor cannot or will not complete the Work within the Contract Time, Owner may assess and withhold, from retention or progress payments, the estimated amount of liquidated damages that will accrue in the future. If the retained percentage or withheld progress payments are not sufficient to discharge all liabilities of the Contractor incurred under this Section, the Contractor and its sureties shall continue to remain liable to the Owner until all such liabilities are satisfied in full.

If Owner accepts any work or makes any payment under the Contract after a default by reason of delays, the payment or payments shall in no respect constitute a waiver or modification of any Contract provisions regarding time of Completion and liquidated damages.

## **8.5 GOVERNMENT APPROVALS**

Owner shall not be liable for any delays or damages related to the time required to obtain government approvals.

## **ARTICLE 9**

### **PAYMENTS AND COMPLETION**

#### **9.1 CONTRACT SUM**

The Contract Sum is stated in the Agreement, later adjusted by Change Orders and Construction Change Directives, and is the total amount payable by the Owner to the Contractor for performance of the Work under the Contract Documents.

#### **9.2 COST BREAKDOWN**

##### **9.2.1 REQUIRED INFORMATION**

On forms approved by the Owner, the Contractor shall furnish the following:

- A. Within ten (10) days of the mailing, faxing or delivering of the Notice of Award of the Contract, a detailed breakdown of the Contract Sum (Schedule of Values) for each Project or Site. Each item in the schedule of values shall include its proper share of the overhead and profit.
- B. Within ten (10) days of the mailing, faxing or delivering of the Notice of Award of the Contract, a schedule of estimated monthly payment requests (cash flow) due the Contractor showing the values and construction time of the various portions of the Work to be performed by it and by its Subcontractors or material and equipment suppliers containing such supporting evidence as to its correctness as the Owner may require;
- C. Five (5) days prior to the submission of a pay request, an itemized breakdown of work done for the purpose of requesting partial payments;
- D. Within ten (10) days of the mailing, faxing or delivering of the Notice of Award of the Contract, the name, address, telephone number, fax number, license number and classification, and for all projects over Twenty-five Thousand Dollars (\$25,000) the public works contractor registration number, of all of its Subcontractors and of all other parties furnishing labor, material, or equipment for its Contract, along with the amount of each such subcontract or the price of such labor, material, and equipment needed for its entire portion of the Work.

##### **9.2.2 OWNER ACCEPTANCE REQUIRED**

The Owner shall review all submissions received pursuant to paragraph 9.2.1 in a timely manner. All submissions must be accepted by the Owner before becoming the basis of any payment.



## 9.3 APPLICATIONS FOR PAYMENT

### 9.3.1 PROCEDURE

On or before the fifth (5th) day of each calendar month during the progress of the portion of the Work for which payment is being requested, the Contractor shall submit to the Architect, unless there is a construction manager for the Project or the Owner directs otherwise, an itemized Application for Payment for operations completed in accordance with the Schedule of Values through the end of the previous calendar month. Such application shall be notarized, if required, and supported by the following or such portion thereof as the applicable entity requires:

- A. The amount paid to the date of the Application to the Contractor, to all its Subcontractors, and all others furnishing labor, material, or equipment for its Contract;
- B. The amount being requested with the Application for Payment by the Contractor on its own behalf and separately stating the amount requested on behalf of each of the Subcontractors and all others furnishing labor, material, and equipment under the Contract;
- C. The balance that will be due to each of such entities after said payment is made;
- D. A certification that the Record Drawings and Annotated Specifications are current;
- E. The Owner approved additions to and subtractions from the Contract Sum and Time;
- F. A summary of the retentions (each Application shall provide for retention, as set out in Article 9.6);
- G. Material invoices, evidence of equipment purchases, rentals, and other support and details of cost as the Owner may require from time to time;
- H. The percentage of Completion of the Contractor's Work by line item;
- I. A statement showing all payments made by the Contractor for labor and materials on account of the Work covered in the preceding Application for Payment. Such applications shall not include requests for payment of amounts the Contractor does not intend to pay to subcontractors or others because of a dispute or other reason; and
- J. Contractor's monthly reports, daily reports, and monthly schedule updates for all months of Work prior to the Application for Payment that Contractor has not previously submitted.

### **9.3.2 PURCHASE OF MATERIALS AND EQUIPMENT**

As the Contractor is required to order, obtain, and store materials and equipment sufficiently in advance of its Work at no additional cost or advance payment from Owner, to assure that there will be no delays, payment by the Owner for stored material shall be made only in unusual circumstances where the Architect specifically recommends, and Owner specifically approves the payment in writing. If payments are to be made on account of materials and equipment not incorporated in the Work, but delivered and suitably stored at the Site or at some other location agreed upon in writing by the Owner, the payments shall be conditioned upon submission by the Contractor, Subcontractor, or vendor of bills of sale and such other documents satisfactory to the Owner to establish the Owner's title to such materials or equipment free of all liens and encumbrances, and otherwise protect the Owner's interest, including, without limitation, provision of applicable insurance and transportation to the Site. All stored items shall be inventoried, specified by identification numbers (if applicable), released to the Owner by sureties of the Contractor and the Subcontractor and, if stored off-Site, stored only in a bonded warehouse.

### **9.3.3 WARRANTY OF TITLE**

The Contractor warrants that title to all Work covered by an Application for Payment will pass to the Owner no later than the time of payment. The Contractor further warrants that upon submittal of an Application for Payment all Work for which Certificates for Payment have been previously issued and payments received from the Owner shall, to the best of the Contractor's knowledge, information, and belief, be free and clear of liens, claims, security interests, or encumbrances in favor of the Contractor, Subcontractors, material and equipment suppliers, or other persons or entities making a claim by reason of having provided labor, materials, and equipment relating to the Work. Transfer of title to Work does not constitute a waiver by Owner of any defects in the Work.

## **9.4 REVIEW OF PROGRESS PAYMENT**

### **9.4.1 OWNER ACCEPTANCE**

The Owner will, within seven (7) days after receipt of the Contractor's Application for Payment, either accept such payment or notify the Contractor in writing of the Owner's reasons for withholding acceptance in whole or in part as provided in paragraph 9.5.1.

### **9.4.2 OWNER'S REVIEW**

The review of the Contractor's Application for Payment by the Owner will be based, at least in part, on the Owner's observations at the Site and the data comprising the Application for Payment that the Work has progressed to the point indicated. The review is also subject to an evaluation of the Work for conformance with the Contract Documents, to results of subsequent tests and inspections, to minor deviations from the Contract Documents correctable prior to Completion, and to specific qualifications expressed by the Owner. The Owner may reject the Application for Payment if it is not complete under section 9.3. The issuance of a Certificate for

Payment will constitute a representation that the Contractor is entitled to payment in the amount certified, subject to any specific qualifications Owner expresses in the Certificate for Payment. However, Contractor's entitlement to payment may be affected by subsequent evaluations of the Work for conformance with the Contract Documents, test and inspections and discovery of minor deviations from the Contract Documents correctable prior to Completion. The issuance of a Certificate for Payment will not be a waiver by the Owner of any defects in the Work covered by the Application for Payment, nor will it be a representation that the Owner has:

- A. Made exhaustive or continuous on-Site inspections to check the quality or quantity of the Work;
- B. Reviewed construction means, methods, techniques, sequences, or procedures;
- C. Reviewed copies of requisitions received from Subcontractors, material and equipment suppliers, and other data requested by the Owner to substantiate the Contractor's right to payment; or
- D. Made an examination to ascertain how or for what purpose the Contractor has used money previously paid on account of the Contract Sum.

## **9.5 DECISIONS TO WITHHOLD PAYMENT**

### **9.5.1 REASONS TO WITHHOLD PAYMENT**

The Owner may withhold from a progress payment, in whole or in part, to such extent as may be necessary to protect the Owner due to any of the following:

- A. Defective or incomplete Work not remedied;
- B. Stop Payment Notices. For any stop payment notice, the Owner shall withhold the amount stated in the stop payment notice, the stop notice claimant's anticipated interest and court costs and an amount to provide for the public entity's reasonable cost of any litigation pursuant to the stop payment notice. For any stop payment notice action the parties resolve before judgment is entered, Owner has the right to permanently withhold for any reasonable cost of litigation for that stop payment notice, even if it exceeds the amount originally withheld by Owner for the estimated reasonable cost of litigation. However, if (1) the Contractor at its sole expense provides a bond or other security satisfactory to the Owner in the amount of at least one hundred twenty-five percent (125%) of the claim, in a form satisfactory to the Owner, which protects the Owner against such claim, and (2) the Owner chooses to accept the bond, then Owner would release the withheld stop payment notice funds to the Contractor, except that Owner may permanently withhold for any reasonable cost of litigation. Any stop payment notice release bond shall be executed by a California admitted, fiscally solvent surety, completely unaffiliated with and separate from the surety on the payment and performance bonds, that does not have any assets pooled with the payment and

performance bond sureties.

- C. Liquidated damages against the Contractor, whether already accrued or estimated to accrue in the future;
- D. Reasonable doubt that the Work can be Completed for the unpaid balance of any Contract Sum or within the Contract Time;
- E. Damage to the property or work of the Owner, another contractor, or subcontractor;
- F. Unsatisfactory prosecution of the Work by the Contractor;
- G. Failure to store and properly secure materials;
- H. Failure of the Contractor to submit on a timely basis, proper and sufficient documentation required by the Contract Documents, including, without limitation, monthly progress schedules, shop drawings, submittal schedules, schedule of values, product data and samples, proposed product lists, executed change orders, and verified reports;
- I. Failure of the Contractor to maintain record drawings;
- J. Erroneous estimates by the Contractor of the value of the Work performed, or other false statements in an Application for Payment;
- K. Unauthorized deviations from the Contract Documents;
- L. Failure of the Contractor to prosecute the Work in a timely manner in compliance with established progress schedules and Completion deadlines;
- M. Subsequently discovered evidence or observations nullifying the whole or part of a previously issued Certificate for Payment;
- N. Failure by Contractor to pay Subcontractors or material suppliers as required by Contract or law, which includes but is not limited to Contractor's failure to pay prevailing wage and any assessment of statutory penalties;
- O. Overpayment to Contractor on a previous payment;
- P. Credits owed to Owner for reduced scope of work or work that Contractor will not perform;
- Q. The estimated cost of performing work pursuant to Section 2.4;
- R. Actual damages related to false claims by Contractor;

- S. Breach of any provision of the Contract Documents;
- T. Owner's potential or actual loss, liability or damages caused by the Contractor; and
- U. As permitted by other provisions in the Contract or as otherwise allowed by law, including statutory penalties Owner or other entities assessed against Contractor. (See e.g., Labor Code section 1813 (working hours) or Public Contract Code section 4110 (subcontractor listings and substitutions))

Owner may, but is not required to, provide to Contractor with the progress payment written notice of the items for which Owner is withholding amounts from the payment. To claim wrongful withholding by the Owner, or if Contractor otherwise disputes any amount being withheld, Contractor must submit an inquiry in writing to Owner within thirty (30) days of receipt of the notice, and Owner shall respond within fifteen (15) days of receipt of the inquiry. If any disputed issues remain unresolved after Owner's response, Contractor shall timely submit a Claim pursuant to Section 4.5.

For any withhold amount based on an estimate where the actual amount later becomes known and certain, no later than the final accounting for the Contract the Owner will release any amount withheld over that certain and known amount. If the certain and known amount exceeds the amount previously withheld, Owner may withhold additional amounts from Contractor to cover the excess amount. If available funds are not sufficient, Contractor shall pay Owner the difference.

#### **9.5.2 PAYMENT AFTER CURE**

When Contractor removes or cures the grounds for withholding amounts, payment shall be made for amounts withheld because of them. No interest shall be paid on any retainage or amounts withheld due to the failure of the Contractor to perform in accordance with the terms and conditions of the Contract Documents.

#### **9.5.3 OVERPAYMENT AND/OR FAILURE TO WITHHOLD**

Neither Owner's overpayment to Contractor, nor Owner's failure to withhold an amount from payment that Owner had the right to withhold, shall constitute a waiver by Owner of its rights to withhold those amounts from future payments to Contractor or to otherwise pursue recovery of those amounts from Contractor.

### **9.6 PROGRESS PAYMENTS**

#### **9.6.1 PAYMENTS TO CONTRACTOR**

Unless otherwise stated in the Contract Documents, within thirty (30) days after receipt of an undisputed and properly submitted Application for Payment, Contractor shall be paid a sum

equal to ninety-five percent (95%) of the undisputed value of the Work performed up to the last day of the previous month, less the aggregate of previous payments; and Owner shall retain the other five percent (5%) of the undisputed value of the Work. The value of the Work completed shall be an estimate only, no inaccuracy or error in said estimate shall operate to release the Contractor, or any bondsman, from damages arising from such Work or from enforcing each and every provision of this Contract, and the Owner shall have the right subsequently to correct any error made in any estimate for payment. Contractor shall base an Application for Payment only on the original Contract Sum plus any fully executed and Board-approved Change Orders. Contractor shall not include Notices of Potential Claims, CORs, Claims or disputed amounts.

The Contractor shall not be entitled to have any payment requests processed, or be entitled to have any payment made for work performed, so long as any lawful or proper direction given by the Owner concerning the Work, or any portion thereof, remains uncomplied with. Payment shall not be a waiver of any such direction.

#### **9.6.2 PAYMENTS TO SUBCONTRACTORS**

No later than ten (10) days after receipt of payment from Owner, pursuant to Business and Professions Code section 7108.5, the Contractor shall pay to each Subcontractor, out of the amount paid to the Contractor on account of such Subcontractor's portion of the Work, the amount to which said Subcontractor is entitled, reflecting percentages actually retained from payments to the Contractor on account of such Subcontractor's portion of the Work. The Contractor shall, by appropriate agreement with each Subcontractor, require each Subcontractor to make payments to Sub-subcontractors in a similar manner.

#### **9.6.3 PERCENTAGE OF COMPLETION OR PAYMENT INFORMATION**

The Owner will, on request, furnish to a Subcontractor, if practicable, information regarding percentages of Completion or amounts applied for by the Contractor, and action taken thereon by the Owner, on account of portions of the Work done by such Subcontractor.

#### **9.6.4 NO OBLIGATION OF OWNER FOR SUBCONTRACTOR PAYMENT**

The Owner shall have no obligation to pay, or to see to the payment of, money to a Subcontractor except as may otherwise be required by law.

#### **9.6.5 PAYMENT TO SUPPLIERS**

Payment to material or equipment suppliers shall be treated in a manner similar to that provided in paragraphs 9.6.2, 9.6.3 and 9.6.4.

#### **9.6.6 PAYMENT NOT CONSTITUTING APPROVAL OR ACCEPTANCE**

An accepted Application for Payment, issuance of a Certificate for Payment, a progress payment, or partial or entire use or occupancy of the Project by the Owner shall not constitute acceptance or approval of any portion of the Work, especially any Work not in accordance with the Contract

Documents.

### **9.6.7 JOINT CHECKS**

Owner shall have the right, if necessary for the protection of the Owner, to issue joint checks made payable to the Contractor and Subcontractors and/or material or equipment suppliers. The joint check payees shall be responsible for the allocation and disbursement of funds included as part of any such joint payment. However, Owner has no duty to issue joint checks. In no event shall any joint check payment be construed to create any contract between the Owner and a Subcontractor of any tier, any obligation from the Owner to such Subcontractor, or rights in such Subcontractor against the Owner.

## **9.7 COMPLETION OF THE WORK**

### **9.7.1 CLOSE-OUT PROCEDURES**

When the Contractor considers that the Work is Complete and submits a written notice to Owner requesting an inspection of the Work, the Owner shall review the Work and prepare and submit to the Contractor a comprehensive list of items to be completed or corrected (the "Punch List"). The Punch List shall include all outstanding obligations of Contractor, including training, start-up, testing, and submission to Owner of all required documentation (e.g., written guarantees, warranties, invoices, as-built drawings, manuals, bonds and the documents described in Sections 9.3 and 9.9). The Contractor and/or its Subcontractors shall proceed promptly to complete and correct items on the Punch List. Failure to include an item on the Punch List does not alter the responsibility of the Contractor to Complete all Work (including the omitted item) in accordance with the Contract Documents, and to Complete or correct the Work so long as the statute of limitations (or repose) has not run.

When the Contractor believes the Punch List work is complete and in accordance with the Contract Documents, it shall then submit a request for an additional inspection by the Owner to determine Completion. Owner shall again inspect the Work and inform the Contractor of any items that are not complete or correct. Contractor shall promptly complete or correct items until no items remain.

After the Work, including all Punch List Work, is inspected and informally deemed by the Owner to be Complete, the Owner's governing body may formally accept the Work as Complete at a meeting of the governing body. Warranties required by the Contract Documents shall commence on the date of Contractor's Completion of the Work (see Sections 3.5, 12.2.5, and 12.2.6).

### **9.7.2 COSTS OF MULTIPLE INSPECTIONS**

More than two (2) requests by Contractor to make inspections to confirm Completion as required under paragraph 9.7.1 shall be considered an additional service of Owner, and all subsequent costs will be invoiced to Contractor and withheld from remaining payments.

## **9.8 PARTIAL OCCUPANCY OR USE**

The Owner may occupy or use any completed, or partially completed, portion of the Work at any stage prior to acceptance, or prior to Completion if there is no formal acceptance. Occupancy or use of any portion of the Work, or the whole Work, shall not constitute approval or acceptance of it, nor shall such occupancy or use relieve Contractor of any of its obligations under the Contract Documents regarding that portion of, or the whole, Work.

The Owner and the Contractor shall agree in writing to the responsibilities assigned to each of them for payments, security, maintenance, heat, utilities, damage to the Work, insurance, the period for correction of the Work, and the commencement of warranties required by the Contract Documents. When the Contractor considers a portion complete, the Contractor may request an inspection of that portion and preparation of a Punch List by the Owner for that portion, as set forth for the entire Work under paragraph 9.7.1; however, such inspection and Punch List shall not act as any form of approval or acceptance of that portion of the Work, or of any Work not complying with the requirements of the Contract, and that portion shall be subject to subsequent inspections and Punch Lists.

Immediately prior to such partial occupancy or use, the Owner, the Architect and the Contractor shall jointly inspect the area to be occupied or portion of the Work to be used in order to determine and record the condition of the Work.

## **9.9 FINAL PROGRESS PAYMENT AND RELEASE OF RETENTION**

### **9.9.1 FINAL APPLICATION FOR PROGRESS PAYMENT**

When, pursuant to Section 9.7.1, the Owner finds all of the Work is Completed in accordance with the Contract Documents, it shall so notify Contractor, who shall then submit to the Owner its final Application for Payment.

Upon receipt and approval of such final Application for Payment, the Owner shall issue a final Certificate of Payment, based on its knowledge, information, and belief, and on the basis of its observations, inspections, and all other data accumulated or received by the Owner in connection with the Work, that such Work has been Completed in accordance with the Contract Documents. If required to do so under Labor Code section 1773.3, subd. (d), Owner shall withhold final payment.

### **9.9.2 PROCEDURES FOR APPLICATION FOR FINAL PROGRESS PAYMENT**

The Application for Final Progress Payment pursuant to Section 9.9.1 shall be accompanied by the same details as set forth in paragraph 9.3, and in addition, the following conditions must be fulfilled:

- A. The Work shall be Complete, and the Contractor shall have made, or caused to have been made, all corrections to the Work which are required to remedy any defects therein, to obtain compliance with the Contract Documents or any



requirements of applicable codes and ordinances, or to fulfill any of the orders or directions of Owner required under the Contract.

- B. Each Subcontractor shall have delivered to the Contractor all written guarantees, warranties, applications, and bonds required by the Contract Documents for its portion of the Work, and Contractor delivered them to the Owner.
- C. The Contractor shall deliver to the Owner (i) reproducible final Record Drawings and Annotated Specifications showing the Contractor's Work "as built," with the Contractor's certification of the accuracy of the Record Drawings and Annotated Specifications, (ii) all warranties and guarantees, (iii) operation and maintenance instructions, manuals and materials for equipment and apparatus, and (iv) all other documents required by the Contract Documents.
- D. Contractor shall provide extensive assistance in the utilization of any equipment or system such as initial start-up or testing, adjusting and balancing, preparation of operation and maintenance manuals and training personnel for operation and maintenance.

Acceptance of Final Progress Payment shall constitute a complete waiver of Claims except for those previously identified in writing and identified by that payee as unsettled at the time of Final Progress Payment.

### **9.9.3 RELEASE OF RETAINAGE**

Owner may withhold from release or payment of retainage (or "retention") up to 150% of disputed amounts listed in Section 9.5. If retainage is held in an escrow account pursuant to an escrow agreement under Public Contract Code section 22300 (see Section 9.10) and Owner withholds from release of retainage based on a breach of the Contract, or other default, by Contractor, Owner may withdraw the withheld retainage from the escrow account. Owner shall release the undisputed retainage within sixty (60) days after Completion of the Work. For this purpose, "Completion" is defined in Public Contract Code section 7107(c). No interest shall be paid on any retainage, or on any amounts withheld, except as provided to the contrary in any Escrow Agreement and General Conditions between the Owner and the Contractor under Public Contract Code section 22300.

### **9.10 SUBSTITUTION OF SECURITIES**

In accordance with section 22300 of the Public Contract Code, the Owner will permit the substitution of securities for any retention monies withheld by the Owner to ensure performance under the Contract. At the request and expense of the Contractor, securities equivalent to the amount withheld shall be deposited with the Owner, or with a state or federally chartered bank as the escrow agent, who shall then pay such retention monies to the Contractor. Upon Completion of the Contract, the securities shall be returned to the Contractor if Owner has no basis to withhold under the Contract Documents.

Securities eligible for investment under this section shall include those listed in Government Code section 16430, bank or savings and loan certificates of deposit, interest-bearing, demand-deposit accounts, standby letters of credit, or any other security mutually agreed to by the Contractor and the Owner.

The Contractor shall be the beneficial owner of any securities substituted for monies withheld and shall receive any interest thereon.

Any escrow agreement entered by Owner and Contractor pursuant to Public Contract Code section 22300, shall be substantially similar to the form set forth in Public Contract Code section 22300.

## **ARTICLE 10**

### **PROTECTION OF PERSONS AND PROPERTY**

#### **10.1 SAFETY PRECAUTIONS AND PROGRAMS**

##### **10.1.1 CONTRACTOR RESPONSIBILITY**

The Contractor shall have responsibility for initiating, maintaining, and supervising all safety precautions and programs in connection with the performance of the Contract. Each Contractor shall designate a responsible member of its organization whose duties shall include loss and accident prevention, and who shall have the responsibility and full authority to enforce the program. This person shall attend meetings with the representatives of the various Subcontractors employed to ensure that all employees understand and comply with the programs. Contractor will ensure that his employees and Subcontractors cooperate and coordinate safety matters with any other contractors on the Project to form a joint safety effort.

##### **10.1.2 SUBCONTRACTOR RESPONSIBILITY**

Subcontractors have the responsibility for participating in, and enforcing, the safety and loss prevention programs established by the Contractor for the Project, which will cover all Work performed by the Contractor and its Subcontractors. Each Subcontractor shall designate a responsible member of its organization whose duties shall include loss and accident prevention, and who shall have the responsibility and full authority to enforce the program. This person shall attend meetings with the representatives of the various Subcontractors employed to ensure that all employees understand and comply with the programs.

##### **10.1.3 COOPERATION**

All Subcontractors and material or equipment suppliers, shall cooperate fully with Contractor, the Owner, and all insurance carriers and loss prevention engineers.

#### **10.1.4 ACCIDENT REPORTS**

Subcontractors shall promptly report in writing to the Contractor all accidents whatsoever arising out of, or in connection with, the performance of the Work, whether on or off the Site, which caused death, personal injury, or property damage, giving full details and statements of witnesses. In addition, if death or serious injuries or serious damages are caused, the accident shall be reported immediately by telephone or messenger. Contractor shall thereafter promptly report the facts in writing to the Owner giving full details of the accident.

#### **10.1.5 FIRST-AID SUPPLIES AT SITE**

The Contractor will provide and maintain at the Site first-aid supplies for minor injuries.

### **10.2 SAFETY OF PERSONS AND PROPERTY**

#### **10.2.1 THE CONTRACTOR**

The Contractor shall take reasonable precautions for the safety of, and shall provide reasonable protection to prevent damage, injury, or loss to:

- A. Employees on the Work and other persons who may be affected thereby;
- B. The Work, material, equipment, tools, construction equipment, and machinery to be incorporated therein or necessary for the proper execution and Completion of the Work, whether in storage on or off the Site, under the care, custody, or control of the Contractor or the Contractor's Subcontractors or Sub-subcontractors; and
- C. Other property at the Site or adjacent thereto such as trees, shrubs, lawns, walks, pavement, roadways, structures, and utilities not designated for removal, relocation, or replacement in the course of construction.

#### **10.2.2 CONTRACTOR NOTICES**

The Contractor shall give notices and comply with applicable laws, ordinances, rules, regulations, and lawful orders of public authorities bearing on the safety of persons or property or their protection from damage, injury, or loss.

#### **10.2.3 SAFETY BARRIERS AND SAFEGUARDS**

The Contractor shall erect and maintain, as required by existing conditions and performance of the Contract, reasonable safeguards for safety and protection, including posting danger signs and other warnings against hazards, promulgating safety regulations, and notifying owners and users of adjacent Sites and utilities.

#### **10.2.4 USE OR STORAGE OF HAZARDOUS MATERIAL**

When use or storage of explosives, other hazardous materials or equipment, or unusual methods are necessary for execution of the Work, the Contractor shall exercise utmost care and carry on such activities under supervision of properly qualified personnel. The Contractor shall notify the Owner any time that explosives or hazardous materials are expected to be stored on Site. Location of storage shall be coordinated with the Owner and local fire authorities.

#### **10.2.5 FINGERPRINTING**

At its own expense, Contractor shall comply with all fingerprinting requirements under law and Contract, including but not limited to the requirements of Education Code section 45125.2 and the Independent Contractor Student Contact Form which is a part of the Contract. Contractor shall hold harmless, defend and indemnify the Owner under section 3.16, for any costs, including attorneys' fees, Owner incurs from Contractor's failure to comply.

### **10.3 PROTECTION OF WORK AND PROPERTY**

#### **10.3.1 PROTECTION OF WORK**

The Contractor and Subcontractors shall continuously protect the Work, the Owner's property, and the property of others, from damage, injury, or loss until the earlier of formal acceptance of the Work or Completion of the Work. The Contractor and Subcontractors shall make good any such damage, injury, or loss, except such as may be solely due to, or caused by, agents or employees of the Owner.

#### **10.3.2 PROTECTION FOR ELEMENTS**

The Contractor will remove all mud, water, or other elements as may be required for the proper protection and prosecution of its Work. The Contractor shall at all times provide heat, coverings, and enclosures necessary to maintain adequate protection against weather so as to preserve the Work, materials, equipment, apparatus, and fixtures free from injury or damage.

#### **10.3.3 SHORING AND STRUCTURAL LOADING**

The Contractor shall not impose structural loading upon any part of the Work under construction or upon existing construction on or adjacent to the Site in excess of safe limits, or loading such as to result in damage to the structural, architectural, mechanical, electrical, or other components of the Work. The design of all temporary construction equipment and appliances used in construction of the Work and not a permanent part thereof, including, without limitation, hoisting equipment, cribbing, shoring, and temporary bracing of structural steel, is the sole responsibility of the Contractor. All such items shall conform to the requirements of governing codes and all laws, ordinances, rules, regulations, and orders of all authorities having jurisdiction. The Contractor shall take special precautions, such as shoring of masonry walls and temporary tie bracing of structural steel work, to prevent possible wind damage during construction of the Work. The installation of such bracing or shoring shall not damage or cause damage to the Work.

in place or the Work installed by others. Any damage which does occur shall be promptly repaired by the Contractor at no cost to the Owner.

#### **10.3.4 CONFORMANCE WITHIN ESTABLISHED LIMITS**

The Contractor and Subcontractors shall confine their construction equipment, the storage of materials, and the operations of workers to the limits indicated by laws, ordinances, permits, and the limits established by the Owner, and shall not unreasonably encumber the premises with construction equipment or materials.

#### **10.3.5 SUBCONTRACTOR ENFORCEMENT OF RULES**

Subcontractors shall enforce the Owner's and the Contractor's instructions, laws, and regulations regarding signs, advertisements, fires, smoking, the presence of liquor, and the presence of firearms by any person at the Site.

#### **10.3.6 SITE ACCESS**

The Contractor and the Subcontractors shall use only those ingress and egress routes designated by the Owner, observe the boundaries of the Site designated by the Owner, park only in those areas designated by the Owner, which areas may be on or off the Site, and comply with any parking control program established by the Owner such as furnishing license plate information and placing identifying stickers on vehicles.

#### **10.3.7 PROTECTION OF MATERIALS**

The Contractor and the Subcontractors shall receive, count, inspect for damage, record, store, and protect construction materials for the Work and Subcontractors shall promptly send to the Contractor evidence of receipt of such materials, indicating thereon any shortage, change, or damage (failure to so note shall constitute acceptance by the Subcontractor of financial responsibility for any shortage).

### **10.4 EMERGENCIES**

#### **10.4.1 EMERGENCY ACTION**

In an emergency affecting the safety of persons or property, the Contractor shall take any action necessary, at the Contractor's discretion, to prevent threatened damage, injury, or loss. Additional money or extension of time claimed by the Contractor on account of an emergency shall be determined as provided in Section 4.5 and Article 7.

#### **10.4.2 ACCIDENT REPORTS**

The Contractor shall promptly report in writing to the Owner all accidents arising out of or in connection with the Work, which caused death, personal injury, or property damage, giving full details and statements of any witnesses. In addition, if death, serious personal injuries, or serious

property damages are caused, the accident shall be reported immediately by telephone or messenger to the Owner.

## **10.5 HAZARDOUS MATERIALS**

### **10.5.1 DISCOVERY OF HAZARDOUS MATERIALS**

In the event the Contractor encounters or suspects the presence on the Site material reasonably believed to be asbestos, polychlorinated biphenyl (PCB), or any other material defined as being hazardous by section 25249.5 of the California Health and Safety Code, which (a) has not been rendered harmless, and (b) the handling or removal of which is not within the scope of the Work, the Contractor shall immediately stop Work in the area affected and report the condition to the Owner and the Architect in writing, whether such material was generated by the Contractor, another contractor, or the Owner. The Work in the affected area shall not thereafter be resumed, except by written agreement of the Owner and the Contractor, if in fact the material is asbestos, polychlorinated biphenyl (PCB), or other hazardous material, and has not been rendered harmless. The Work in the affected area shall be resumed only in the absence of asbestos, polychlorinated biphenyl (PCB), or other hazardous material, or when it has been rendered harmless by written agreement of the Owner and the Contractor.

### **10.5.2 HAZARDOUS MATERIAL WORK LIMITATIONS**

In the event that the presence of hazardous materials is suspected or discovered on the Site, the Owner shall retain an independent testing laboratory to determine the nature of the material encountered and whether corrective measures or remedial action is required. The Contractor shall not be required pursuant to Article 7 to perform without consent any Work in the affected area of the Site relating to asbestos, polychlorinated biphenyl (PCB), or other hazardous material, until any known or suspected hazardous material has been removed, or rendered harmless, or determined to be harmless by Owner, as certified by an independent testing laboratory and/or approved by the appropriate government agency.

### **10.5.3 INDEMNIFICATION BY OWNER FOR HAZARDOUS MATERIAL NOT CAUSED BY CONTRACTOR**

In the event the presence of hazardous materials on the Site is not caused by the Contractor, Owner shall pay for all costs of testing and remediation, if any, and shall compensate Contractor for any delay or additional costs incurred in accordance with the applicable provisions of Article 7 and 8 herein. Owner shall defend, indemnify and hold harmless the Contractor and its agents, officers, directors and employees from and against any and all claims, damages, losses, costs and expenses incurred in connection with or arising out of, or relating to, the performance of the Work in the area affected by the hazardous material, except to the extent the claims, damages, losses, costs, or expenses were caused by Contractor's active negligence, sole negligence or willful misconduct. By providing this indemnification, Owner does not waive any immunities.

### **10.5.4 NATURALLY OCCURRING ASBESTOS**

If the Site is found to contain naturally occurring asbestos (asbestos naturally contained in rocks

which can become airborne when released “NOA”), in addition to complying with applicable provisions in sections 10.5.1-10.5.3 above, Contractor shall comply with, and be solely responsible for, all applicable NOA requirements of the California Air Resources Board (CARB), California Department of Industrial Relations, California Division of Occupational Safety and Health (Cal/OSHA), any local air quality management district with jurisdiction over the Site, the County, and all other applicable federal, State and local governmental entities. This compliance and responsibility includes, but is not limited to, dust control mitigation measures and a monitoring plan.

**10.5.5 INDEMNIFICATION BY CONTRACTOR FOR HAZARDOUS MATERIAL CAUSED BY CONTRACTOR**

In the event the presence of hazardous materials on the Site is caused by Contractor, Subcontractors, materialmen or suppliers, the Contractor shall pay for all costs of testing and remediation, if any, and shall compensate the Owner for any additional costs incurred as a result of the generation of hazardous material on the Project Site. In addition, the Contractor shall defend, indemnify and hold harmless Owner and its agents, officers, and employees from and against any and all claims, damages, losses, costs and expenses incurred in connection with, arising out of, or relating to, the presence of hazardous material on the Site, except to the extent the claims, damages, losses, costs, or expenses were caused by Owner’s active negligence, sole negligence or willful misconduct.

**10.5.6 TERMS OF HAZARDOUS MATERIAL PROVISION**

The terms of this Hazardous Material provision shall survive the Completion of the Work and/or any termination of this Contract.

**10.5.7 ARCHEOLOGICAL MATERIALS**

In the event the Contractor encounters or reasonably suspects the presence on the Site of archeological materials, the Contractor shall immediately stop Work in the area affected and report the condition to the Owner and the Architect in writing. The Work in the affected area shall not thereafter be resumed, except after Contractor’s receipt of written notice from the Owner.

**ARTICLE 11**

**INSURANCE AND BONDS**

**11.1. CONTRACTOR’S LIABILITY INSURANCE**

**11.1.1 LIABILITY INSURANCE REQUIREMENTS**

11.1.1 By the earlier of the deadline set forth in the Instructions to Bidders or the commencement of the Work and within limits acceptable to the Owner, the Contractor shall purchase from and maintain in a company or companies lawfully authorized to do business in

California as admitted carriers with a financial rating of at least A+, Class XII status as rated in the most recent edition of Best's Insurance Reports such commercial general liability insurance per occurrence for bodily injury, personal injury and property damage as set forth in the Agreement and automobile liability insurance per accident for bodily injury and property damage combined single limit as set forth in the Agreement as will protect the Contractor from claims set forth below, which may arise out of or result from the Contractor's operations under the Contract and for which the Contractor may be legally liable, whether such operations are by the Contractor, by a Subcontractor, by Sub-subcontractor, by anyone directly or indirectly employed by any of them, or by anyone for whose acts any of them may be liable:

- 11.1.1.1 claims for damages because of bodily injury (including emotional distress), sickness, disease, or death of any person other than the Contractor's employees. This coverage shall be provided in a form at least as broad as Insurance Services Office (ISO) Form CG 0001 11188;
- 11.1.1.2 claims for damages arising from personal or advertising injury in a form at least as broad as ISO Form CG 0001 11188;
- 11.1.1.3 claims for damages because of injury or destruction of tangible property, including loss of use resulting therefrom, arising from operations under the Contract Documents; and
- 11.1.1.4 claims for damages because of bodily injury, death of a person, or property damage arising out of the ownership, maintenance, or use of a motor vehicle, all mobile equipment, and vehicles moving under their own power and engaged in the Work; and
- 11.1.1.5 claims involving blanket contractual liability applicable to the Contractor's obligations under the Contract Documents, including liability assumed by and the indemnity and defense obligations of the Contractor and the Subcontractors; and
- 11.1.1.6 claims involving Completed Operations, Independent Contractors' coverage, and Broad Form property damage, without any exclusions for collapse, explosion, demolition, underground coverage, and excavating. (XCU)

If commercial general liability insurance or another insurance form with a general aggregate limit is used, either the general aggregate limit shall apply separately to the project location (with the ISO CG 2501 or insurer's equivalent endorsement provided to the Owner) or the general aggregate limit shall be twice the required occurrence limit.

Any deductible or self-insured retention must be declared to and approved by the Owner. At the option of the Owner, either the insurer shall reduce or eliminate such deductibles or self-insured retentions as respects the Owner, its Board of Trustees,



members of its Board of Trustees, officers, employees, agents and volunteers; or the Contractor shall procure a bond guaranteeing payment of losses and related investigations, claim administration and defense expenses.

#### **11.1.2 SUBCONTRACTOR INSURANCE REQUIREMENTS**

The Contractor shall require its Subcontractors and any Sub-subcontractors to take out and maintain similar public liability insurance and property damage insurance, in a company or companies lawfully authorized to do business in California as admitted carriers with a financial rating of at least A+, Class XII status as rated in the most recent edition of Best's Insurance Reports, in like amounts and scope of coverage.

#### **11.1.3 OWNER'S INSURANCE**

The Owner shall be responsible for purchasing and maintaining the Owner's usual liability insurance. Optionally, the Owner may purchase and maintain other insurance for self-protection against claims which may arise from operations under the Contract. The Contractor shall not be responsible for purchasing and maintaining this optional Owner's liability insurance unless specifically required by the Contract Documents.

#### **11.1.4 ADDITIONAL INSURED ENDORSEMENT REQUIREMENTS**

The Contractor shall name, on any policy of insurance, the Owner and the Architect as additional insureds. Subcontractors shall name the Contractor, the Owner and the Architect as additional insureds. The Additional Insured Endorsement included on all such insurance policies shall state that coverage is afforded the additional insured with respect to claims arising out of operations performed by or on behalf of the insured. If the additional insureds have other insurance which is applicable to the loss, such other insurance shall be excess to any policy of insurance required herein. The amount of the insurer's liability shall not be reduced by the existence of such other insurance.

#### **11.1.5 WORKERS' COMPENSATION INSURANCE**

During the term of this Contract, the Contractor shall provide workers' compensation insurance for all of the Contractor's employees engaged in Work under this Contract on or at the Site of the Project and, in case any of the Contractor's work is sublet, the Contractor shall require the Subcontractor to provide workers' compensation insurance for all the Subcontractor's employees engaged in Work under the subcontract. Any class of employee or employees not covered by a Subcontractor's insurance shall be covered by the Contractor's insurance. In case any class of employees engaged in Work under this Contract on or at the Site of the Project is not protected under the Workers' Compensation laws, the Contractor shall provide or cause a Subcontractor to provide adequate insurance coverage for the protection of those employees not otherwise protected. The Contractor shall file with the Owner certificates of insurance as required under this Article and in compliance with Labor Code section 3700.

If the contractor fails to maintain such insurance, the Owner may take out compensation

insurance which the Owner might be liable to pay under the provisions of the Act by reason of an employee of the Contractor being injured or killed, and withhold from progress payments and/or retention the amount of the premium for such insurance.

#### **11.1.6 BUILDER'S RISK/"ALL RISK" INSURANCE**

##### **11.1.6.1 COURSE-OF-CONSTRUCTION INSURANCE REQUIREMENTS**

Unless provided by Owner at Owner's sole discretion, Contractor, during the progress of the Work and until final acceptance of the Work by Owner upon Completion of the entire Contract, shall maintain Builder's Risk/Course-of-Construction insurance satisfactory to the Owner, issued on a completed value basis on all insurable Work included under the Contract Documents. This insurance shall insure against all risks, including but not limited to the following perils: vandalism, theft, malicious mischief, fire, sprinkler leakage, civil authority, sonic boom, explosion, collapse, wind, hail, lightning, smoke, riot or civil commotion, debris removal (including demolition) and reasonable compensation for the Architect's services and expenses required as a result of such insured loss. This insurance shall provide coverage in an amount not less than the full cost to repair, replace or reconstruct the Work. Such insurance shall include the Owner, the Architect, and any other person or entity with an insurable interest in the Work as an additional named insured.

The Contractor shall submit to the Owner for its approval all items deemed to be uninsurable under the Builder's Risk/Course-of-Construction insurance. The risk of the damage to the Work due to the perils covered by the Builder's Risk/Course-of-Construction insurance, as well as any other hazard which might result in damage to the Work, is that of the Contractor and the surety, and no claims for such loss or damage shall be recognized by the Owner, nor will such loss or damage excuse the Complete and satisfactory performance of the Contract by the Contractor.

##### **11.1.7 CONSENT OF INSURER FOR PARTIAL OCCUPANCY OR USE**

Partial occupancy or use in accordance with the Contract Documents shall not commence until the insurance company providing property insurance has consented to such partial occupancy or use by endorsement or otherwise. The Owner and the Contractor shall take reasonable steps to obtain consent of the insurance company and shall, without mutual consent, take no action with respect to partial occupancy or use that would cause cancellation, lapse, or reduction of the insurance.

##### **11.1.8 FIRE INSURANCE**

Before the commencement of the Work, the Contractor shall procure, maintain, and cause to be maintained at the Contractor's expense, fire insurance on all Work included under the Contract Documents, insuring the full replacement value of such Work as well as the cost of any removal and demolition necessary to replace or repair all Work damaged by fire. The amount of fire insurance shall be subject to approval by the Owner and shall be sufficient to protect the Work against loss or damage in full until the Work is accepted by the Owner. Should the Work being constructed be damaged by fire or other causes during construction, it shall be replaced in

accordance with the requirements of the drawings and specifications without additional expense to the Owner.

#### 11.1.9 **OTHER INSURANCE**

The Contractor shall provide all other insurance required to be maintained under applicable laws, ordinances, rules, and regulations.

#### 11.1.10 **PROOF OF CARRIAGE OF INSURANCE**

The Contractor shall not commence Work nor shall it allow any Subcontractor to commence Work under this Contract until all required insurance, certificates, and an Additional Insured Endorsement and Declarations Page have been obtained and delivered in duplicate to the Owner for approval subject to the following requirements:

- (a) Certificates and insurance policies shall include the following clause:

This policy shall not be non-renewed, canceled, or reduced in required limits of liability or amounts of insurance until notice has been mailed to the Owner. Date of cancellation or reduction may not be less than thirty (30) days after the date of mailing notice.

- (b) Certificates of insurance shall state in particular those insured, the extent of insurance, location and operation to which the insurance applies, the expiration date, and cancellation and reduction notices.
- (c) Certificates of insurance shall clearly state that the Owner and the Architect are named as additional insureds under the policy described and that such insurance policy shall be primary to any insurance or self-insurance maintained by Owner and any other insurance carried by the Owner with respect to the matters covered by such policy shall be excess and non-contributing.
- (d) The Contractor and its Subcontractors shall produce a certified copy of any insurance policy required under this Section upon written request of the Owner.

#### 11.1.11 **COMPLIANCE**

In the event of the failure of any contractor to furnish and maintain any insurance required by this Article, the Contractor shall be in default under the Contract. Compliance by Contractor with the requirement to carry insurance and furnish certificates, policies, Additional Insured Endorsement and Declarations Page evidencing the same shall not relieve the Contractor from liability assumed under any provision of the Contract Documents, including, without limitation, the obligation to defend and indemnify the Owner and the Architect.

**11.2 PERFORMANCE AND PAYMENT BONDS**

**11.2.1 BOND REQUIREMENTS**

Unless otherwise specified in the Contract Documents, prior to commencing any portion of the Work, the Contractor shall apply for and furnish Owner separate payment and performance bonds for its portion of the Work which shall cover 100% faithful performance of and payment of all obligations arising under the Contract Documents and/or guaranteeing the payment in full of all claims for labor performed and materials supplied for the Work. All bonds shall be provided by a corporate surety authorized and admitted to transact business in California. All bonds shall be submitted on the Owner’s approved form.

To the extent, if any, that the Contract Sum is increased in accordance with the Contract Documents, the Contractor shall cause the amount of the bonds to be increased accordingly and shall promptly deliver satisfactory evidence of such increase to the Owner. To the extent available, the bonds shall further provide that no change or alteration of the Contract Documents (including, without limitation, an increase in the Contract Sum, as referred to above), extensions of time, or modifications of the time, terms, or conditions of payment to the Contractor will release the surety. If the Contractor fails to furnish the required bond, the Owner may terminate the Contract for cause.

**11.2.2 SURETY QUALIFICATION**

Only bonds executed by admitted Surety insurers as defined in Code of Civil Procedure section 995.120 shall be accepted. The surety insurers must, unless otherwise agreed to by Owner in writing, at the time of issuance of the bonds, have a rating not lower than “A-” as rated by A.M. Best Company, Inc. or other independent rating companies. Owner reserves the right to approve or reject the surety insurers selected by Contractor and to require Contractor to obtain bonds from surety insurers satisfactory to the Owner.

**ARTICLE 12**

**UNCOVERING AND CORRECTION OF WORK**

**12.1 UNCOVERING OF WORK**

**12.1.1 UNCOVERING WORK FOR REQUIRED INSPECTIONS**

If a portion of the Work is covered contrary to the Owner’s request or to requirements specifically expressed in the Contract Documents, Contractor must, if required in writing by the Owner, uncover it for the Owner’s observation and replace the removed work at the Contractor’s expense without change in the Contract Sum or Time.

**12.1.2 COSTS FOR INSPECTIONS NOT REQUIRED**

If a portion of the Work has been covered which the Owner has not specifically requested to

observe prior to its being covered, the Owner may request to see such work, and it shall be uncovered by the Contractor. If such work is in accordance with the Contract Documents, costs of uncover and replacement shall, by appropriate Change Order, be paid by the Owner. If such work is not in accordance with Contract Documents, the Contractor shall pay such costs, unless the condition was caused by the Owner or a separate contractor, in which event the Owner shall be responsible for payment of such costs to the Contractor.

## **12.2 CORRECTION OF WORK; WARRANTY**

### **12.2.1 CORRECTION OF REJECTED WORK**

The Contractor shall promptly correct the work rejected by the Owner for failing to conform to the requirements of the Contract Documents, until the statutes of limitation (or repose) and all warranties have run, as applicable, and whether or not fabricated, installed or completed. The Contractor shall bear costs of correcting the rejected work, including additional testing, inspections, and compensation for the Owner's expenses and costs incurred.

### **12.2.2 REMOVAL OF NONCONFORMING WORK**

The Contractor shall remove from the Site portions of the Work which are not in accordance with the requirements of the Contract Documents and are not corrected by the Contractor or accepted or approved by the Owner.

### **12.2.3 OWNER'S RIGHTS IF CONTRACTOR FAILS TO CORRECT**

If the Contractor fails to correct nonconforming work within a reasonable time, the Owner may correct it in accordance with Section 2.4. As part of Owner's correction of the work, the Owner may remove any portion of the nonconforming Work and store any salvageable materials or equipment at the Contractor's expense. If the Contractor does not pay costs of such removal and storage within ten (10) days after written notice, the Owner may upon ten (10) additional days written notice sell such material or equipment at auction or at private sale and shall account for the proceeds thereof, after deducting costs and damages that should have been borne by the Contractor, including compensation for the Architect's and other professionals and representatives' services and expenses, made necessary thereby. If such proceeds of sale do not cover costs which the Contractor should have borne, the Contractor shall be invoiced for the deficiency or Owner may withhold such costs from payment pursuant to Section 9.5. If progress payments or retention then or thereafter due the Contractor are not sufficient to cover such amount, the Contractor shall pay the difference to the Owner.

### **12.2.4 COST OF CORRECTING THE WORK**

The Contractor shall bear the cost of correcting destroyed or damaged construction of the Owner or separate contractors, whether completed or partially completed, caused by the Contractor's correction or removal of the nonconforming work.

**12.2.5 WARRANTY CORRECTIONS (INCLUDES REPLACEMENT)**

Pursuant to the warranty in Section 3.5, if within one (1) year after the Completion of the Work or within a longer time period for an applicable special warranty or guarantee required by the Contract Documents, any of the Work does not comply with the Contract Documents, the Contractor shall correct it after receipt of Owner’s written notice to do so, unless the Owner has previously waived in writing such right to demand correction. Contractor shall correct the Work promptly, and passage of the applicable warranty period shall not release Contractor from its obligation to correct the Work if Owner provided the written notice within the applicable warranty period. Contractor’s obligation to correct the warranty item continues until the correction is made. After the correction is made to Owner’s satisfaction, a new warranty period of the same length as the original warranty period shall run on the corrected work. The obligations under this paragraph 12.2.5 shall survive acceptance of the Work under the Contract and termination of the Contract.

**12.2.6 NO TIME LIMITATION**

Nothing contained in this Section 12.2 shall be construed to establish a period of limitation with respect to other obligations which the Contractor might have under the Contract Documents. Establishment of the time period of one (1) year as described in Sections 3.5 and 12.2.5 relates only to the specific warranty obligation of the Contractor to correct the Work after the date of commencement of warranties and has, for example, no relationship to the time within which the obligation to comply with the Contract Documents may be sought to be enforced, or to the time within which proceedings may be commenced to establish the Contractor’s liability with respect to the Contractor’s obligations other than specifically to correct the Work.

**12.3 NONCONFORMING WORK AND WITHHOLDING THE VALUE OF IT**

If it is found at any time before Completion of the Work that the Contractor has varied from the Contract Documents in materials, quality, form, finish, or in the amount or value of the materials or labor used, the Owner may, in addition to other remedies in the Contract Documents or under law and as allowed by law, accept the improper Work. The Owner may withhold from any amount due or to become due Contractor that sum of money equivalent to the difference in value between the Work performed and that called for by the Drawings and Specifications. The Owner shall determine such difference in value. No structural related work shall be accepted that is not in conformance with the Contract Documents.

**ARTICLE 13**

**MISCELLANEOUS PROVISIONS**

**13.1 GOVERNING LAW**

The Contract shall be governed by the law of the place where the Project is located.

**13.2 SUCCESSORS AND ASSIGNS**

The Owner and the Contractor respectively bind themselves, their partners, successors, assigns, and legal representatives to the other party hereto and to partners, successors, assigns, and legal representatives of such other party in respect to covenants, agreements, and obligations contained in the Contract Documents. Neither party to the Contract shall assign the Contract as a whole or in part without written consent of the other. If either party attempts to make such an assignment without such consent, that party shall nevertheless remain legally responsible for all obligations under the Contract.

### **13.3 WRITTEN NOTICE**

In the absence of specific notice requirements in the Contract Documents, written notice shall be deemed to have been duly served if delivered in person to the individual, member of the firm or entity, or to an officer of the corporation for which it was intended, or if delivered at or sent by registered or certified or overnight mail to the last business address known to the party giving notice. Owner shall, at Contractor's cost, timely notify Contractor of Owner's receipt of any third party claims relating to the Contract pursuant to Public Contract Code section 9201.

### **13.4 RIGHTS AND REMEDIES**

#### **13.4.1 DUTIES AND OBLIGATIONS CUMULATIVE**

Duties and obligations imposed by the Contract Documents and rights and remedies available thereunder shall be in addition to and not a limitation of duties, obligations, rights, and remedies otherwise imposed or available by law.

#### **13.4.2 NO WAIVER**

No action or failure to act by the Owner, Inspector of Record, Architect or any construction manager shall constitute a waiver of a right or duty afforded them under the Contract Documents, nor shall such action or failure to act constitute approval of or acquiescence in a breach thereunder, except as may be specifically agreed to in a written amendment to the Contract.

### **13.5 TESTS AND INSPECTIONS**

#### **13.5.1 COMPLIANCE**

Tests, inspections, and approvals of portions of the Work required by the Contract Documents will comply with Title 24, and with all other laws, ordinances, rules, regulations, or orders of public authorities having jurisdiction.

#### **13.5.2 INDEPENDENT TESTING LABORATORY**

The Owner will select and pay an independent testing laboratory to conduct all tests and inspections, including shipping or transportation costs or expenses (mileage and hours).

Selection of the materials required to be tested shall be made by the laboratory and not by the Contractor. However, if Contractor requests that the Owner use a different testing laboratory and Owner chooses to approve such request, Contractor shall reimburse Owner for any additional shipping or transportation costs or expenses (mileage and hours). Owner may invoice such costs or expenses to the Contractor or withhold such costs or expenses from progress payments and/or retention.

#### **13.5.3 ADVANCE NOTICE TO INSPECTOR OF RECORD**

The Contractor shall notify the Inspector of Record a sufficient time in advance of its readiness for required observation or inspection so that the Inspector of Record may arrange for same. The Contractor shall notify the Inspector of Record a sufficient time in advance of the manufacture of material to be supplied under the Contract Documents which must, by terms of the Contract Documents, be tested in order that the Inspector of Record may arrange for the testing of the material at the source of supply.

#### **13.5.4 TESTING OFF-SITE**

Any material shipped by the Contractor from the source of supply, prior to having satisfactorily passed such testing and inspection or prior to the receipt of notice from said Inspector of Record that such testing and inspection will not be required, shall not be incorporated in the Work.

#### **13.5.5 ADDITIONAL TESTING OR INSPECTION**

If the Inspector of Record, the Architect, the Owner, or public authority having jurisdiction determines that portions of the Work require additional testing, inspection, or approval not included under section 13.5.1, the Inspector of Record will, upon written authorization from the Owner, make arrangements for such additional testing, inspection, or approval. The Owner shall bear such costs except as provided in section 13.5.6.

#### **13.5.6 COSTS FOR RETESTING**

If such procedures for testing, inspection, or approval under sections 13.5.1, 13.5.2 and 13.5.5 reveal failure of the portions of the Work to comply with requirements established by the Contract Documents, the Contractor shall bear all costs arising from such failure, including those of re-testing, re-inspection, or re-approval, including, but not limited to, compensation for the Architect's services and expenses. Any such costs shall be paid by the Owner, invoiced to the Contractor, and, among other remedies, can be withheld from progress payments and/or retention.

#### **13.5.7 COSTS FOR PREMATURE TEST**

In the event the Contractor requests any test or inspection for the Project and is not completely ready for the inspection, the Contractor shall be invoiced by the Owner for all costs and expenses resulting from that testing or inspection, including, but not limited to, the Architect's fees and expenses, and the amount of the invoice can among other remedies, be withheld from progress



payments and/or retention.

### **13.5.8 TESTS OR INSPECTIONS NOT TO DELAY WORK**

Tests or inspections conducted pursuant to the Contract Documents shall be made promptly to avoid unreasonable delay in the Work.

### **13.6 [INTENTIONALLY LEFT BLANK]**

### **13.7 TRENCH EXCAVATION**

#### **13.7.1 TRENCHES GREATER THAN FIVE FEET**

Pursuant to Labor Code section 6705, if the Contract Sum exceeds \$25,000 and involves the excavation of any trench or trenches five (5) feet or more in depth, the Contractor shall, in advance of excavation, submit to the Owner or a registered civil or structural engineer employed by the Owner a detailed plan showing the design of shoring for protection from the hazard of caving ground during the excavation of such trench or trenches.

#### **13.7.2 EXCAVATION SAFETY**

If such plan varies from the Shoring System Standards established by the Construction Safety Orders, the plan shall be prepared by a registered civil or structural engineer, but in no case shall such plan be less effective than that required by the Construction Safety Orders. No excavation of such trench or trenches shall be commenced until said plan has been accepted by the Owner or by the person to whom authority to accept has been delegated by the Owner.

#### **13.7.3 NO TORT LIABILITY OF OWNER**

Pursuant to Labor Code section 6705, nothing in this Article shall impose tort liability upon the Owner or any of its employees.

#### **13.7.4 NO EXCAVATION WITHOUT PERMITS**

The Contractor shall not commence any excavation work until it has secured all necessary permits including the required CAL OSHA excavation/shoring permit. Any permits shall be prominently displayed on the Site prior to the commencement of any excavation.

### **13.8 WAGE RATES**

#### **13.8.1 WAGE RATES**

Pursuant to the provisions of Article 2 (commencing at § 1770), Chapter 1, Part 7, Division 2, of the Labor Code, the governing board of the Owner has obtained the general prevailing rate of per diem wages and the general prevailing rate for holiday and overtime work in the locality in which this public work is to be performed for each craft, classification, or type of worker needed

for this Project from the Director of Industrial Relations (“Director”). These rates are on file with the Clerk of the Owner’s Governing Board, and copies will be made available to any interested party on request. The Contractor shall post a copy of such wage rates at the Site.

#### **13.8.2 HOLIDAY AND OVERTIME PAY**

Holiday and overtime work, when permitted by law, shall be paid for at a rate of at least one and one-half (1½) times the above specified rate of per diem wages, unless otherwise specified. Holidays shall be defined in the Collective Bargaining Agreement applicable to each particular craft, classification, or type of worker employed.

#### **13.8.3 WAGE RATES NOT AFFECTED BY SUBCONTRACTS**

The Contractor shall pay and shall cause to be paid each worker engaged in the Work on the Project not less than the general prevailing rate of per diem wages determined by the Director, regardless of any contractual relationship which may be alleged to exist between the Contractor or any Subcontractor and such workers.

#### **13.8.4 CHANGE IN PREVAILING WAGE DURING BID OR CONSTRUCTION**

If during the period this bid is required to remain open, the Director of Industrial Relations determines that there has been a change in any prevailing rate of per diem wages in the locality in which this public work is to be performed, such change shall not alter the wage rates discussed in the Notice to Bidders or the Contract subsequently awarded.

#### **13.8.5 FORFEITURE AND PAYMENTS**

Pursuant to Labor Code section 1775, the Contractor and any subcontractor under the Contractor shall as a penalty to the Owner, forfeit not more than Two Hundred Dollars (\$200.00) for each calendar day, or portion thereof, for each worker paid less than the prevailing rate of per diem wages, determined by the Director, for such craft or classification in which such worker is employed for any public work done under the Agreement by the Contractor or by any Subcontractor under it. Minimum penalties shall apply, as also provided in Civil Code section 1775. The amount of the penalty shall be determined by the Labor Commissioner and shall be based on both of the following: (1) whether the failure of the contractor or subcontractor to pay the correct rate of per diem wages was a good faith mistake and, if so, the error was promptly and voluntarily corrected upon being brought to the attention of the contractor or subcontractor; and (2) whether the contractor or subcontractor has a prior record of failing to meet its prevailing wage obligations. The difference between such prevailing rate of per diem wage and the amount paid to each worker for each calendar day or portion thereof for which each worker was paid less than the prevailing rate of per diem wage shall be paid to each work by the Contractor or subcontractor. Labor Code section 1777.1 shall also apply.

#### **13.8.6 MINIMUM WAGE RATES**

Any worker employed to perform Work on the Contract, which Work is not covered by any craft

or classification listed in the general prevailing rate of per diem wages determined by the Director, shall be paid not less than the minimum rate of wages specified therein for the craft or classification which most nearly corresponds to the Work to be performed by them, and such minimum wage rate shall be retroactive to time of initial employment of such person in such craft or classification.

### **13.8.7 PER DIEM WAGES**

Pursuant to Labor Code section 1773.1, per diem wages includes employer payments for health and welfare, pension, and vacation pay.

### **13.8.8 POSTING OF WAGE RATES AND OTHER REQUIRED JOB SITE NOTICES**

The Contractor shall post at appropriate conspicuous points on the Site, a schedule showing all determined minimum wage rates and all authorized deductions, if any, from unpaid wages actually earned and all other required job site notices as prescribed by regulation.

## **13.9 RECORD OF WAGES PAID: INSPECTION**

### **13.9.1 APPLICATION OF LABOR CODE**

Pursuant to section 1776 of the Labor Code:

(a) Each Contractor and subcontractor shall keep accurate payroll records, showing the name, address, social security number, work classification, and straight time and overtime hours worked each day and week, and the actual per diem wages paid to each journeyman, apprentice, worker, or other employee employed by him or her in connection with the public work. Each payroll record shall contain or be verified by a written declaration that is made under penalty of perjury, stating both of the following:

- (1) The information contained in the payroll record is true and correct.
- (2) The employer has complied with the requirements of sections 1771, 1811 and 1815 for any work performed by his or her employees on the public works project.

(b) The payroll records enumerated under subdivision (a) shall be certified and shall be available for inspection at all reasonable hours at the principal office of the Contractor on the following basis:

- (1) A certified copy of an employee's payroll record shall be made available for inspection or furnished to the employee or his or her authorized representative on request.
- (2) A certified copy of all payroll records enumerated in subdivision (a) shall be made available for inspection or furnished upon request to a representative of the

Owner and the Division of Labor Standards Enforcement of the Department of Industrial Relations (“DIR”) and as may be required by the Labor Commissioner under Labor Code section 1771.4). The Contractor and each subcontractor shall furnish a certified copy of all payroll records directly to the Labor Commissioner monthly or more frequently, if so specified in the Agreement and in a format the Labor Commissioner prescribes.

(3) A certified copy of all payroll records enumerated in subdivision (a) shall be made available upon request by the public for inspection or for copies thereof. However, a request by the public shall be made through either the body awarding the contract or the Division of Labor Standards Enforcement of the ... (DIR). If the requested payroll records have not been provided pursuant to paragraph (2), the requesting party shall, prior to being provided the records, reimburse the costs of the preparation by the contractor, subcontractors, and the entity through which the request was made. The public may not be given access to such records at the principal office of the Contractor.

(c) Unless required as of January 1, 2015, to be furnished directly to the Labor Commissioner under Labor Code section 1771.4(a)(3), the certified payroll records shall be on forms provided by the Division of Labor Standards Enforcement (of the DIR) or shall contain the same information as the forms provided by the division. The payroll records may consist of printouts of payroll data that are maintained as computer records, if the printouts contain the same information as the forms provided by the division and the printouts are verified in the manner specified in (a) above.

(d) A Contractor or subcontractor shall file a certified copy of the records enumerated in subdivision (a) with the entity that requested such records within 10 days after receipt of a written request.

(e) Except as provided in subdivision (f), any copy of records made available for inspection as copies and furnished upon request to the public or any public agency by the awarding body or the Division of Labor Standards Enforcement (of the DIR) shall be marked or obliterated to prevent disclosure of an individual’s name, address and social security number. The name and address of the Contractor awarded the Contract or the subcontractor performing the Contract shall not be marked or obliterated. Any copy of records made available for inspection by, or furnished to, a multiemployer Taft-Hartley trust fund (29 U.S.C. Sec. 186(c)(5) that requests the records for the purposes of allocating contributions to participants shall be marked or obliterated only to prevent disclosure of an individual’s full social security number, but shall provide the last four digits of the social security number. Any copy of records made available for inspection by, or furnished to, a joint labor-management committee established pursuant to the federal Labor Management Cooperation Act of 1978 (29 U.S.C. Sec. 175a) shall be marked or obliterated only to prevent disclosure of an individual’s social security number.

(f) Notwithstanding any other provision of law, agencies that are included in the Joint

Enforcement Strike Force on the Underground Economy established pursuant to Section 329 of the Unemployment Insurance Code and other law enforcement agencies investigating violations of law shall, upon request, be provided nonredacted copies of certified payroll records. Any copies of records or certified payroll made available for inspection and furnished upon request to the public by an agency included in the Joint Enforcement Strike Force on the Underground Economy or to a law enforcement agency investigating a violation of law shall be marked or redacted to prevent disclosure of an individual's name, address, and social security number. An employer shall not be liable for damages in a civil action for any reasonable act or omission taken in good faith in compliance with this subsection.

(g) The contractor shall inform the body awarding the contract of the location of the records enumerated under subdivision (a), including the street address, city and county, and shall, within five working days, provide a notice of a change of location and address.

(h) The contractor or subcontractor has 10 days in which to comply subsequent to receipt of written notice requesting the records enumerated in subdivision (a). In the event that the Contractor or subcontractor fails to comply within the 10-day period, he or she shall, as a penalty to the state or political subdivision on whose behalf the contract is made or awarded, forfeit One Hundred Dollars (\$100.00) for each calendar day, or portion thereof, for each worker, until strict compliance is effectuated. Upon the request of the Division of Labor Standards Enforcement (of the DIR), these penalties shall be withheld from progress payments then due. A contractor is not subject to a penalty assessment pursuant to this section due to the failure of the subcontractor to comply with this section.

## **13.10 APPRENTICES**

### **13.10.1 APPRENTICE WAGES AND DEFINITIONS**

All apprentices employed by the Contractor to perform services under the Contract shall be paid the standard wage paid to apprentices under the regulations of the craft or trade at which he or she is employed, and shall be employed only at the work of the craft or trade to which he or she is registered. Only apprentices, as defined in section 3077 of the Labor Code, who are in training under apprenticeship standards and written apprenticeship agreements under Chapter 4 (commencing with § 3070) of Division 3, are eligible to be employed under this Contract. The employment and training of each apprentice shall be in accordance with the apprenticeship standards and apprentice agreements under which he or she is training. Contractor shall pay apprentices for any preemployment activities, as set forth in Labor Code section 1777.5.

### **13.10.2 APPRENTICE LABOR POOL**

When the Contractor to whom the Contract is awarded by the Owner, or any Subcontractor under him or her, in performing any of the Work under the Contract or subcontract, employs workers in any apprenticeable craft or trade, the Contractor and Subcontractor shall apply to the joint

apprenticeship committee administering the apprenticeship standards of the craft or trade in the area of the Site of the Project, for a certificate approving the Contractor or Subcontractor under the apprenticeship standards for the employment and training of apprentices in the area or industry affected. However, approval as established by the joint apprenticeship committee or committees shall be subject to the approval of the Administrator of Apprenticeship. The joint apprenticeship committee or committees, subsequent to approving the subject Contractor or Subcontractor, shall arrange for the dispatch of apprentices to the Contractor or Subcontractor in order to comply with this section. Every Contractor and Subcontractor shall submit the contract award information to the applicable joint apprenticeship committee which shall include an estimate of journeyman hours to be performed under the Contract, the number of apprentices to be employed, and the approximate dates the apprentices will be employed. There shall be an affirmative duty upon the joint apprenticeship committee or committees administering the apprenticeship standards of the crafts or trade in the area of the Site of the public work, to ensure equal employment and affirmative action and apprenticeship for women and minorities. Contractors or Subcontractors shall not be required to submit individual applications for approval to local joint apprenticeship committees provided they are already covered by the local apprenticeship standards. The ratio of work performed by apprentices to journeymen, who shall be employed in the craft or trade on the Project, may be the ratio stipulated in the apprenticeship standards under which the joint apprenticeship committee operates, but, except as otherwise provided in this section, in no case shall the ratio be less than one (1) hour of apprentice work for every five (5) hours of labor performed by a journeyman. However, the minimum ratio for the land surveyor classification shall not be less than one (1) apprentice for each five (5) journeymen.

### **13.10.3 JOURNEYMAN/APPRENTICE RATIO; COMPUTATION OF HOURS**

Any ratio shall apply during any day or portion of a day when any journeyman, or the higher standard stipulated by the joint apprenticeship committee, is employed at the job Site and shall be computed on the basis of the hours worked during the day by journeymen so employed, except for the land surveyor classification. The Contractor shall employ apprentices for the number of hours computed as above before the end of the Contract. However, the Contractor shall endeavor, to the greatest extent possible, to employ apprentices during the same time period that the journeymen in the same craft or trade are employed at the job Site. Where an hourly apprenticeship ratio is not feasible for a particular craft or trade, the Division of Apprenticeship Standards, upon application of a joint apprenticeship committee, may order a minimum ratio of not less than one (1) apprentice for each five (5) journeymen in a craft or trade classification.

### **13.10.4 JOURNEYMAN/APPRENTICE RATIO**

The Contractor or Subcontractor, if he or she is covered by this section upon the issuance of the approval certificate, or if he or she has been previously approved in the craft or trade, shall employ the number of apprentices or the ratio of apprentices to journeymen stipulated in the apprenticeship standards. Upon proper showing by the Contractor that he or she employs apprentices in the craft or trade in the state on all of his or her contracts on an annual average of not less than one (1) hour of apprentice work for every five (5) hours of labor performed by a journeyman, or in the land surveyor classification, one (1) apprentice for each five (5)

journeymen, the Division of Apprenticeship Standards may grant a certificate exempting the Contractor from the 1-to-5 hourly ratio as set forth in this section. This section shall not apply to contracts of general contractors or to contracts of specialty contractors not bidding for work through a general or prime contractor, when the contracts of general contractors or those specialty contractors involve less than Thirty Thousand Dollars (\$30,000) or twenty (20) working days. Any work performed by a journeyman in excess of eight (8) hours per day or forty (40) hours per week, shall not be used to calculate the hourly ratio required by this section.

13.10.4.1 ***Apprenticeable Craft or Trade.*** “Apprenticeable craft or trade” as used in this Article means a craft or trade determined as an apprenticeable occupation in accordance with the rules and regulations prescribed by the California Apprenticeship Council. The joint apprenticeship committee shall have the discretion to grant a certificate, which shall be subject to the approval of the Administrator of Apprenticeship, exempting a Contractor from the 1-to-5 ratio set forth in this Article when it finds that any one of the following conditions is met:

- A. Unemployment for the previous three-month period in the area exceeds an average of fifteen percent (15%).
- B. The number of apprentices in training in such area exceeds a ratio of 1-to-5.
- C. There is a showing that the apprenticeable craft or trade is replacing at least one-thirtieth (1/30) of its journeymen annually through the apprenticeship training, either on a statewide basis or on a local basis.
- D. Assignment of an apprentice to any work performed under this contract would create a condition which would jeopardize his or her life or the life, safety, or property of fellow employees or the public at large or if the specific task to which the apprentice is to be assigned is of such a nature that training cannot be provided by a journeyman.

#### 13.10.5 **RATIO EXEMPTION**

When exemptions are granted to an organization which represents Contractors in a specific trade from the 1-to-5 ratio on a local or statewide basis, the member Contractors will not be required to submit individual applications for approval to local joint apprenticeship committees, if they are already covered by the local apprenticeship standards.

#### 13.10.6 **APPRENTICE FUND**

A Contractor to whom the Contract is awarded or any Subcontractor under him or her, who, in performing any of the work under the Contract, employs journeymen or apprentices in any apprenticeable craft or trade and who is not contributing to a fund or funds to administer and conduct the apprenticeship program in any such craft or trade in the area of the Site of the Project, to which fund or funds other contractors in the area of the Site of the Project are contributing, shall contribute to the fund or funds in each craft or trade in which he or she employs journeymen or apprentices on the Project in the same amount or upon the same basis

and in the same manner as the other contractors do, but where the trust fund administrators are unable to accept the funds, contractors not signatory to the trust agreement shall pay a like amount to the California Apprenticeship Council. The Contractor or Subcontractor may add the amount of the contributions in computing his or her bid for the contract. The Division of Labor Standards Enforcement is authorized to enforce the payment of the contributions to the fund or funds as set forth in the Labor Code section 227.

#### **13.10.7 PRIME CONTRACTOR COMPLIANCE**

The responsibility of compliance with section 13.10 and section 1777.5 of the Labor Code for all apprenticeable occupations is with the Prime Contractor.

#### **13.10.8 DECISIONS OF JOINT APPRENTICESHIP COMMITTEE**

All decisions of the joint apprenticeship committee under this section 13.10 and Labor Code section 1777.5 are subject to Labor Code section 3081.

#### **13.10.9 NO BIAS**

It shall be unlawful for an employer or a labor union to refuse to accept otherwise qualified employees as registered apprentices on any public works on the grounds of race, religious creed, color, national origin, ancestry, sex, or age, except as provided in the Labor Code section 3077.

#### **13.10.10 VIOLATION OF LABOR CODE**

Pursuant to Labor Code sections 1777.1 and 1777.7, in the event a Contractor or Subcontractor fails to comply with the provisions of this section 13.10 and Labor Code section 1777.5, among other things:

(a) If a Contractor or Subcontractor willfully fails to comply, the Labor Commissioner may deny to the contractor or subcontractor, and to its responsible officers, the right to bid on, or be awarded or perform work as a subcontractor on, any public works project for a period of up to one year for the first violation and for a period of up to three years for the second and subsequent violation. Each period of debarment shall run from the date the determination of noncompliance by the Labor Commissioner becomes a final order.

(b) A contractor or subcontractor who violates section 1777.5 shall forfeit as a civil penalty an amount not exceeding the sum of One Hundred Dollars (\$100) for each full calendar day of noncompliance. Upon receipt of a determination that a civil penalty has been imposed, the awarding body shall enforce the penalty, which includes withholding the amount of the civil penalty from the contract progress payments or retention then due or to become due.

(c) In lieu of the penalty provided, the Labor Commissioner may for a first time violation and with the concurrence of an applicable apprenticeship program, order the



contractor or subcontractor to provide apprentice employment equivalent to the work hours that would have been provided for apprentices during the period of noncompliance.

(d) Any funds withheld by the awarding body pursuant to this section shall be deposited in the General Fund.

(e) The interpretation and enforcement of section 1777.5 and this section shall be in accordance with the regulations of the California Apprenticeship Council.

Pursuant to Public Contract Code section 6109, no contractor or subcontractor may bid on, be awarded, or perform work as a subcontractor on a public works project if ineligible to bid or work on, or be awarded, a public works project pursuant to section 1777.1 of the Labor Code.

### **13.11 ASSIGNMENT OF ANTITRUST CLAIMS**

#### **13.11.1 APPLICATION**

Pursuant to Public Contract Code section 7103.5 and Government Code section 4552, in entering into a public works contract or a subcontract to supply goods, services, or materials pursuant to a public works contract, the Contractor or Subcontractor offers and agrees to assign to the Owner all rights, title, and interest in and to all causes of action it may have under Section 4 of the Clayton Act, (15 U.S.C. § 15) or under the Cartwright Act (Chapter 2 [commencing with § 16700] of Part 2 of Division 7 of the Bus. & Prof. Code), arising from the purchase of goods, services, or materials pursuant to the public works contract or the subcontract. This assignment shall be made and become effective at the time the awarding body tenders Final Progress Payment to the Contractor, without further acknowledgment by the parties. If the Owner receives, either through judgment or settlement, a monetary recovery for a cause of action assigned under Chapter 11 (commencing with § 4550) of Division 5 of Title 1 of the Government Code, the assignor may, upon demand, recover from the Owner any portion of the recovery, including treble damages, attributable to overcharges that were paid by the assignor but were not paid by the Owner as part of the bid price, less the expenses incurred in obtaining that portion of the recovery.

#### **13.11.2 ASSIGNMENT OF CLAIM**

Upon demand in writing by the assignor, the Owner shall, within one (1) year from such demand, reassign the cause of action assigned pursuant to this Article if the assignor has been or may have been injured by the violation of law for which the cause of action arose and the Owner has not been injured thereby or the Owner declines to file a court action for the cause of action.

### **13.12 AUDIT**

Pursuant to and in accordance with the provisions of Government Code section 8546.7, or any amendments thereto, all books, records, and files of the Owner, the Contractor, or any Subcontractor connected with the performance of this Contract involving the expenditure of state

funds in excess of Ten Thousand Dollars (\$10,000.00), including, but not limited to, the administration thereof, shall be subject to the examination and audit of the Office of the Auditor General of the State of California for a period of three (3) years after release of all retention under this Contract. Contractor shall preserve and cause to be preserved such books, records, and files for the audit period. During the progress of the Work and for three (3) years after release of all retention under the Contract, Owner shall also have the right to an audit of Contractor's books, records, subcontracts, material and equipment contracts, files, and information related to the project, and Contractor must cooperate by producing all requested items within seven (7) days.

### **13.13 STORM WATER DISCHARGE PERMIT**

If applicable, the Contractor shall file a Notice of Intent to comply with the terms of the general permit to discharge storm water associated with construction activity (WQ Order No. 920-08-DWQ). The Notice of Intent must be sent to the following address along with the appropriate payment (warrant to be furnished by the Owner upon request by the Contractor, allow warrant processing time.): California State Water Resources Control Board, Division of Water Quality, Storm Water Permit Unit, P.O. Box 1977, Sacramento, CA 95812-1977. The Contractor may also call the State Water Board's Construction Activity Storm Water Hotline at (916) 657-1146. The Notice of Intent shall be filed prior to the start of any construction activity.

## **ARTICLE 14**

### **TERMINATION OR SUSPENSION OF THE CONTRACT**

#### **14.1 TERMINATION BY THE CONTRACTOR FOR CAUSE**

Contractor may not terminate for convenience. Contractor may only terminate for cause if the Work is stopped by others for a period of one hundred eighty (180) consecutive days through no act or fault of the Contractor, a Subcontractor of any tier, their agents or employees, or any other persons performing portions of the Work for whom the Contractor is contractually responsible, **and** the Work was stopped by others for one of the following reasons: (A) Issuance of an order of a court or other public authority having jurisdiction which requires Owner to stop all Work; or (B) an act of government, such as a declaration of national emergency, making material unavailable which requires Owner to stop all Work. If such grounds exist, the Contractor may serve written notice of such grounds on Owner and demand a meet-and-confer conference to negotiate a resolution in good faith within twenty (20) days of Owner's receipt of such notice. If such conference does not lead to resolution and the grounds for termination still exist, Contractor may terminate the Contract and recover from the Owner payment for Work executed and for reasonable verified costs with respect to materials, equipment, tools, construction equipment, and machinery, including reasonable overhead, profit, and damages for the Work executed, but excluding overhead (field and home office) and profit for (i) Work not performed and (ii) the period of time that the Work was stopped.

## 14.2 TERMINATION BY THE OWNER FOR CAUSE

### 14.2.1 GROUNDS FOR TERMINATION

The Owner may terminate the Contract if the Contractor:

- A. Refuses or fails to supply enough properly skilled workers or proper materials, or refuses or fails to take steps to adequately prosecute the Work toward Completion within the Contract Time;
- B. Fails to make payment to Subcontractors for materials or labor in accordance with Public Contract Code section 10262 or Business and Professions Code section 7108.5, as applicable;
- C. Violates Labor Code section 1771.1(a), subject to the provisions of Labor Code section 1771.1(f);
- D. Disregards laws, ordinances, rules, regulations, or orders of a public authority having jurisdiction; or
- E. Otherwise is in breach of the Contract Documents.

### 14.2.2 NOTIFICATION OF TERMINATION

When any of the above reasons exist, the Owner may, without prejudice to any other rights or remedies of the Owner, give notice to Contractor of the grounds for termination and demand cure of the grounds within seven (7) days (a "Notice of Intent to Terminate"). If Contractor fails to **either** (a) completely cure the grounds for termination within seven (7) days **or** (b) reasonably commence cure of the grounds for termination within seven (7) days and reasonably continue to cure the grounds for termination until such cure is complete, then Owner may terminate the Contract effective immediately upon service of written Notice of Termination and may, subject to any prior rights of Contractor's surety on the performance bond ("Surety"):

- A. Take possession of the Site and of all material, equipment, tools, and construction equipment and machinery thereon owned by the Contractor;
- B. Accept assignment of subcontracts pursuant to section 5.4; and
- C. Complete the Work by whatever reasonable method the Owner may deem expedient.

### 14.2.3 PAYMENTS WITHHELD

If the Owner terminates the Contract for one of the reasons stated in section 14.2.1, the Contractor shall not be entitled to receive further payment until the Work is Complete.

#### 14.2.4 PAYMENTS UPON COMPLETION

If the unpaid balance of the Contract Sum exceeds costs of Completing the Work, including compensation for professional services and expenses made necessary thereby, such excess shall be paid to the Contractor. If such costs exceed the unpaid balance, the Contractor shall pay the difference to the Owner. This payment obligation shall survive Completion of the Contract.

#### 14.2.5 INCLUSION OF TERMINATION FOR CONVENIENCE

Any purported termination by Owner for cause under this section 14.2, which is revoked or determined to not have been for cause, shall be deemed to have been a termination for convenience effective as of the same date as the purported termination for cause.

### 14.3 SUSPENSION OR TERMINATION BY THE OWNER FOR CONVENIENCE

#### 14.3.1 SUSPENSION BY OWNER

The Owner may, without cause, order the Contractor in writing to suspend, delay, or interrupt the Work in whole or in part for such period of time as the Owner may determine.

14.3.1.1 *Adjustments.* An adjustment shall be made for increases in the cost of performance of the Contract, including profit on the increased cost of performance caused by suspension, delay, or interruption. No adjustment shall be made to the extent:

- A. That performance is, was or would have been so suspended, delayed, or interrupted by another cause for which the Contractor is responsible; or
- B. That an equitable adjustment is made or denied under another provision of this Contract.

14.3.1.2 *Adjustments for Fixed Cost.* Adjustments made in the cost of performance may have a mutually agreed fixed or percentage fee.

#### 14.3.2 TERMINATION BY THE OWNER FOR CONVENIENCE

14.3.2.1 The Owner may, at any time, terminate the Contract for the Owner's convenience and without cause.

14.3.2.2 Upon receipt of written notice from the Owner of such termination for the Owner's convenience, the Contractor shall:

1. Cease operations as directed by the Owner in the notice;
2. Take actions necessary, or that the Owner may direct, for the protection and preservation of the Work; and

3. Except for Work directed to be performed prior to the effective date of termination stated in the notice, terminate all existing subcontracts and purchase orders and enter into no further subcontracts and purchase orders.

14.3.2.3 In case of such termination for the Owner's convenience, the Contractor shall be entitled to receive payment for Work executed, and costs incurred by reason of such termination.

#### **14.4 NOT A WAIVER**

Any suspension or termination by Owner for convenience or cause under this Article 14 shall not act as a waiver of any claims by Owner against Contractor or others for damages based on breach of contract, negligence or other grounds.

#### **14.5 MUTUAL TERMINATION FOR CONVENIENCE**

The Contractor and the Owner may mutually agree in writing to terminate this Contract for convenience. The Contractor shall receive payment for all Work performed to the date of termination in accordance with the provisions of Article 9.

#### **14.6 EARLY TERMINATION**

Notwithstanding any provision herein to the contrary, if for any fiscal year of this Contract the governing body of the Owner fails to appropriate or allocate funds for future periodic payments under the Contract after exercising reasonable efforts to do so, the Owner may upon thirty (30) days' notice, order work on the Project to cease. The Owner will remain obligated to pay for the work already performed but shall not be obligated to pay the balance remaining unpaid beyond the fiscal period for which funds have been appropriated or allocated and for which the work has not been done.



# **PERFORMANCE BOND**

TULARE CITY SCHOOL DISTRICT  
District Office  
600 North Cherry St.  
Tulare, CA 93274

**KNOW ALL MEN BY THESE PRESENTS** that we, \_\_\_\_\_  
\_\_\_\_\_ as Principal and  
\_\_\_\_\_ as Surety, are held and  
firmly bound unto **Tulare City School District** in the County of Tulare, State of  
California, hereinafter called the "Owner", in the sum of  
\_\_\_\_\_ Dollars (\$\_\_\_\_\_) for the payment of  
which sum well and truly made, we bind ourselves, our heirs, executors, administrators,  
and successors, jointly and severally, to the Owner for the full performance of a certain  
contract with the Owner, the terms of which are incorporated herein by reference, dated  
\_\_\_\_\_, 2021, for construction of:

## **LIVE OAK MIDDLE SCHOOL LOCKER ROOM REMODEL**

The condition of this obligation is such that, if the Principal shall well and truly perform and fulfill all the undertakings, covenants, terms, conditions, and agreements of said Contract during the original term of said Contract and any extensions thereof that may be granted by the Owner, with or without notice to the Surety, and for the period of time specified in the Contract after completion for correction of faulty or improper materials and workmanship and during the life of any guaranty or warranty required under the Contract, and shall also well and truly perform and fulfill all the undertakings, covenants, terms, conditions and agreement of any and all duly authorized modifications of said Contract that may hereafter be made, then this obligation is to be void, otherwise to remain in full force and virtue.

And the said Surety, for value received, hereby stipulates and agrees that no change, extension of time, alteration or addition to the terms of the Contract or to the Work to be performed thereunder or the specifications accompanying the same, shall in any way affect its obligation on this bond, and it does hereby waive notice of any such change, extension of time, alteration or addition to the terms of the Contract, or to the Work, or to the specifications.

No further agreement between Surety and Owner shall be required as a prerequisite to the Surety performing its obligations under this bond.

**IN WITNESS WHEREOF**, the above-bounden parties have executed this instrument under their several seals this \_\_\_\_\_ day of \_\_\_\_\_, \_\_\_\_\_ hereto affixed and these presents duly signed by its undersigned representative, pursuant to authority of its governing body.

(To be signed by \_\_\_\_\_ )  
(Principal and Surety, \_\_\_\_\_ )  
(and acknowledged and \_\_\_\_\_ )  
(Notarial Seal attached \_\_\_\_\_ )

(Affix Corporate Seal)

\_\_\_\_\_  
(Individual Principal)

\_\_\_\_\_  
(Business Address)

(Affix Corporate Seal)

\_\_\_\_\_  
(Corporate Principal)

\_\_\_\_\_  
(Business Address)

(Affix Corporate Seal)

\_\_\_\_\_  
(Corporate Surety)

\_\_\_\_\_  
(Business Address)

\_\_\_\_\_

By: \_\_\_\_\_

\_\_\_\_\_

The rate of premium on this bond is \_\_\_\_\_ per thousand.

The total amount of premium charged is \_\_\_\_\_.

The above must be filled in by Corporate Surety.



# **PAYMENT BOND**

(Labor and Material)

TULARE CITY SCHOOL DISTRICT

District Office  
600 North Cherry St.  
Tulare, CA 93274

## **KNOW ALL MEN BY THESE PRESENTS:**

That WHEREAS, TULARE CITY SCHOOL DISTRICT (the "Owner" of the public works project described below) and \_\_\_\_\_, hereinafter designated as the "Principal," have entered into a Contract for the furnishing of all materials and labor, services and transportation, necessary, convenient, and proper to construct:

### **LIVE OAK MIDDLE SCHOOL LOCKER ROOM REMODEL**

Which said agreement dated \_\_\_\_\_, 2021, and all of the Contract Documents are hereby referred to and made a part hereof;

and

WHEREAS, the Principal is required, before entering upon the performance of the work, to file a good and sufficient bond with the body by whom the Contract is awarded to secure the claims arising under said agreement.

## **NOW, THEREFORE, THESE PRESENTS WITNESSETH:**

That the said Principal and the undersigned \_\_\_\_\_ ("Surety") are held and firmly bound unto all laborers, material men, and other persons, and bound for all amounts due, referred to in Civil Code section 9554, subdivision (b), in the sum of \_\_\_\_\_ Dollars (\$\_\_\_\_\_) which sum well and truly be made, we bind ourselves, our heirs, executors, administrators, successors, or assigns, jointly and severally, by these presents.

The condition of this obligation is that if the said Principal or any of its subcontractors, or the heirs, executors, administrators, successors, or assigns of any, all, or either of them, shall fail to pay any of the persons named in Civil Code section 9100, or any of the amounts due, as specified in Civil Code section 9554, subdivision (b), that said Surety will pay the same in an amount not exceeding the amount hereinabove set forth, and also in case suit is brought upon this bond, will pay costs and reasonable attorney's fees to be awarded and fixed by the Court, and to be taxed as costs and to be included in the judgment therein rendered.

It is hereby expressly stipulated and agreed that this bond shall inure to the benefit of any and all persons, companies, and corporations entitled to file claims so as to give a right of action to them or their assigns in any suit brought upon this bond.

Should the condition of this bond be fully performed, then this obligation shall become null and void, otherwise it shall be and remain in full force and effect.

And the said Surety, for value received, thereby stipulates and agrees that no change, extension of time, alteration, or addition to the terms of said contract or the specifications accompanying the same shall in any manner affect its obligations on this bond, and it does hereby waive notice of any such change, extension, alteration, or addition.

IN WITNESS WHEREOF, this instrument has been duly executed by the Principal and Surety this \_\_\_\_\_ day of \_\_\_\_\_, \_\_\_\_\_.

(To be signed by \_\_\_\_\_ )  
(Principal and Surety, \_\_\_\_\_ )  
(and acknowledged and \_\_\_\_\_ )  
(Notarial Seal attached \_\_\_\_\_ )

\_\_\_\_\_  
Principal

\_\_\_\_\_  
Surety

By: \_\_\_\_\_

The above bond is accepted and approved this \_\_\_\_ day of \_\_\_\_\_.

**ESCROW AGREEMENT FOR SECURITY  
DEPOSITS IN LIEU OF RETENTION**

TULARE CITY SCHOOL DISTRICT  
District Office  
600 North Cherry St.  
Tulare, CA 93274

**This is a fiduciary account created by statute, Public Contract Code section 22300. The funds deposited in this account shall not be released to Contractor or any other person or entity, other than Owner, including pursuant to any purported lien or writ of attachment or execution, without the prior written, express approval of Owner.**

This Escrow Agreement is made and entered into by and between the TULARE CITY SCHOOL DISTRICT, whose address is 600 North Cherry St., Tulare, CA 93274 (hereinafter called "Owner"), \_\_\_\_\_ whose address is \_\_\_\_\_ (hereinafter called "Contractor"); and \_\_\_\_\_, a state or federally chartered bank in California whose address is \_\_\_\_\_ (hereinafter called "Escrow Agent").

For the consideration hereinafter set forth, the Owner, Contractor, and Escrow Agent agree as follows:

1. Pursuant to section 22300 of the Public Contract Code of the State of California, Contractor has the option to deposit securities with Escrow Agent as a substitute for retention earnings required to be withheld by the Owner pursuant to the Contract entered into between the Owner and Contractor in the amount of \_\_\_\_\_ Dollars (\$ \_\_\_\_\_), and dated \_\_\_\_\_, 2021, (the "Contract"). Alternatively, on written request of the Contractor, the Owner shall make payments of the retention earnings directly to the Escrow Agent. When Contractor deposits the securities as a substitute for retention earnings, the Escrow Agent shall notify the Owner within ten (10) calendar days of the deposit. The market value of the securities at the time of the substitution, as valued by the Owner, shall be at least equal to the cash amount then required to be withheld as retention under the terms of the Contract between the Owner and Contractor. If the Owner determines that the securities are not adequate it will notify Contractor and Escrow Agent, and Contractor shall deposit additional security as further determined by the Owner. Securities shall be held in the name of the Owner and shall designate the Contractor as the beneficial owner.
2. Thereafter, Owner shall make progress payments to the Contractor for such funds which otherwise would be withheld from progress payments pursuant to the

Contract provisions, provided that the Escrow Agent holds securities in the form and amount specified above.

3. Pursuant to Public Contract Code section 22300, as an alternative to the procedures set forth above, Contractor may request in writing that the Owner pay retention amounts directly to Escrow Agent. When the Owner makes payment of retentions earned directly to the Escrow Agent, the Escrow Agent shall hold them for benefit of the Contractor until such time as the escrow created under this Escrow Agreement is terminated. The Contractor may direct the investment of the payments into securities. All terms and conditions of this Escrow Agreement and the rights and responsibilities of the parties shall be equally applicable and binding when the Owner pays the Escrow Agent directly.
4. The Contractor shall be responsible for paying all fees for the expenses incurred by Escrow Agent in administering the Escrow Account and all expenses of the Owner. These expenses and payment terms shall be determined by the Owner, Contractor and Escrow Agent.
5. The interest earned on the securities or the money market accounts held in escrow and all interest earned on that interest shall be for the sole account of Contractor and shall be subject to withdrawal by Contractor at any time and from time to time without notice to the Owner.
6. Contractor shall have the right to withdraw all or any part of the principal in the Escrow Account only by written notice to Escrow Agent accompanied by written authorization from Owner to the Escrow Agent that Owner consents to the withdrawal of the amount sought to be withdrawn by Contractor.
7. The Owner shall have the right to draw upon the securities or any amount paid directly to Escrow Agent in the event of default by the Contractor. Upon seven (7) days written notice to the Escrow Agent from the Owner of the default, the Escrow Agent shall immediately convert the securities to cash and shall distribute the cash, including any amounts paid directly to Escrow Agent pursuant to Section 3 above, as instructed by Owner. Escrow Agent shall not be concerned with the validity of any notice of default given by Owner pursuant to this paragraph, and shall promptly comply with Owner's instructions to pay over said escrowed assets. Escrow Agent further agrees to not interplead the escrowed assets in response to a conflicting demand and hereby waives any present or future opportunity of interpleader.
8. Upon receipt of written notification from the Owner certifying that the Contract is final and complete, and that the Contractor has complied with all requirements and procedures applicable to the Contract, Escrow Agent shall release to Contractor all securities and interest on deposit less escrow fees and charges of the Escrow Account. The escrow shall be closed immediately upon disbursement of all moneys and securities on deposit and payment of fees and charges.

9. Escrow Agent shall rely on the written notifications from the Owner and Contractor pursuant to Sections (4), (5), (6), (7) and (8) of this Agreement and the Owner and Contractor shall hold Escrow Agent harmless from Escrow Agent's release and disbursement of the securities and interest as set forth above.
10. The names of the persons who are authorized to give written notice or to receive written notice on behalf of the Owner, the Contractor and the Escrow Agent in connection with the foregoing, and exemplars of their respective signatures are as follows:

ON BEHALF OF OWNER:

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Typewritten Name

\_\_\_\_\_  
Title

ON BEHALF OF CONTRACTOR:

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Typewritten Name

\_\_\_\_\_  
Title

ON BEHALF OF ESCROW AGENT:

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Typewritten Name

\_\_\_\_\_  
Title

**IN WITNESS WHEREOF**, the parties have executed this Agreement by their proper officers on the date first set forth above.

OWNER:

\_\_\_\_\_  
Signature

Typewritten Name

\_\_\_\_\_  
Title

CONTRACTOR:

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Typewritten Name

\_\_\_\_\_  
Title

ESCROW AGENT:

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Typewritten Name

\_\_\_\_\_  
Title

At the time the Escrow Account is opened, the Owner and Contractor shall deliver to the Escrow Agent a fully executed counterpart of this Agreement.

# **ROOF PROJECT CERTIFICATION**

(Public Contract Code §3006(a) and (b))

TULARE CITY SCHOOL DISTRICT

District Office

600 North Cherry St.

Tulare, CA 93274

I, \_\_\_\_\_ [name], \_\_\_\_\_ [name of employer], certify that I have not offered, given, or agreed to give, received, accepted, or agreed to accept, any gift, contribution, or any financial incentive whatsoever to or from any person in connection with the roof project contract. As used in this certification, "person" means any natural person, business, partnership, corporation, union, committee, club, or other organization, entity, or group of individuals. Furthermore, I, \_\_\_\_\_ [name], \_\_\_\_\_ [name of employer], certify that I do not have, and throughout the duration of the contract, I will not have, any financial relationship in connection with the performance of this contract with any architect, engineer, roofing, consultant, materials manufacturer, distributor, or vendor that is not disclosed below.

I, \_\_\_\_\_ [name], \_\_\_\_\_ [name of employer], have the following financial relationships, with an architect, engineer, roofing consultant, materials manufacturer, distributor, or vendor, or other person in connection with the following roof project contract:

\_\_\_\_\_  
[name and address of building, contract date and number]

\_\_\_\_\_  
[name and address of building, contract date and number]

\_\_\_\_\_  
[name and address of building, contract date and number]

\_\_\_\_\_  
[name and address of building, contract date and number]

I certify that to the best of my knowledge, the contents of this disclosure are true, or are believed to be true.

\_\_\_\_\_ Signature

\_\_\_\_\_ Date

\_\_\_\_\_ Print Name

\_\_\_\_\_ Print Name of Employer





SECTION 011100  
SUMMARY OF WORK

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes:

1. Project information.
2. Work covered by Contract Documents.
3. Work by Owner.
4. Owner furnished, contractor installed products.
5. Access to site.
6. Coordination with occupants.
7. Work restrictions.
8. Specification and drawing conventions.

- B. Related Sections:

1. Division 01 Section "Temporary Facilities and Controls" for limitations and procedures governing temporary use of Owner's facilities.

1.3 PROJECT INFORMATION

- A. Project Identification:

Locker Room Remodel at Live Oak Middle School  
980 N. Laspina  
Tulare, CA 93274

Architect's Project Number: 19-11344

- B. Owner:

Tulare City School District  
600 N. Cherry St.  
Tulare, CA 93274

Telephone: (559) 685-7200  
Contact: Brian Hollingshead

C. Architect:

TETER, LLP  
7535 N. Palm Avenue, Suite 201  
Fresno, California 93711

Telephone: (559) 437-0887  
Contact: Elizabeth Garcia

1.4 WORK COVERED BY CONTRACT DOCUMENTS

A. The Work of the Project is defined by the Contract Documents and consists of the following:

1. Site Work: Accessible parking stall upgrades at existing parking lot and path of travel concrete flatwork improvements.
2. Building 600: Modernization of existing building.
  - a. Extensive remodel of boys and girls locker rooms and restrooms, the addition of accessible showers, equipment rooms and offices.
  - b. Improvements to the classroom spaces including new casework and interior finishes.
  - c. New light fixtures and lighting controls, fire alarm upgrades and building modifications to exterior door/door hardware throughout building.
  - d. Removal and reinstallation of HVAC equipment on new rooftop curbs and duct modifications as required for space reconfigurations.
3. Building 700: Accessibility upgrades to unisex staff restroom including modifying toilet fixture and accessory mounting heights.

B. Type of Contract: Project will be constructed under a single prime contract.

1.5 WORK BY OWNER

A. General: Cooperate fully with Owner so work may be carried out smoothly, without interfering with or delaying work under this Contract or work by Owner. Coordinate the Work of this Contract with work performed by Owner.

B. Preceding Work: Owner will perform the following construction operations at Project site. Those operations are scheduled to be substantially complete before work under this Contract begins.

1. Relocation of existing storage container.
2. Removal of all existing furniture, display systems (smart boards, marker boards and tack boards), wall speakers and short-throw projectors.

- C. Subsequent Work: Owner will perform the following additional work at site after Substantial Completion. Completion of that work will depend on successful completion of preparatory work under this Contract.

- 1. Installation of marker boards and short-throw projectors.

#### 1.6 OWNER-FURNISHED CONTRACTOR-INSTALLED PRODUCTS

- A. Owner will furnish products indicated. The Work includes receiving, unloading, handling, storing, protecting, and installing Owner-furnished products.

- B. Owner-Furnished Products:

- 1. TVs and TV mounting wall brackets.
  - 2. Smart boards.
  - 3. Select toilet room accessories as indicated on drawings.

#### 1.7 ACCESS TO SITE

- A. General: Contractor shall have limited use of Project site for construction operations as indicated on Drawings by the Contract limits and as indicated by requirements of this Section.

- B. Use of Site: Limit use of Project site to work in areas indicated. Do not disturb portions of Project site beyond areas in which the Work is indicated.

- 1. Driveways, Walkways and Entrances: Keep driveways, loading areas, and entrances serving premises clear and available to Owner, Owner's employees, and emergency vehicles at all times. Do not use these areas for parking or storage of materials.
    - a. Schedule deliveries to minimize use of driveways and entrances by construction operations.
    - b. Schedule deliveries to minimize space and time requirements for storage of materials and equipment on-site.

- C. Condition of Existing Building: Maintain portions of existing building affected by construction operations in a weathertight condition throughout construction period. Repair damage caused by construction operations.

## 1.8 COORDINATION WITH OCCUPANTS

- A. Partial Owner Occupancy: Owner will occupy the premises during entire construction period, with the exception of areas under construction. Cooperate with Owner during construction operations to minimize conflicts and facilitate Owner usage. Perform the Work so as not to interfere with Owner's operations. Maintain existing exits unless otherwise indicated.
  - 1. Maintain access to existing walkways, corridors, and other adjacent occupied or used facilities. Do not close or obstruct walkways, corridors, or other occupied or used facilities without written permission from Owner and authorities having jurisdiction.
  - 2. Provide not less than 72 hours' notice to Owner of activities that will affect Owner's operations.

## 1.9 WORK RESTRICTIONS

- A. Work Restrictions, General: Comply with restrictions on construction operations.
  - 1. Comply with limitations on use of public streets and other requirements of authorities having jurisdiction.
- B. On-Site Work Hours: Limit work in the existing building to normal business working hours of 7:00 a.m. to 5:00 p.m., Monday through Friday, except as otherwise indicated.
  - 1. Submit a written request to the Architect for work hours outside of the indicted on-site hours; request subject to review by the Owner.
- C. Existing Utility Interruptions: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted under the following conditions and then only after providing temporary utility services according to requirements indicated:
  - 1. Notify Architect and Owner not less than 2 days in advance of proposed utility interruptions.
  - 2. Obtain Architect's and Owner's written permission before proceeding with utility interruptions.
- D. Noise, Vibration, and Odors: Coordinate operations that may result in high levels of noise and vibration, odors, or other disruption to Owner occupancy with Owner.
  - 1. Notify Architect and Owner not less than 2 days in advance of proposed disruptive operations.
  - 2. Obtain Architect's and Owner's written permission before proceeding with disruptive operations.
- E. Controlled Substances: Use of tobacco products and other controlled substances on Project site is not permitted.

## 1.10 SPECIFICATION AND DRAWING CONVENTIONS

- A. Specification Content: The Specifications use certain conventions for the style of language and the intended meaning of certain terms, words, and phrases when used in particular situations. These conventions are as follows:
  - 1. Imperative mood and streamlined language are generally used in the Specifications. The words "shall," "shall be," or "shall comply with," depending on the context, are implied where a colon (:) is used within a sentence or phrase.
  - 2. Specification requirements are to be performed with by Contractor unless specifically stated otherwise.
- B. Division 01 General Requirements: Requirements of Sections in Division 01 apply to the Work of all Sections in the Specifications.
- C. Drawing Coordination: Requirements for materials and products identified on Drawings are described in detail in the Specifications. One or more of the following are used on Drawings to identify materials and products:
  - 1. Terminology: Materials and products are identified by the typical generic terms used in the individual Specifications Sections.
  - 2. Abbreviations: Materials and products are identified by abbreviations scheduled on Drawings.
  - 3. Keynoting: Materials and products are identified by reference keynotes.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION



SECTION 011103  
ADDENDA

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes administrative requirements for Addenda issued prior to bid opening.
- B. Related Requirements:
  - 1. Division 00 Sections as applicable to contract requirements and modifications.
  - 2. Division 01 Section "Substitution Procedures" for administrative procedures for handling requests for substitutions made after the Contract award.
  - 3. Division 01 Section "Contract Modification Procedures" for changes to the Contract Documents after award of the Contract.

1.3 NOTICE TO BIDDERS

- A. Addenda will be issued to registered plan holders for changes to the drawings and specifications during the bidding period prior to the bid opening. Addenda shall serve to clarify, revise, and supersede information in the Project Manual, Drawings, and previously issued Addenda. Portions of the Addenda affecting the Contract Documents will be incorporated into the Contract by enumeration of the Addendum in the Owner/Contractor Agreement.
- B. The Bidder shall acknowledge receipt of this Addendum in the appropriate space on the Bid Form.

1.4 GOVERNING AGENCY REVIEW AND APPROVAL

- A. Addenda shall be submitted to the Authority having Jurisdiction (AHJ) by the project Architect and shall be approved by the AHJ in order to be officially incorporated into the construction documents.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION





SECTION 011105  
USE OF ARCHITECT'S ELECTRONIC FILES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes Administrative and procedural requirements for use of Architect's electronic Contract Document drawing files.
- B. Related Sections:
  - 1. Division 01 Section "Project Management and Coordination."
  - 2. Division 01 Section "Submittal Procedures."
  - 3. Division 01 Section "Project Record Drawings."

1.3 USE OF ARCHITECT'S ELECTRONIC FILES

- A. Architect may make available to Contractor digital data files of Architect's Drawings for use in preparing shop drawings, coordination drawings, and project record drawings.
  - 1. Architect makes no representations as to the accuracy or completeness of digital data files as they relate to Drawings.
  - 2. Files will be supplied digitally via email or FTP site and will be in PDF, DWG, or similar common format.
  - 3. Electronic files will be available without charge.
- B. Contractor, Subcontractors, and Suppliers of this Project shall jointly execute a waiver of Liability for each use of the Architects electronic files and shall be responsible for the use of electronic files.
  - 1. Liability Form: "ELECTRONIC DATA FILE DISTRIBUTION WAIVER OF LIABILITY FORM" included at the end of this Specification Section.
- C. The use of the electronic files shall only be used for this Project and for the identified purposes noted on the "ELECTRONIC DATA FILE DISTRIBUTION WAIVER OF LIABILITY FORM." Electronic Contract Document drawing files received from the architect shall not be duplicated without written permission of the Architect.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

(Electronic Data File Distribution Waiver of Liability included on the following page)



**ELECTRONIC DATA FILE DISTRIBUTION WAIVER OF LIABILITY**

**TETER, LLP**  
7535 North Palm, Suite 201  
Fresno, California 93711

Project: \_\_\_\_\_

Intended Use: \_\_\_\_\_

Any electronic data, files or information provided under this Agreement are the property of the above listed Professionals and consultants (Team). It is understood and agreed that the information contained in these electronic data file shall not be copied or duplicated for any use other than the project for which they were created. It is understood by the undersigned that compatibility of this electronic media with other systems is not guaranteed, and conversion to other systems is done at the user's own risk.

The user hereby agrees and recognizes that designs, plans and data stored on electronic media including, but not limited to, computer disk and magnetic tape, may be subject to undetectable alteration and/or uncontrollable deterioration. It is agreed by the undersigned that the Team shall not be liable for the completeness or accuracy of any material provided on electronic media.

The undersigned agrees to defend, hold harmless and indemnify the Team and its officers, directors, employees, agents and consultants for any and all claims, losses, costs or damage whatsoever arising out of, resulting from, or in any way related to the use of electronic data files provided hereunder, whether that use is authorized or unauthorized. The user further agrees to defend, indemnify and hold harmless the Team its officers, directors, employees, agents and consultants from any and all claims, damages, losses, expenses and injuries arising out of the modification of the electronic data files by the user or by anyone obtaining said files through or from the user.

The Team bears no responsibility for the information in the electronic data files once it leaves the offices of **TETER, LLP**. The undersigned understands that the electronic data files are subject to applicable copyright laws of the United States and agrees to be bound by same. Upon our receipt of this agreement duly executed by an Officer of your firm you may request the Data files.

Name (Print/Sign): \_\_\_\_\_ Date: \_\_\_\_\_

Firm: \_\_\_\_\_

Phone and email: \_\_\_\_\_

Name (Print/Sign): \_\_\_\_\_ Date: \_\_\_\_\_

Firm: \_\_\_\_\_

Phone and email: \_\_\_\_\_

Name (Print/Sign): \_\_\_\_\_ Date: \_\_\_\_\_

Firm: \_\_\_\_\_

Phone and email: \_\_\_\_\_



SECTION 012500  
SUBSTITUTION PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for substitutions.
- B. Related Sections:
  - 1. Division 00 Section "Instructions to Bidders" and other Division 00 Sections as applicable to substitution requests prior to submission of bids.
  - 2. Division 01 Section "DSA Hourly Fee Services" for DSA hourly fee services for review of changes to DSA approved Construction Documents.
  - 3. Division 01 Section "Contract Modification Procedures" for changes to DSA approved Construction Documents."
  - 4. Division 01 Section "Product Requirements" for requirements for submitting comparable product submittals for products by listed manufacturers.
  - 5. Divisions 02 through 33 Sections for specific requirements and limitations for substitutions.

1.3 DEFINITIONS

- A. Substitutions: Changes in products, materials, equipment, and methods of construction from those required by the Contract Documents.
  - 1. Substitutions for Cause: Changes proposed by Contractor that are required due to changed Project conditions, such as unavailability of product, regulatory changes, or unavailability of required warranty terms.
  - 2. Substitutions for Convenience: Changes proposed by Contractor that are not required in order to meet other Project requirements but may offer advantage to the Owner.

## 1.4 REGULATORY REQUIREMENTS

- A. Division of the State Architect (DSA) Review and Approval: Substitutions resulting in changes to DSA approved Construction Documents shall be considered a change requiring DSA review and approval per DSA IR A-6 and Section 338(c) Part 1, Title 24 CCR. Review and approval is required prior to fabrication and installation.
1. DSA Construction Change Documents shall be as specified in Division 01 Section "Contract Modification Procedures."
  2. DSA Hourly Fee Services for review of CCD's shall be as specified in Division 01 Section "DSA Hourly Fee Services."

## 1.5 SUBMITTALS

- A. Substitution Requests: Submit documentation identifying product or fabrication or installation method to be replaced. Include Specification Section number and title, and Drawing numbers and titles.
1. Substitution Request Form: Use form provided at the end of this Section.
  2. Documentation: Show compliance with requirements for substitutions and the following, as applicable:
    - a. Statement indicating why specified product or fabrication or installation cannot be provided, if applicable.
    - b. Coordination information, including a list of changes or modifications needed to other parts of the Work and to construction performed by Owner and separate contractors that will be necessary to accommodate proposed substitution.
    - c. Detailed comparison of significant qualities of proposed substitution with those of the Work specified. Include annotated copy of applicable specification section. Significant qualities may include attributes such as performance, weight, size, durability, visual effect, sustainable design characteristics, warranties, and specific features and requirements indicated. Indicate deviations, if any, from the Work specified.
    - d. Product Data, including drawings and descriptions of products and fabrication and installation procedures.
    - e. Samples, where applicable or requested.
    - f. Certificates and qualification data, where applicable or requested.
    - g. List of similar installations for completed projects with project names and addresses and names and addresses of architects and owners.
    - h. Material test reports from a qualified testing agency indicating and interpreting test results for compliance with requirements indicated.
    - i. Research reports evidencing compliance with building code in effect for Project, from ICC-ES.

- j. Detailed comparison of Contractor's construction schedule using proposed substitution with products specified for the Work, including effect on the overall Contract Time. If specified product or method of construction cannot be provided within the Contract Time, include letter from manufacturer, on manufacturer's letterhead, stating date of receipt of purchase order, lack of availability, or delays in delivery.
  - k. Cost information, including a proposal of change, if any, in the Contract Sum.
  - l. Contractor's certification that proposed substitution complies with requirements in the Contract Documents except as indicated in substitution request, is compatible with related materials, and is appropriate for applications indicated.
  - m. Contractor's waiver of rights to additional payment or time that may subsequently become necessary because of failure of proposed substitution to produce indicated results.
3. Architect's Action: If necessary, Architect will request additional information or documentation for evaluation within 7 days of receipt of a request for substitution. Architect will notify Contractor of acceptance or rejection of proposed substitution within 15 days of receipt of request, or 7 days of receipt of additional information or documentation, whichever is later. Architect will not act on any Post-Bid Substitutions until 7 days following the submission of the Schedule of Values per Division 01 Section "Payment Procedures."
- a. Forms of Acceptance:
    - 1) Substitutions Prior to Bid: Addenda will be issued for substitutions accepted prior to bid.
    - 2) Substitutions After Award of Contract: Change Order, Construction Change Directive, or Architect's Supplemental Instructions for minor changes in the Work.
  - b. Use product specified if Architect does not issue a decision on use of a proposed substitution within time allocated.

## 1.6 QUALITY ASSURANCE

- A. Compatibility of Substitutions: Investigate and document compatibility of proposed substitution with related products and materials. Engage qualified testing agency to perform compatibility tests recommended by manufacturers.

## 1.7 PROCEDURES

- A. Coordination: Revise or adjust affected work as necessary to integrate work of the approved substitutions.

## PART 2 - PRODUCTS

### 2.1 SUBSTITUTIONS

- A. Substitutions Prior to Bid: Architect will consider requests for substitution if received within 21 days prior to the submission of bids. Requests received after that time may be considered or rejected at discretion of Architect.
1. Conditions: Architect will consider bidder's request for substitution when the following conditions are satisfied.
    - a. Substitutions prior to bid shall also be subject to the requirements of applicable Division 00 Specification Sections.
    - b. Substitutions prior to bid shall comply with the requirements for Substitutions for Cause or Substitutions for Convenience as applicable.
  2. Substitutions requested by bidders during the bidding period, and accepted by Addendum prior to award of the Contract, are considered as included in the Contract Documents.
- B. Substitutions After Award of Contract: The Contractor after award of the Contract, as allowed by the General Conditions, may submit materials and methods to be considered for substitutions.
1. The following are not considered to be substitutions:
    - a. Revisions to the Contract Documents requested by the Owner or Architect.
    - b. Specified options of products and construction methods included in the Contract Documents.
    - c. The Contractor's compliance with governing regulations and orders issued by governing authorities.
- C. Substitutions for Cause: Submit requests for substitution immediately upon discovery of need for change, but not later than 21 days prior to time required for preparation and review of related submittals.
1. Conditions: Architect will consider Contractor's request for substitution when the following conditions are satisfied. If the following conditions are not satisfied, Architect will return requests without action, except to record noncompliance with these requirements:
    - a. Requested substitution is consistent with the Contract Documents and will produce indicated results.
    - b. Substitution request is fully documented and properly submitted.
    - c. Requested substitution will not adversely affect Contractor's construction schedule.
    - d. Requested substitution has received necessary approvals of authorities having jurisdiction.
    - e. Requested substitution is compatible with other portions of the Work.



- f. Requested substitution has been coordinated with other portions of the Work.
  - g. Requested substitution provides specified warranty.
  - h. If requested substitution involves more than one contractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved.
- D. Substitutions for Convenience: Architect will consider requests for substitution if received within 60 days after the Notice to Proceed. Requests received after that time may be considered or rejected at discretion of Architect.
1. Conditions: Architect will consider Contractor's request for substitution when the following conditions are satisfied. If the following conditions are not satisfied, Architect will return requests without action, except to record noncompliance with these requirements:
- a. Requested substitution offers Owner a substantial advantage in cost, time, energy conservation, or other considerations, after deducting additional responsibilities Owner must assume. Owner's additional responsibilities may include compensation to Architect for redesign and evaluation services, increased cost of other construction by Owner, and similar considerations.
  - b. Requested substitution does not require extensive revisions to the Contract Documents.
  - c. Requested substitution is consistent with the Contract Documents and will produce indicated results.
  - d. Substitution request is fully documented and properly submitted.
  - e. Requested substitution will not adversely affect Contractor's construction schedule.
  - f. Requested substitution has received necessary approvals of authorities having jurisdiction.
  - g. Requested substitution is compatible with other portions of the Work.
  - h. Requested substitution has been coordinated with other portions of the Work.
  - i. Requested substitution provides specified warranty.
  - j. If requested substitution involves more than one contractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved.

PART 3 - EXECUTION (Not Used)

END OF SECTION

(Substitution Request Form included on the following page)



**SUBSTITUTION REQUEST FORM**

**FOR: Locker Room Remodel at Live Oak Middle School**

We hereby submit for your consideration the following product instead of the specified item for the above project:

SECTION	PARAGRAPH	SPECIFIED ITEM
_____	_____	_____

Proposed Substitution: \_\_\_\_\_

Attach complete technical data, including laboratory tests, if applicable.

Include complete information on changes to Drawings and/or Specifications which proposed substitution will require for its proposed installation.

Fill in the blanks below:

- A. Does the substitution affect dimension on Drawings:  
\_\_\_\_\_
- B. Will the undersigned pay for changes to the building design, including engineering and detailing costs caused by the requested substitution?  
\_\_\_\_\_
- C. What affect does substitution have on other trades?  
\_\_\_\_\_
- D. Difference between proposed substitution and specified item?  
\_\_\_\_\_
- E. Manufacturer's guarantees of the proposed and specified items are:  
       \_\_\_\_\_ Same                      \_\_\_\_\_ Different (explain on attachment)
- F. Cost difference between proposed substitution and specified item - savings to Owner?  
\_\_\_\_\_

The undersigned states that the function, appearance and quality are equivalent or superior to the specified item and will be at no additional cost to the Owner.

Submitted to the Architect by:

Signature: _____	For Use by Design Consultant
Firm: _____	Accepted _____
Address: _____	Accepted as Noted _____
_____	Not Accepted _____
_____	Received Too Late _____
Date: _____	By: _____
Telephone: _____	Date: _____
Remarks: _____	

SECTION 012600  
CONTRACT MODIFICATION PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.
- B. Division of the State Architect (DSA) Interpretation of Regulations IR A-6 "Construction Change Document Submittal and Approval Process," latest edition (This document is available on DSA's website).

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for handling and processing Contract modifications including the following:
  - 1. Governing Agency requirements.
  - 2. Architect's Supplemental Instructions.
  - 3. Architect's Change Directive.
  - 4. Proposal Requests.
  - 5. Change Orders.
- B. Related Requirements:
  - 1. Division 00 Sections as applicable to contract requirements and modifications.
  - 2. Division 01 Section "Substitution Procedures" for administrative procedures for handling requests for substitutions made after the Contract award.
  - 3. Division 01 Section "DSA Hourly Fee Services" for fees charged by DSA for changes to the Construction Documents.

1.3 DEFINITIONS

- A. Contract Modification: A change to the Contract Agreement between the Owner and the Contractor affecting the Contract Documents, the Contract Time, and/or the Contract Amount.
- B. Change Order (CO): A document defining Contract Modifications. Change Orders shall be issued by the Architect and shall be signed by the Architect, Owner, and Contractor.
- C. Construction Change Document (CCD): A form required by DSA for documentation of changes to the DSA approved Construction Documents.

- D. Architect's Change Directive (ACD): A form utilized by the Architect directing the Contractor to proceed with a change that may or may not require DSA approval.
- E. Architect's Supplemental Instruction (ASI): For minor changes in the Work not involving adjustment to the Contract Sum or the Contract Time, the Architect will issue Architect's Supplemental Instructions authorizing such changes.

#### 1.4 CHANGES TO DSA APPROVED CONSTRUCTION DOCUMENTS

- A. Division of the State Architect: For projects under the jurisdiction of the Division of the State Architect (DSA), Changes to the Construction Documents shall be reviewed and approved by DSA. Changes to the Construction Documents shall be submitted to DSA by the Architect, submittals for changes shall include DSA Form 140 "Application for Submittal of Post-Approval Document."
- B. DSA Hourly Fee Services: Changes to DSA approved Construction Documents shall be reviewed by DSA and shall be subject to DSA Hourly Fee Services. Charges will be made to the Owner by DSA.
  - 1. Where changes to DSA approved Construction Documents are the result of actions by the Contractor, the Contractor shall be liable for DSA Hourly Fee Services as described in Division 01 Section "DSA Hourly Fee Services."

#### 1.5 ARCHITECT'S SUPPLEMENTAL INSTRUCTION

- A. Architect's Supplemental Instruction (ASI): For minor changes in the Work not involving adjustment to the Contract Sum or the Contract Time, the Architect will issue Architect's Supplemental Instructions authorizing such changes.
  - 1. Architect's Supplemental Instructions affecting changes to the Construction Documents shall be subject to governing agency review and approval, and shall be accompanied by appropriate DSA CCD documentation.
  - 2. Contractor's Response:
    - a. Contractor shall perform the work indicated in the Architect's Supplemental Instruction without adjustment to the Contract Sum or the Contract Time.
    - b. If the Contractor determines that an adjustment to the Contract Sum or the Contract Time is necessary due to the Architect's Supplemental Instruction, the Contractor shall respond to the Architect's Supplemental Instruction as if it were an Architect/Owner initiated Proposal Request.

## 1.6 ARCHITECT'S CHANGE DIRECTIVE

- A. Architect's Change Directive (ACD): Architect may issue an Architect's Change Directive on Architect's standard form to instruct Contractor to proceed with a change in the Work for subsequent inclusion in a Change Order.
  - 1. Architect's Change Directive contains a complete description of change in the Work. It also designates method to be followed to determine change in the Contract Sum or the Contract Time.
  - 2. Architect's Change Directives affecting structural, fire/life safety, and/or access compliance shall be accompanied by appropriate approved DSA CCD documentation.
  - 3. Architect's Change Directive shall be issued by the Architect and shall be signed by the Architect.
- B. Documentation by Contractor: Maintain detailed records on a time and material basis of work required by the Architect's Change Directive.
  - 1. After completion of change, submit an itemized account and supporting data necessary to substantiate cost and time adjustments to the Contract.

## 1.7 PROPOSAL REQUESTS

- A. General: Proposal Requests allow the Contractor to respond to proposed changes in the Work that involve an adjustment to the Contract Sum or the Contract Time. Proposal Requests are not instructions to stop work in progress or execute proposed changes. Upon Owner's approval of a Proposal Request, Architect will issue a Change Order instructing the Contractor to proceed with the proposed changes (Refer to Part 1 Article "Change Order Procedures").
- B. Architect/Owner-Initiated Proposal Requests: Architect will issue a detailed description of proposed changes in the Work that may require adjustment to the Contract Sum or the Contract Time. If necessary, the description will include supplemental or revised Drawings and Specifications.
  - 1. Contractor's Response: Within time specified in Proposal Request, or not more than 7 days after receipt of Proposal Request when not otherwise specified, submit a quotation estimating cost adjustments to the Contract Sum and the Contract Time necessary to execute the change.
    - a. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
    - b. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
    - c. Include costs of labor and supervision directly attributable to the change.
    - d. Include an updated Contractor's construction schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.

- e. Quotation Form: Use forms acceptable to Architect.
- C. Contractor-Initiated Proposals: If conditions require modifications to the Contract, Contractor may initiate a claim by submitting a request for a change to Architect. Architect will not act on any Contractor Initiated Proposals until 7 days following the submission of the Schedule of Values per Division 01 Section "Payment Procedures."
- 1. Include a statement outlining reasons for the change and the effect of the change on the Work. Provide a complete description of the proposed change. Indicate the effect of the proposed change on the Contract Sum and the Contract Time.
  - 2. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
  - 3. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
  - 4. Include costs of labor and supervision directly attributable to the change.
  - 5. Include an updated Contractor's construction schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.
  - 6. Comply with requirements in Division 01 Section "Substitution Procedures" if the proposed change requires substitution of one product or system for product or system specified.
  - 7. Proposal Request Form: Use form acceptable to Architect.
- D. Architect's Response: Within 7 days after receipt of Contractor's response to Architect/Owner initiated Proposal Request or Contractor's Proposal, Architect will:
- 1. Issue a Change Order for accepted proposals.
  - 2. Notify the Contractor of unaccepted proposals.
  - 3. Issue an Architect's Change Directive where changes are necessary for the progress of the Work and changes to the Contract Sum and the Contract Time are in dispute.

## 1.8 CHANGE ORDER PROCEDURES

- A. On Owner's approval of a Proposal Request, Architect will issue a Change Order for signatures of Owner and Contractor on form provided by Architect.
- 1. Change Orders affecting changes to the Construction Documents shall be subject to governing agency review and approval, and shall be accompanied by appropriate DSA CCD documentation.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION





SECTION 012605  
DSA HOURLY FEE SERVICES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.
- B. Division of the State Architect (DSA) Interpretive Regulation IR A-30 "DSA Hourly Fee Services" latest edition (Document is available on DSA's website under "Publications;" Interpretive Regulations (IRs); A- Administrative; IR-30 ).

<https://www.dgs.ca.gov/dsa/>

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for DSA Hourly Fee Services associated with changes to DSA approved Construction Documents.
- B. Related Requirements:
  - 1. Division 00 Sections as applicable to contract requirements and modifications.
  - 2. Division 01 Section "Addenda"
  - 3. Division 01 Section "Substitution Procedures"
  - 4. Division 01 Section "Contract Modification Procedures"
  - 5. Division 01 Section "Payment Procedures"
  - 6. Division 01 Section "Submittal Procedures"
  - 7. Division 01 Section "Product Requirements"

1.3 DSA HOURLY FEE SERVICES

- A. General: Changes to DSA approved Construction Documents shall be documented by the use of DSA Construction Change Document (CCD) forms. CCD forms shall be submitted to DSA by the Architect.
  - 1. Refer to Division 01 Section "Contract Modification Procedures" for additional information regarding DSA CCD's.
- B. DSA Hourly Fee Services: Changes to DSA approved Construction Documents shall be reviewed by DSA and shall be subject to DSA Hourly Fee Services for review at a rate established by DSA IR A-30. Charges will be made to the Owner by DSA.
  - 1. Hourly Rate: Rate per hour as established by DSA IR A-30, latest edition.

- C. Bidder's Responsibility: Prior to bidding, where a bidder's request for substitution or similar action results in a change requiring DSA Hourly Fee Services, bidder shall submit a deposit to the Architect for reimbursement for DSA Hourly Fee Services. The deposit amount shall be established by the Architect, a minimum of one hour of DSA Hourly Fee Services (hourly rate as established by DSA IR A-30) will not be refundable. Deposits shall be made payable to the Owner.
  
- D. Contractor's Responsibility: When a contractor's action results in a change requiring DSA Hourly Fee Services, charges by DSA to the Owner will be deducted from the Contract Sum and the Architect will issue a Change Order on a quarterly basis to adjust the Contract Sum.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

SECTION 012613  
REQUEST FOR INFORMATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes administrative provisions for preparation, submittal and response to Contractor's Request for Information (RFI's) during construction of project.
- B. Related Sections:
  - 1. General Conditions of the Contract.

1.3 DEFINITIONS

- A. RFI, Request for Information: Request from Contractor seeking information required by or clarification of the Contract Documents.

1.4 SUBMITTALS

- A. RFI Submittals: Submit RFI's via email as PDF electronic files; include attachments in PDF electronic file format.

1.5 REQUESTS FOR INFORMATION (RFIs)

- A. General: Immediately on discovery of the need for additional information or interpretation of the Contract Documents, Contractor shall prepare and submit an RFI in the form specified.
  - 1. Architect will return without response those RFIs submitted to Architect by other entities controlled by Contractor.
  - 2. Coordinate and submit RFIs in a prompt manner so as to avoid delays in Contractor's work or work of subcontractors.

- B. Content of the RFI: Include a detailed, legible description of item needing information or interpretation and the following:
1. Project name.
  2. Project number.
  3. Date.
  4. Name of Contractor.
  5. Name of Architect
  6. RFI number, numbered sequentially.
  7. RFI subject.
  8. Specification Section number and title and related paragraphs, as appropriate.
  9. Drawing number and detail references, as appropriate.
  10. Field dimensions and conditions, as appropriate.
  11. Contractor's suggested resolution. If Contractor's solution(s) impacts the Contract Time or the Contract Sum, Contractor shall state impact in the RFI.
  12. Contractor's signature.
  13. Attachments: Include sketches, descriptions, measurements, photos, Product Data, Shop Drawings, coordination drawings, and other information necessary to fully describe items needing interpretation.
    - a. Include dimensions, thicknesses, structural grid references, and details of affected materials, assemblies, and attachments on attached sketches.
- C. RFI Form: Use RFI form included at end of this Section or form acceptable to Architect. Upon request from the Contractor, the form at the end of this section will be made available in WORD format from the Architect.
- D. Architect's Action: Architect will review each RFI, determine action required, and respond.
1. Allow 10 working days for Architect's response for each RFI. RFIs received by Architect after 1:00 p.m. will be considered as received the following working day.
  2. Architect will not act on any RFI's until 7 days following the submission of the Schedule of Values per Division 01 Section "Payment Procedures."
  3. The following RFIs will be returned without action:
    - a. Requests for approval of submittals.
    - b. Requests for approval of substitutions.
    - c. Requests for approval of Contractor's means and methods.
    - d. Requests for coordination information already indicated in the Contract Documents.
    - e. Requests for adjustments in the Contract Time or the Contract Sum.
    - f. Requests for interpretation of Architect's actions on submittals.
    - g. Incomplete RFIs or inaccurately prepared RFIs.
  4. Architect's action may include a request for additional information, in which case Architect's time for response will date from time of receipt of additional information.

5. Architect's action on RFIs that may result in a change to the Contract Time or the Contract Sum may be eligible for Contractor to submit Change Proposal according to Division 01 Section "Contract Modification Procedures."
    - a. If Contractor believes the RFI response warrants change in the Contract Time or the Contract Sum, notify Architect in writing within 10 days of receipt of the RFI response.
  6. Distribution: The Architect shall distribute one electronic copy of each completed RFI review to the Contractor and the Owner.
- E. Regulatory Requirements: Architect's responses that modify the Contract Documents affecting Structural Safety, Fire and Life Safety, and/or Access Compliance shall be submitted to the Division of the State Architect for review and approval.
1. Changes to DSA approved Construction Documents shall be as specified in Division 01 Section "Contract Modification Procedures."
- F. RFI Log: Prepare, maintain, and submit a tabular log of RFIs organized by the sequential RFI number. Submit log weekly unless otherwise directed in writing by Architect. Include the following:
1. Project name.
  2. Name and address of Contractor.
  3. Name and address of Architect.
  4. RFI number including RFIs that were returned without action or withdrawn.
  5. RFI description.
  6. Date the RFI was submitted.
  7. Date Architect's response was received.
- G. On receipt of Architect's action, update the RFI log and immediately distribute the RFI response to affected parties. Review response and notify Architect within 7 days if Contractor disagrees with response.
- H. Contractor's Expense for RFIs: Architect will review and respond to legitimate RFI's at no additional cost to the Contractor. RFI's determined by the Architect to be flagrant or unnecessary will have the expense for the Architect's time paid by the Owner with the amount being deducted from the Contract Sum. The expense will be based on an hourly rate in accordance with the Architect's standard hourly rate schedule in effect at the time the work is performed with a minimum of one hour for each flagrant or unnecessary RFI.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

(REQUEST FOR INFORMATION form included on the following page)



**TETER**

ARCHITECTS ENGINEERS CONNECTED

# REQUEST FOR INFORMATION

Project:

**Locker Room Remodel  
Live Oak Middle School  
19-11344**

980 N. Laspina  
Tulare, CA 93274

**Client Project No.**

DSA File No. 54-99  
DSA Appl No. 02-118489

**Date:**

Request for Information No. \_\_\_\_\_

- Deviation from Contract Docs
- Correction of Non-Compliant Work

**From:**

**Name  
Company Name**

To:

**Name  
Title or Department**

**TETER**  
7535 N. Palm Ave., Suite 201  
Fresno, CA 93711

Drawing: \_\_\_\_\_

Detail No. \_\_\_\_\_

Specification: \_\_\_\_\_

Addendum: \_\_\_\_\_

Respond by:

Priority  
(Low) 1 2 3 4 5 (High)

Subject:

\_\_\_\_\_

Information Requested:

Contractor's Recommendation:

Probable Cost Effect: \_\_\_\_\_ Probable Time Effect: \_\_\_\_\_

Architect's Response:

Disclaimer

The work shall be carried out in accordance with the above supplemental instructions pursuant the Contract Documents, without change in the Contract Sum or Contract Time. Proceeding with the Work, according to these instructions, indicates your acknowledgement that there will be no change in the Contract Sum or Contract Time. If the Contractor considers that this response requires a change in the Contract Sum or Contract Time, the Contractor shall not proceed with this Work and shall promptly submit an item proposal.

SECTION 012900  
PAYMENT PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section specifies administrative and procedural requirements necessary to prepare and process Applications for Payment.
- B. Related Sections:
  - 1. Division 01 Section "Contract Modification Procedures" for administrative procedures for handling changes to the Contract.
  - 2. Division 01 Section "Construction Progress Documentation" for administrative requirements governing the preparation and submittal of the Contractor's construction schedule.
  - 3. Division 01 Section "Submittal Procedures" for administrative requirements governing the preparation and submittal of the submittal schedule.

1.3 DEFINITIONS

- A. Schedule of Values: A statement furnished by Contractor allocating portions of the Contract Sum to various portions of the Work and used as the basis for reviewing Contractor's Applications for Payment.

1.4 SCHEDULE OF VALUES

- A. Coordination: Coordinate preparation of the Schedule of Values with preparation of Contractor's construction schedule.
  - 1. Coordinate line items in the schedule of values with other required administrative forms and schedules, including the following:
    - a. Application for Payment forms with continuation sheets.
    - b. Submittal schedule.
    - c. Items required to be indicated as separate activities in Contractor's construction schedule.

2. Submit the Schedule of Values to Architect at earliest possible date but no later than 7 days before the date scheduled for submittal of initial Applications for Payment.
    - a. Architect will not act on any RFI's, Post-Bid Substitutions, and/or changes to the project scope, cost, or schedule until 7 days following the submission of the Schedule of Values.
- B. Format and Content: Use the Project Manual table of contents as a guide to establish line items for the schedule of values. Provide at least one line item for each Specification Section.
1. Identification: Include the following Project identification on the schedule of values:
    - a. Project name and location.
    - b. Name of Architect.
    - c. Architect's project number.
    - d. Contractor's name and address.
    - e. Date of submittal.
  2. Arrange the schedule of values in tabular form with separate columns to indicate the following for each item listed:
    - a. Related Specification Section or Division.
    - b. Description of the Work.
    - c. Name of subcontractor.
    - d. Name of manufacturer or fabricator.
    - e. Name of supplier.
    - f. Change Orders (numbers) that affect value.
    - g. Dollar value of the following, as a percentage of the Contract Sum to nearest one-hundredth percent, adjusted to total 100 percent.
      - 1) Labor.
      - 2) Materials.
      - 3) Equipment.
  3. Provide a breakdown of the Contract Sum in enough detail to facilitate continued evaluation of Applications for Payment and progress reports. Coordinate with the Project Manual table of contents. Provide multiple line items for principal subcontract amounts in excess of 5 percent of Contract Sum.
    - a. Include separate line items under Contractor and principal subcontracts for project closeout requirements in an amount totaling 5 percent of the Contract Sum and subcontract amount.
  4. Round amounts to nearest whole dollar; total shall equal the Contract Sum.



5. Provide a separate line item in the schedule of values for each part of the Work where Applications for Payment may include materials or equipment purchased or fabricated and stored, but not yet installed.
  - a. Differentiate between items stored on-site and items stored off-site. If required, include evidence of insurance.
6. Provide separate line items in the schedule of values for initial cost of materials, for each subsequent stage of completion, and for total installed value of that part of the Work.
7. Each item in the schedule of values and Applications for Payment shall be complete. Include total cost and proportionate share of general overhead and profit for each item.
  - a. Temporary facilities and other major cost items that are not direct cost of actual work-in-place may be shown either as separate line items in the schedule of values or distributed as general overhead expense, at Contractor's option.
8. Schedule Updating: Update and resubmit the schedule of values before the next Applications for Payment when Change Orders or Construction Change Directives result in a change in the Contract Sum.

#### 1.5 APPLICATIONS FOR PAYMENT

- A. Each Application for Payment following the initial Application for Payment shall be consistent with previous applications and payments as certified by Architect and paid for by Owner.
  1. Initial Application for Payment, Application for Payment at time of Substantial Completion, and final Application for Payment involve additional requirements.
- B. Payment Application Times: The date for each progress payment application shall be as indicated in the Agreement between Owner and Contractor. The period of construction work covered by each Application for Payment is the period indicated in the Agreement.
  1. If dates and periods are not indicated in the Agreement between Owner and Contractor at time of bidding, the date for Application for Payment shall be established by the Owner to correspond with the Owner's administrative procedures in order to allow for processing and approval of Application for Payment. The period of construction work covered by each Application for Payment shall be one month.
  2. Submit draft copy of Application for Payment 7 days prior to due date for review by Architect.
- C. Application for Payment Forms: Use forms acceptable to Architect and Owner for Applications for Payment. Submit forms for approval with initial submittal of schedule of values.

- D. Application Preparation: Complete every entry on form. Notarize and execute by a person authorized to sign legal documents on behalf of Contractor. Architect will return incomplete applications without action.
1. Entries shall match data on the schedule of values and Contractor's construction schedule. Use updated schedules if revisions were made.
  2. Include amounts for work completed following previous Application for Payment, whether or not payment has been received. Include only amounts for work completed at time of Application for Payment.
  3. Include amounts of Change Orders and Construction Change Directives issued before last day of construction period covered by application.
  4. Indicate separate amounts for work being carried out under Owner-requested project acceleration.
- E. Stored Materials: Include in Application for Payment amounts applied for materials or equipment purchased or fabricated and stored, but not yet installed. Differentiate between items stored on-site and items stored off-site.
1. Provide certificate of insurance, evidence of transfer of title to Owner, and consent of surety to payment, for stored materials.
  2. Provide supporting documentation that verifies amount requested, such as paid invoices. Match amount requested with amounts indicated on documentation; do not include overhead and profit on stored materials.
  3. Provide summary documentation for stored materials indicating the following:
    - a. Materials previously stored and included in previous Applications for Payment.
    - b. Work completed for this Application utilizing previously stored materials.
    - c. Additional materials stored with this Application.
    - d. Total materials remaining stored, including materials with this Application.
- F. Transmittal: Submit 6 signed and notarized original copies of each Application for Payment to Architect by a method ensuring receipt within 24 hours. One copy shall include waivers of lien and similar attachments if required.
1. Transmit each copy with a transmittal form listing attachments and recording appropriate information about application.
- G. Waivers of Mechanic's Lien: With each Application for Payment, submit waivers of mechanic's liens from subcontractors, sub-subcontractors, and suppliers for construction period covered by the previous application.
1. Submit partial waivers on each item for amount requested in previous application, after deduction for retainage, on each item.
  2. When an application shows completion of an item, submit conditional final or full waivers.
  3. Owner reserves the right to designate which entities involved in the Work must submit waivers.
  4. Submit final Application for Payment with or preceded by conditional final waivers from every entity involved with performance of the Work covered by the application who is lawfully entitled to a lien.

5. Waiver Forms: Submit waivers of lien on forms, executed in a manner acceptable to Owner.
- H. Initial Application for Payment: Administrative actions and submittals that must precede or coincide with submittal of first Application for Payment include the following:
1. List of subcontractors.
  2. Schedule of values.
  3. Contractor's construction schedule (preliminary if not final).
  4. Submittal schedule (preliminary if not final).
  5. List of Contractor's staff assignments.
  6. Copies of authorizations and licenses from authorities having jurisdiction for performance of the Work.
  7. Initial progress report.
  8. Report of preconstruction conference.
- I. Application for Payment at Substantial Completion: After issuance of the Certificate of Substantial Completion, submit an Application for Payment showing 100 percent completion for portions of the Work claimed as substantially complete.
1. Include documentation supporting claim that the Work is substantially complete and a statement showing an accounting of changes to the Contract Sum.
  2. This application shall reflect Certificates of Partial Substantial Completion issued previously for Owner occupancy of designated portions of the Work.
- J. Final Payment Application: After completing Project closeout requirements, submit final Application for Payment with releases and supporting documentation not previously submitted and accepted, including, but not limited, to the following:
1. Evidence of completion of Project closeout requirements.
  2. Updated final statement, accounting for final changes to the Contract Sum.
  3. Evidence that claims have been settled.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION



SECTION 013113  
PROJECT MANAGEMENT AND COORDINATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes administrative provisions for coordinating construction operations on Project including, but not limited to, the following:
  - 1. General project coordination procedures.
  - 2. Administrative and supervisory personnel.
  - 3. Coordination drawings.
- B. Related Sections:
  - 1. Division 01 Section "Construction Progress Documentation" for preparing and submitting Contractor's construction schedule.
  - 2. Division 01 Section "Execution" for procedures for coordinating general installation and field-engineering services, including establishment of benchmarks and control points.
  - 3. Division 01 Section "Closeout Procedures" for coordinating closeout of the Contract.

1.3 SUBMITTALS

- A. List of Key Personnel Names: Within 14 calendar days of starting construction operations, submit a list of key personnel assignments, including superintendent and other personnel in attendance at Project site. Identify individuals and their duties and responsibilities; list addresses and telephone numbers, including home, office, and cellular telephone numbers and email addresses. Provide names, addresses, and telephone numbers of individuals assigned as alternates in the absence of individuals assigned to Project.
  - 1. Post copies of list in project meeting room, in temporary field office, and by each temporary telephone. Keep list current at all times.

## 1.4 COORDINATION PROCEDURES

- A. Coordination: Coordinate construction operations included in different Sections of the Specifications to ensure efficient and orderly installation of each part of the Work. Coordinate construction operations, included in different Sections, that depend on each other for proper installation, connection, and operation.
  - 1. Schedule construction operations in sequence required to obtain the best results where installation of one part of the Work depends on installation of other components, before or after its own installation.
  - 2. Coordinate installation of different components to ensure maximum performance and accessibility for required maintenance, service, and repair.
  - 3. Make adequate provisions to accommodate items scheduled for later installation.
- B. Prepare memoranda for distribution to each party involved, outlining special procedures required for coordination. Include such items as required notices, reports, and list of attendees at meetings.
  - 1. Prepare similar memoranda for Owner and separate contractors if coordination of their Work is required.
- C. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities to avoid conflicts and to ensure orderly progress of the Work. Such administrative activities include, but are not limited to, the following:
  - 1. Preparation of Contractor's construction schedule.
  - 2. Preparation of the schedule of values.
  - 3. Installation and removal of temporary facilities and controls.
  - 4. Delivery and processing of submittals.
  - 5. Progress meetings.
  - 6. Preinstallation conferences.
  - 7. Startup and adjustment of systems.
  - 8. Project closeout activities.
- D. Conservation: Coordinate construction activities to ensure that operations are carried out with consideration given to conservation of energy, water, and materials. Coordinate use of temporary utilities to minimize waste.
  - 1. Salvage materials and equipment involved in performance of, but not actually incorporated into, the Work. Refer to other Sections for disposition of salvaged materials that are designated as Owner's property.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 GENERAL COORDINATION PROVISIONS

- A. Examination of Conditions: Require the Installer of each major component to examine both the substrate and conditions under which Work is to be performed. Do not proceed until unsatisfactory conditions have been corrected in an acceptable manner.

3.2 CLEANING AND PROTECTION

- A. Clean and protect construction in progress and adjoining materials in place, during handling and installation. Apply protective covering where required to assure protection from damage or deterioration at Substantial Completion.
- B. Clean and provide maintenance on completed construction as frequently as necessary through the remainder of the construction period.
- C. Limiting Exposures: Supervise construction operations to assure that no part of the construction, completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period.

END OF SECTION





SECTION 013119  
PROJECT MEETINGS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes administrative provisions for project meetings, including, but not limited to, the following:
  - 1. Preconstruction conferences.
  - 2. Preinstallation conferences.
  - 3. Progress meetings.
  - 4. Project Closeout Conference.
- B. Related requirements include but are not limited to the following:
  - 1. Division 01 Sections as applicable to project management.

1.3 PRECONSTRUCTION CONFERENCE

- A. Preconstruction Conference: Schedule a preconstruction conference before starting construction at the project site, at a time convenient to the Owner, Inspector of Record, and the Architect, but no later than 14 days after execution of the Agreement. Hold the conference at the Project Site or another convenient location. Owner and Architect to conduct the meeting to review responsibilities and personnel assignments.
- B. Attendees: Authorized representatives of the Owner, Architect, and their consultants; the Contractor and its superintendent shall attend the conference. Major subcontractors and other concerned parties shall be invited to attend the conference, but attendance is not mandatory. Participants at the conference shall be familiar with the Project and authorized to conclude matters relating to the Work.
- C. Agenda: Discuss items of significance that could affect progress, including but not limited to the following:
  - 1. Tentative construction schedule.
  - 2. Critical work sequencing and long-lead items.
  - 3. Designation of key personnel and their duties.
  - 4. Lines of communication.

5. Procedures for processing field decisions and Change Orders.
6. Procedures for processing Applications for Payment.
7. Procedures for RFI's.
8. Procedures for testing and inspection.
9. Submittal procedures.
10. Sustainability requirements including construction waste management and disposal.
11. Preparation of record documents.
12. Use of the premises.
13. Work restrictions and working hours.
14. Temporary facilities and controls.
15. Parking availability.
16. Office, work, and storage areas.
17. Equipment deliveries and priorities.
18. Safety procedures and first aid.
19. Security.
20. Housekeeping.
21. Owner's alcohol, drug and tobacco policy.

- D. Minutes: Contractor shall record significant discussions and agreements achieved. Distribute the meeting minutes to everyone concerned, including Owner, Inspector of Record, and Architect, within three days of the meeting.

#### 1.4 PREINSTALLATION CONFERENCES

- A. Preinstallation Conferences: Conduct a preinstallation conference at the Project Site before each construction activity that requires coordination with other construction.
- B. Attendees: Installers and representatives of manufacturers and fabricators involved in or affected by the installation, and its coordination or integration with other materials and installations that have preceded or will follow, shall attend the meeting. Advise the Owner, Inspector of Record, and Architect of scheduled meeting dates.
- C. Agenda: Review the progress of other construction activities and preparations for the particular activity under consideration at each preinstallation conference, including requirements for the following:
1. Contract Documents.
  2. Options.
  3. Related RFI's, Proposal Requests, and Change Orders.
  4. Purchases.
  5. Deliveries.
  6. Submittals.
  7. Sustainability requirements.
  8. Possible conflicts.
  9. Compatibility problems.
  10. Time schedules.
  11. Weather limitations.
  12. Manufacturer's written instructions.

13. Warranty requirements.
  14. Compatibility of materials.
  15. Acceptability of substrates.
  16. Temporary facilities.
  17. Space and access limitations.
  18. Regulations of authorities having jurisdiction.
  19. Safety.
  20. Testing and inspecting requirements.
  21. Required performance results.
  22. Recording requirements.
  23. Protection.
  24. Record significant conference discussions, agreements, disagreements, including corrective measures and actions.
  25. Promptly distribute minutes of the meeting to each party present and to other parties requiring information, including the Owner and the Architect.
  26. Do not proceed with the installation if the conference cannot be successfully concluded. Initiate whatever actions are necessary to resolve impediments to performance of Work and reconvene the conference at the earliest feasible date.
- D. Minutes: Contractor shall record significant discussions and agreements achieved. Distribute the meeting minutes to everyone concerned, including Owner, Inspector of Record, and Architect, within three days of the meeting.

#### 1.5 PROGRESS MEETINGS

- A. Progress Meetings: Conduct progress meetings at the Project Site at regular intervals to be established by the Architect, Inspector of Record, Contractor, and Owner.
1. Coordinate dates of meetings with preparation of the payment request.
- B. Attendees: In addition to representatives of the Owner and Architect, each subcontractor, supplier, and other entity concerned with current progress or involved in planning, coordination, or performance of future activities shall be represented at these meetings. All participants at the conference shall be familiar with the Project and authorized to conclude matters relating to the Work.
- C. Attendees: In addition to representatives of the Owner and Architect, each subcontractor, supplier, and other entity concerned with current progress or involved in planning, coordination, or performance of future activities shall be represented at these meetings. All participants at the conference shall be familiar with the Project and authorized to conclude matters relating to the Work.

- D. Agenda: Review and correct or approve minutes of the previous progress meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to the status of the Project. Review proposed percentages of work completed for current months progress payment.
1. Contractor's Construction Schedule: Review progress since the last meeting. Determine whether each activity is on time, ahead of schedule, or behind schedule, in relation to Contractor's construction schedule. Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the Contract Time.
  2. Review the present and future needs of each entity present, including the following:
    - a. Interface requirements.
    - b. Sequence of operation.
    - c. Status of submittals.
    - d. Status of Sustainability documentation.
    - e. Deliveries.
    - f. Off-site fabrication.
    - g. Access.
    - h. Site utilization.
    - i. Temporary facilities and services.
    - j. Status of correction of deficient items.
    - k. Field observations.
    - l. Status of RFI's, Proposal Requests, and Change Orders.
    - m. Progress cleaning.
    - n. Quality and work standards.
    - o. Documentation of information for payment requests.
    - p. Request for Information
- E. Minutes: Contractor shall record significant discussions and agreements achieved. Distribute the meeting minutes to everyone concerned, including Owner, Inspector of Record, and Architect, within three days of the meeting.
- F. Schedule Updating: Revise the Contractor's Construction Schedule after each progress meeting where revisions to the schedule have been made or recognized. Issue the revised schedule to the Owner, the Architect, and all other parties involved in the project. Failure to revise and keep current the Contractor's construction schedule may be grounds for returning Application for Payment unreviewed.

## 1.6 PROJECT CLOSEOUT CONFERENCE

- A. Project Closeout Conference: Conduct a project closeout conference, at a time convenient to Owner and Architect, but not less than 90 days prior to the scheduled date of Substantial Completion. Conduct the conference to review requirements and responsibilities related to Project closeout.

- B. Attendees: Authorized representatives of Owner, Architect and their consultants; Contractor and its superintendent. Participants at the meeting shall be familiar with Project and authorized to conclude matters relating to the Work.
- C. Agenda: Discuss items of significance that could affect or delay Project closeout, including the following:
  - 1. Preparation of record documents.
  - 2. Procedures required prior to inspection for Substantial Completion and for final inspection for acceptance.
  - 3. Submittal of written warranties.
  - 4. Requirements for completing Sustainability documentation.
  - 5. Requirements for preparing operations and maintenance data.
  - 6. Requirements for delivery of material samples, attic stock, and spare parts.
  - 7. Requirements for demonstration and training.
  - 8. Preparation of Contractor's punch list.
  - 9. Procedures for processing Applications for Payment at Substantial Completion and for final payment.
  - 10. Submittal procedures.
  - 11. Responsibility for removing temporary facilities and controls.
- D. Minutes: Contractor shall record significant discussions and agreements achieved. Distribute the meeting minutes to everyone concerned, including Owner, Inspector of Record, and Architect, within three days of the meeting.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION



SECTION 013200  
CONSTRUCTION PROGRESS DOCUMENTATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for documenting the progress of construction during performance of the Work, including the following:
  - 1. Contractor's construction schedule.
  - 2. Special reports.
- B. Related Sections include but are not limited to the following:
  - 1. Division 01 Section "Submittal Procedures" for submitting schedules and reports.
  - 2. Division 01 Section "Quality and Testing Requirements" for submitting a schedule of tests and inspections.

1.3 DEFINITIONS

- A. Activity: A discrete part of a project that can be identified for planning, scheduling, monitoring, and controlling the construction project. Activities included in a construction schedule consume time and resources.
  - 1. Critical Activity: An activity on the critical path that must start and finish on the planned early start and finish times.
  - 2. Predecessor Activity: An activity that precedes another activity in the network.
  - 3. Successor Activity: An activity that follows another activity in the network.
- B. Critical Path: The longest connected chain of interdependent activities through the network schedule that establishes the minimum overall Project duration and contains no float.
- C. Event: The starting or ending point of an activity.
- D. Float: The measure of leeway in starting and completing an activity.
  - 1. Float time is not for the exclusive use or benefit of either Owner or Contractor, but is a jointly owned, expiring Project resource available to both parties as needed to meet schedule milestones and Contract completion date.

2. Free float is the amount of time an activity can be delayed without adversely affecting the early start of the successor activity.
  3. Total float is the measure of leeway in starting or completing an activity without adversely affecting the planned Project completion date.
- E. Milestone: An activity, which occurs in an instant and thus has no time duration, a key or critical point in time for reference or measurement.

#### 1.4 SUBMITTALS

- A. Format for Submittals: Submit required submittals in the following format:
1. Working electronic copy of schedule file, where indicated.
  2. PDF electronic file.
- B. Startup Network Diagram: Of size required to display entire network for entire construction period. Show logic ties for activities.
- C. Contractor's Construction Schedule: Initial schedule, of size required to display entire schedule for entire construction period.
1. Submit electronic copy of schedule labeled to comply with requirements for submittals. Include type of schedule (initial or updated) and date on label.
- D. Construction Schedule Updating Reports: Submit with Applications for Payment.
- E. Special Reports: Submit at time of unusual event.

#### 1.5 QUALITY ASSURANCE

- A. Prescheduling Conference: Conduct conference at Project site to comply with requirements in Division 01 Section "Project Meetings." Review methods and procedures related to the preliminary construction schedule and Contractor's construction schedule, including, but not limited to, the following:
1. Discuss constraints.
  2. Review delivery dates for Owner-furnished products.
  3. Review schedule for work of Owner's separate contracts.
  4. Review submittal requirements and procedures.
  5. Review time required for review of submittals and resubmittals.
  6. Review requirements for tests and inspections by independent testing and inspecting agencies.
  7. Review time required for Project closeout and Owner startup procedures, including commissioning activities.
  8. Review and finalize list of construction activities to be included in schedule.
  9. Review procedures for updating schedule.



## 1.6 COORDINATION

- A. Coordinate preparation and processing of schedules with performance of construction activities and with scheduling of separate contractors.
- B. Coordinate Contractor's construction schedule with the submittal schedule and other required schedules.
  - 1. Secure time commitments for performing critical elements of the Work from entities involved.
  - 2. Coordinate each construction activity in the network with other activities and schedule them in proper sequence.

## PART 2 - PRODUCTS

### 2.1 CONTRACTOR'S CONSTRUCTION SCHEDULE, GENERAL

- A. Time Frame: Extend schedule from date established for the Notice to Proceed to date of final completion.
  - 1. Contract completion date shall not be changed by submission of a schedule that shows an early completion date, unless specifically authorized by Change Order.
- B. Activities: Treat each story or separate area as a separate numbered activity for each main element of the Work. Comply with the following:
  - 1. Activity Duration: Define activities so no activity is longer than 20 days, unless specifically allowed by Architect.
  - 2. Procurement Activities: Include procurement process activities for the following long lead items and major items, requiring a cycle of more than 60 days, as separate activities in schedule. Procurement cycle activities include, but are not limited to, submittals, approvals, purchasing, fabrication, and delivery.
  - 3. Submittal Review Time: Include review and resubmittal times indicated in Division 01 Section "Submittal Procedures" in schedule. Coordinate submittal review times in Contractor's construction schedule with submittal schedule.
  - 4. Startup and Testing Time: Include no fewer than 15 days for startup and testing.
  - 5. Completion: Indicate completion in advance of date established for completion, and allow time for Architect's administrative procedures necessary for certification of completion.
  - 6. Punch List and Final Completion: Include not more than 30 days for completion of punch list items and final completion.
- C. Constraints: Include constraints and work restrictions indicated in the Contract Documents and as follows in schedule, and show how the sequence of the Work is affected.
  - 1. Work by Owner: Include a separate activity for each portion of the Work performed by Owner.

2. Products Ordered in Advance: Include a separate activity for each product. Include delivery date indicated in Division 01 Section "Summary." Delivery dates indicated stipulate the earliest possible delivery date.
  3. Owner-Furnished Products: Include a separate activity for each product. Include delivery date indicated in Division 01 Section "Summary." Delivery dates indicated stipulate the earliest possible delivery date.
  4. Work Restrictions: Show the effect of the following items on the schedule:
    - a. Coordination with existing construction.
    - b. Limitations of continued occupancies.
    - c. Uninterruptible services.
    - d. Use of premises restrictions.
    - e. Seasonal variations.
    - f. Environmental control.
  5. Work Stages: Indicate important stages of construction for each major portion of the Work, including, but not limited to, the following:
    - a. Submittals.
    - b. Purchases.
    - c. Mockups.
    - d. Fabrication.
    - e. Sample testing.
    - f. Deliveries.
    - g. Installation.
    - h. Tests and inspections.
    - i. Adjusting.
    - j. Curing.
    - k. Startup and placement into final use and operation.
  6. Construction Areas: Identify each major area of construction for each major portion of the Work. Indicate where each construction activity within a major area must be sequenced or integrated with other construction activities to provide for the following:
    - a. Structural completion.
    - b. Temporary enclosure and space conditioning.
    - c. Permanent space enclosure.
    - d. Completion of mechanical installation.
    - e. Completion of electrical installation.
    - f. Substantial Completion.
- D. Milestones: Include milestones indicated in the Contract Documents in schedule, including, but not limited to, the Notice to Proceed, Substantial Completion, and final completion.
- E. Contract Modifications: For each proposed contract modification and concurrent with its submission, prepare a time-impact analysis to demonstrate the effect of the proposed change on the overall project schedule.

- F. Upcoming Work Summary: Prepare summary report indicating activities scheduled to occur or commence prior to submittal of next schedule update. Summarize the following issues:
  - 1. Unresolved issues.
  - 2. Unanswered Requests for Information.
  - 3. Rejected or unreturned submittals.
  - 4. Notations on returned submittals.
  - 5. Pending modifications affecting the Work and Contract Time.
- G. Recovery Schedule: When periodic update indicates the Work is 14 or more calendar days behind the current approved schedule, submit a separate recovery schedule indicating means by which Contractor intends to regain compliance with the schedule. Indicate changes to working hours, working days, crew sizes, and equipment required to achieve compliance, and date by which recovery will be accomplished.
- H. Computer Scheduling Software: Prepare schedules using current version of a program that has been developed specifically to manage construction schedules.

## 2.2 SPECIAL REPORTS

- A. Reporting Unusual Events: When an event of an unusual and significant nature occurs at Project site, whether or not related directly to the Work, prepare and submit a special report. List chain of events, persons participating, response by Contractor's personnel, evaluation of results or effects, and similar pertinent information. Advise Owner in advance when these events are known or predictable.
  - 1. Submit special reports directly to Owner within one day of an occurrence. Distribute copies of report to parties affected by the occurrence.
- B. Field Condition Reports: Immediately on discovery of a difference between field conditions and the Contract Documents, prepare a detailed report. Submit with a request for information. Include a detailed description of the differing conditions, together with recommendations for changing the Contract Documents.

## PART 3 - EXECUTION

### 3.1 CONTRACTOR'S CONSTRUCTION SCHEDULE

- A. Contractor's Construction Schedule Updating: At progress meetings, update schedule to reflect actual construction progress and activities. Issue schedule one week before each regularly scheduled progress meeting.
  - 1. Revise schedule immediately after each meeting or other activity where revisions have been recognized or made. Issue updated schedule concurrently with the report of each such meeting.

2. Include a report with updated schedule that indicates every change, including, but not limited to, changes in logic, durations, actual starts and finishes, and activity durations.
  3. As the Work progresses, indicate final completion percentage for each activity.
- B. Distribution: Distribute copies of approved schedule to Architect, Owner, Inspector of Record, separate contractors, testing and inspecting agencies, and other parties identified by Contractor with a need-to-know schedule responsibility.
1. Post copies in Project meeting rooms and temporary field offices.
  2. When revisions are made, distribute updated schedules to the same parties and post in the same locations. Delete parties from distribution when they have completed their assigned portion of the Work and are no longer involved in performance of construction activities.

END OF SECTION

SECTION 013233  
PHOTOGRAPHIC DOCUMENTATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for the following:
1. Preconstruction photographs.
  2. Concealed Work photographs.
  3. Periodic construction photographs.
- B. Related Sections:
1. Division 02 Section "Selective Demolition" for photographic documentation before building demolition operations commence.
  2. Division 31 Section "Site Clearing" for photographic documentation before site clearing operations commence.

1.3 SUBMITTALS

- A. Digital Photographs: Submit image files at monthly intervals coinciding with the cutoff date associated with each Application for Payment.
1. Submit photos by uploading to Project FTP site. Include copy of key plan indicating each photograph's location and direction.
  2. Identification: Provide the following information with each image description:
    - a. Date photograph was taken.
    - b. Description of location, vantage point, and direction.
    - c. Unique sequential identifier keyed to accompanying key plan.
  3. Key Plan: Include key plan of Project site and/or building(s) indicating location and direction of each photograph or group of photographs. Include same information as corresponding photographic documentation.

#### 1.4 PHOTOGRAPHIC FORMATS AND MEDIA

- A. Digital Photographs: Provide color images in JPG format, produced by a digital camera with minimum sensor size of 12 megapixels, and at an image resolution of not less than 3200 by 2400 pixels. Use flash in low light levels or backlit conditions.
- B. Digital Images: Submit digital media as originally recorded in the digital camera, without alteration, manipulation, editing, or modifications using image-editing software.
- C. File Names: Name media files with location or area photograph was taken, date, and sequential numbering suffix.

#### 1.5 CONSTRUCTION PHOTOGRAPHS

- A. General: Take photographs with maximum depth of field and in focus.
- B. Key Plan: Maintain key plan with each set of construction photographs that identifies each photographic location.
- C. Preconstruction Photographs: Before commencement of the Work, take photographs of Project site and adjacent areas, including existing items to remain during construction, from different vantage points, as necessary to record preconstruction conditions.
  - 1. Take additional photographs as needed to record settlement or cracking of existing adjacent structures, pavements, and improvements.
- D. Periodic Construction Photographs: Take photographs to record construction progress at not greater than bi-weekly intervals with the cutoff date associated with each Application for Payment. Select vantage points to show status of construction and progress since last photographs were taken.
- E. Concealed Work Photographs: Before proceeding with installing work that will conceal other work, take photographs sufficient in number, with annotated descriptions, to record nature and location of concealed Work, including, but not limited to, the following:
  - 1. Underground utilities.
  - 2. Underslab services.
  - 3. Piping.
  - 4. Electrical conduit.
  - 5. Waterproofing and weather-resistant barriers.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

SECTION 013300  
SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Submittal schedule requirements.
2. Administrative and procedural requirements for submitting Shop Drawings, Product Data, Samples, and other submittals.
3. Cost for multiple resubmittals.

B. Related Sections:

1. Division 01 Section "Payment Procedures" for submitting Applications for Payment and the schedule of values.
2. Division 01 Section "Project Management and Coordination" for submitting coordination drawings.
3. Division 01 Section "Construction Progress Documentation" for submitting schedules and reports, including Contractor's construction schedule.
4. Division 01 Section "Photographic Documentation" for submitting preconstruction photographs, periodic construction photographs, and final completion construction photographs.
5. Division 01 Section "Quality and Testing Requirements" for submitting test and inspection reports, and schedule of tests and inspections.
6. Division 01 Section "Closeout Procedures" for submitting closeout submittals and maintenance material submittals.
7. Division 01 Section "Operation and Maintenance Data" for submitting operation and maintenance manuals.
8. Division 01 Section "Project Record Drawings" for submitting record Drawings.
9. Division 01 Section "Demonstration and Training" for submitting video recordings of demonstration of equipment and training of Owner's personnel.

### 1.3 SUBMITTAL SCHEDULE

- A. Submittal Schedule: Submit as a submittal, a list of submittals arranged in chronological order by dates required by construction schedule. Include time required for review, ordering, manufacturing, fabrication, and delivery when establishing dates. Include additional time required for making corrections or modifications to submittals noted by the Architect and additional time for handling and reviewing submittals required by those corrections.
1. Coordinate submittal schedule with list of subcontracts, the schedule of values, and Contractor's construction schedule.
  2. Initial Submittal: Submit concurrently with start-up construction schedule. Include submittals required during the first 60 days of construction. List those submittals required to maintain orderly progress of the Work and those required early because of long lead time for manufacture or fabrication.
  3. Final Submittal: Submit concurrently with the first complete submittal of Contractor's construction schedule.
    - a. Submit revised submittal schedule to reflect changes in current status and timing for submittals.
  4. Format: Arrange the following information in a tabular format:
    - a. Scheduled date for first submittal.
    - b. Specification Section number and title.
    - c. Name of subcontractor.
    - d. Description of the Work covered.
    - e. Scheduled date for Architect's final release or approval.
    - f. Scheduled dates for purchasing.
    - g. Scheduled date of fabrication.
    - h. Scheduled dates for installation.
    - i. Activity or event number.

### 1.4 SUBMITTAL FORMAT AND PROCEDURES

- A. General: Prepare and submit submittals required by individual Specification Sections.
1. Architect will not review submittals received from Contractor that do not have Contractor's review and approval.
  2. Architect will not review submittals received from sources other than the Contractor.



- B. Electronic Digital Submittals: Prepare submittals as PDF package unless otherwise indicated, incorporate complete information into each PDF file, name PDF file with submittal number, and transmit submittal package to Architect via email.
1. Paper Submittals: Where paper submittals are requested, necessary, or required in lieu of electronic submittals, prepare submittals in paper form and deliver to Architect. Transmit each paper submittal using transmittal form. Comply with the following:
    - a. Place a permanent label or title block on each submittal item for identification; include name of firm or entity that prepared submittal.
    - b. Provide a space approximately 6 by 8 inches on label or beside title block to record Contractor's review and approval markings and action taken by Architect.
    - c. Number of Copies: Submit not less than three paper copies of each submittal unless otherwise indicated. Architect will return two copies.
    - d. Transmittal for Submittals: Assemble each submittal individually and appropriately for transmittal and handling. Transmit each submittal using transmittal form.
- C. Submittal Cover Page Information: Include the following information on the submittal cover page for each submittal:
1. Project name.
  2. Date.
  3. Name of Architect.
  4. Name of Contractor.
  5. Name of firm or entity that prepared submittal.
  6. Names of subcontractor, manufacturer, and supplier.
  7. Unique submittal number, including revision identifier. Include Specification Section number with sequential alphanumeric identifier and alphanumeric suffix for resubmittals.
  8. Number and title of Specification Section, with paragraph number and generic name for each of multiple items.
  9. Drawing number and detail references, as appropriate.
  10. Indication of full or partial submittal.
  11. Location(s) where product is to be installed, as appropriate.
  12. Other necessary identification.
  13. Remarks.
  14. Signature of transmitter.
  15. Contractor's review/approval stamp of size required by contractor, approximately 3 inches by 3 inches, on or beside title block to record Contractor's review and approval.
  16. Space for Architect's review stamp of not less than 4 inches wide by 3-1/2 inches high on or beside title block to record Architect's review stamp and action taken by Architect.
- D. Product Options:
1. Clearly identify options requiring selection by Architect.
  2. Clearly identify product options required to comply with the Contract Documents.

- E. Deviations and Additional Information: On each submittal, clearly indicate deviations from requirements in the Contract Documents, including minor variations and limitations; include relevant additional information and revisions, other than those requested by Architect on previous submittals. Indicate by highlighting on each submittal or noting on attached separate sheet.
- F. Field Conditions: Indicate field conditions where applicable to the work associated with the submittal.
- G. Coordination: Coordinate preparation and processing of submittals with performance of construction activities.
  - 1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.
  - 2. Submit all submittal items required for each Specification Section concurrently unless partial submittals for portions of the Work are indicated on approved submittal schedule.
  - 3. Submit action submittals and informational submittals required by the same Specification Section as separate packages under separate transmittals.
  - 4. Coordinate timing of submitting submittals for related parts of the Work specified in different Sections so processing will not be delayed because of need to review related submittals concurrently for coordination.
    - a. Architect reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.
- H. Processing Time: Allow time for submittal review, including time for resubmittals, as follows. Time for review shall commence on Architect's receipt of submittal. No extension of the Contract Time will be authorized because of failure to transmit submittals enough in advance of the Work to permit processing, including resubmittals.
  - 1. Initial Review: Allow 14 calendar days for initial review of each submittal. Allow additional time if coordination with subsequent submittals is required. Architect will advise Contractor when a submittal being processed must be delayed for coordination.
  - 2. Intermediate Review: If intermediate submittal is necessary, process it in same manner as initial submittal.
  - 3. Resubmittal Review: Allow 14 calendar days for review of each resubmittal.
  - 4. Sequential Review: Where sequential review of submittals by Architect's consultants, Owner, or other parties is indicated, allow 21 calendar days for initial review of each submittal.
  - 5. Concurrent Consultant Review: Where the Contract Documents indicate that submittals may be transmitted simultaneously to Architect and to Architect's consultants, allow 14 calendar days for review of each submittal. Submittal will be returned to Architect before being returned to Contractor.
    - a. Submit one copy of submittal to concurrent reviewer in addition to specified number of copies to Architect.

- I. Resubmittals: Make resubmittals in same form and number of copies as initial submittal.
  - 1. Note date and content of previous submittal.
  - 2. Note date and content of revision in label or title block and clearly indicate extent of revision.
  - 3. Resubmit submittals until they are marked with approval notation from Architect's action stamp.
- J. Distribution: Furnish copies of final submittals to manufacturers, subcontractors, suppliers, fabricators, installers, authorities having jurisdiction, and others as necessary for performance of construction activities. Show distribution on transmittal forms.
- K. Use for Construction: Retain complete copies of submittals on Project site. Use only final submittals that are marked with acceptable notation from Architect's action stamp.

## 1.5 SUBMITTAL REQUIREMENTS

- A. Product Data: Collect information into a single submittal for each element of construction and type of product or equipment.
  - 1. If information must be specially prepared for submittal because standard published data are unsuitable for use, submit as Shop Drawings, not as Product Data.
  - 2. Mark each copy of each submittal to show which products and options are applicable.
  - 3. Include the following information, as applicable:
    - a. Manufacturer's catalog cuts.
    - b. Manufacturer's product specifications.
    - c. Standard color charts.
    - d. Statement of compliance with specified referenced standards.
    - e. Testing by recognized testing agency.
    - f. Application of testing agency labels and seals.
    - g. Notation of coordination requirements.
    - h. Availability and delivery time information.
  - 4. For equipment, include the following in addition to the above, as applicable:
    - a. Wiring diagrams that show factory-installed wiring.
    - b. Printed performance curves.
    - c. Operational range diagrams.
    - d. Clearances required to other construction, if not indicated on accompanying Shop Drawings.
  - 5. Submit Product Data before Shop Drawings, and before or concurrently with Samples.

- B. Shop Drawings: Prepare Project-specific information, drawn accurately to scale. Do not base Shop Drawings on reproductions of the Contract Documents or standard printed data.
1. Preparation: Fully illustrate requirements in the Contract Documents. Include the following information, as applicable:
    - a. Identification of products.
    - b. Schedules.
    - c. Compliance with specified standards.
    - d. Notation of coordination requirements.
    - e. Notation of dimensions established by field measurement.
    - f. Relationship and attachment to adjoining construction clearly indicated.
    - g. Seal and signature of professional engineer if specified.
  2. Drawing Sheet Size: Except for templates, patterns, and similar full-size Drawings, prepare Shop Drawings on sheets at least 8-1/2 by 11 inches, but no larger than 30 by 42 inches.
  3. Submit Shop Drawings in PDF format unless otherwise indicated.
- C. Samples: Submit Samples for review of kind, color, pattern, and texture for a check of these characteristics with other materials.
1. Transmit Samples that contain multiple, related components such as accessories together in one submittal package.
  2. Identification: Permanently attach label on unexposed side of Samples that includes the following:
    - a. Project name and submittal number.
    - b. Generic description of Sample.
    - c. Product name and name of manufacturer.
    - d. Sample source.
    - e. Number and title of applicable Specification Section.
    - f. Specification paragraph number and generic name of each item.
  3. Submit samples in PDF format unless physical samples are required.
  4. Disposition: Maintain sets of approved Samples at Project site, available for quality-control comparisons throughout the course of construction activity. Sample sets may be used to determine final acceptance of construction associated with each set.
    - a. Samples that may be incorporated into the Work are indicated in individual Specification Sections. Such Samples must be in an undamaged condition at time of use.
    - b. Samples not incorporated into the Work, or otherwise designated as Owner's property, are the property of Contractor.

5. Samples for Initial Selection: Submit manufacturer's color charts consisting of units or sections of units showing the full range of colors, textures, and patterns available.
  - a. Number of Samples: Submit one full set of available choices where color, pattern, texture, or similar characteristics are required to be selected from manufacturer's product line. Architect will return submittal with options selected.
6. Samples for Verification: Submit full-size units or Samples of size indicated, prepared from same material to be used for the Work, cured and finished in manner specified, and physically identical with material or product proposed for use, and that show full range of color and texture variations expected. Samples include, but are not limited to, the following: partial sections of manufactured or fabricated components; small cuts or containers of materials; complete units of repetitively used materials; swatches showing color, texture, and pattern; color range sets; and components used for independent testing and inspection.
  - a. Number of Samples: Submit three (3) sets of Samples. Architect will retain two (2) Sample sets; remainder will be returned.
    - 1) Submit a single Sample where assembly details, workmanship, fabrication techniques, connections, operation, and other similar characteristics are to be demonstrated.
    - 2) If variation in color, pattern, texture, or other characteristic is inherent in material or product represented by a Sample, submit at least three (3) sets of paired units that show approximate limits of variations.
- D. Product Schedule: As required in individual Specification Sections, prepare a written summary indicating types of products required for the Work and their intended location. Include the following information in tabular form:
  1. Type of product. Include unique identifier for each product indicated in the Contract Documents or assigned by Contractor if none is indicated.
  2. Manufacturer and product name, and model number if applicable.
  3. Number and name of room or space.
  4. Location within room or space.
- E. Qualification Data: Prepare written information that demonstrates capabilities and experience of firm or person. Include lists of completed projects with project names and addresses, contact information of architects and owners, and other information specified.
- F. Design Data: Prepare and submit written and graphic information indicating compliance with indicated performance and design criteria in individual Specification Sections. Include list of assumptions and summary of loads. Include load diagrams if applicable. Provide name and version of software, if any, used for calculations. Number each page of submittal.

G. Certificates:

1. Certificates and Certifications Submittals: Submit a statement that includes signature of entity responsible for preparing certification. Certificates and certifications shall be signed by an officer or other individual authorized to sign documents on behalf of that entity. Provide a notarized signature where indicated.
2. Installer Certificates: Submit written statements on manufacturer's letterhead certifying that Installer complies with requirements in the Contract Documents and, where required, is authorized by manufacturer for this specific Project.
3. Manufacturer Certificates: Submit written statements on manufacturer's letterhead certifying that manufacturer complies with requirements in the Contract Documents. Include evidence of manufacturing experience where required.
4. Material Certificates: Submit written statements on manufacturer's letterhead certifying that material complies with requirements in the Contract Documents.
5. Product Certificates: Submit written statements on manufacturer's letterhead certifying that product complies with requirements in the Contract Documents.
6. Welding Certificates: Prepare written certification that welding procedures and personnel comply with requirements in the Contract Documents. Submit record of Welding Procedure Specification and Procedure Qualification Record on AWS forms. Include names of firms and personnel certified.

H. Test and Research Reports:

1. Compatibility Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of compatibility tests performed before installation of product. Include written recommendations for primers and substrate preparation needed for adhesion.
2. Field Test Reports: Submit written reports indicating and interpreting results of field tests performed either during installation of product or after product is installed in its final location, for compliance with requirements in the Contract Documents.
3. Material Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting test results of material for compliance with requirements in the Contract Documents.
4. Preconstruction Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of tests performed before installation of product, for compliance with performance requirements in the Contract Documents.
5. Product Test Reports: Submit written reports indicating that current product produced by manufacturer complies with requirements in the Contract Documents. Base reports on evaluation of tests performed by manufacturer and witnessed by a qualified testing agency, or on comprehensive tests performed by a qualified testing agency.

6. Research Reports: Submit written evidence, from a model code organization acceptable to authorities having jurisdiction, that product complies with building code in effect for Project. Include the following information:
  - a. Name of evaluation organization.
  - b. Date of evaluation.
  - c. Time period when report is in effect.
  - d. Product and manufacturers' names.
  - e. Description of product.
  - f. Test procedures and results.
  - g. Limitations of use.

## 1.6 DELEGATED-DESIGN SERVICES

- A. Performance and Design Criteria: Where professional design services or certifications by a design professional are specifically required of Contractor by the Contract Documents, provide products and systems complying with specific performance and design criteria indicated.
  1. If criteria indicated are insufficient to perform services or certification required, submit a written request for additional information to Architect.
- B. Delegated-Design Services Certification: In addition to Shop Drawings, Product Data, and other required submittals, submit digitally signed PDF file(s) of certificate, signed and sealed by the responsible design professional, for each product and system specifically assigned to Contractor to be designed or certified by a design professional.
  1. Indicate that products and systems comply with performance and design criteria in the Contract Documents. Include list of codes, loads, and other factors used in performing these services.

## 1.7 CONTRACTOR'S REVIEW

- A. Contractor's Review of Submittals: Contractor shall review each submittal and check for completeness, coordination with other Work of the Contract, and compliance with the Contract Documents. Note corrections and field dimensions. Mark with approval stamp before submitting to Architect.
- B. Contractor's Approval: Indicate Contractor's approval for each submittal with a uniform approval stamp. Include name of reviewer, date of Contractor's approval, and statement certifying that submittal has been reviewed, checked, and approved for compliance with the Contract Documents.
  1. Architect will not review submittals received from Contractor that do not have Contractor's review and approval.
  2. Contractor's approval shall certify the following actions by the Contractor:
    - a. Field measurements have been determined, verified, and indicated on submittal.

- b. Field conditions have been verified and coordinated with Work associated with the submittal.
- c. The Work associated with the submittal is in conformance with the Contract Documents.
- d. Work being performed by various subcontractors and trades is coordinated with Work associated with the submittal including work being performed by others for the Owner.
- e. Deviations from the Contract Documents are identified and notes.

## 1.8 ARCHITECT'S REVIEW

- A. Architect's Review and Action: Architect will review each submittal, indicate corrections or revisions required, mark with an action stamp indicating one of the following actions, and return it.
  - 1. Reviewed: Final unrestricted release, work may proceed, provided it complies with the Contract Documents.
  - 2. Furnish as Corrected: Final but restricted release, work may proceed, provided written confirmation is delivered to Architect by Contractor that installed work complied with notations and corrections on submittal and with Contract Documents.
  - 3. Revise and Resubmit: Returned for resubmittal, do not proceed with work. Revise submittal in accordance with notations thereon, and resubmit without delay to obtain an acceptable action marking. Do not allow submittals with this marking (or unmarked submittals where a marking is required) to be used in connection with performance of the Work.
  - 4. Rejected: Submittal content varies from the Contract Documents and is not acceptable for use on the Project, do not proceed with work. Revise submittal in accordance with notations thereon, and resubmit without delay to obtain an acceptable action marking. Do not allow submittals with this marking (or unmarked submittals where a marking is required) to be used in connection with performance of the Work.
- B. Non-conforming Submittals: The following are considered non-confirming submittals and will not be reviewed by the Architect.
  - 1. Architect will not review submittals received from Contractor that do not have Contractor's review and approval.
  - 2. Architect will not review submittals received from sources other than the Contractor.
  - 3. Partial submittals are not acceptable, will be considered nonresponsive, and will be returned without review.
  - 4. Incomplete submittals are not acceptable, will be considered nonresponsive, and will be returned without review.
- C. Submittals not required by the Contract Documents may not be reviewed and may be discarded.



1.9 COST FOR MULTIPLE RESUBMITTALS

- A. Contractor's initial submittal and one resubmittal are included in the Architect's Construction Administration services to the Owner. Architect's services for review of subsequent resubmittals will be charged to the Owner at the Architect's current billing rate, and the Owner will deduct the charges from the Contract Amount by a change order.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION



SECTION 014000  
QUALITY AND TESTING REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for quality assurance and quality control including but not limited to the following:
  - 1. General quality requirements.
  - 2. Reports and documents.
  - 3. Contractor's responsibilities in regard to testing and inspections.
  - 4. Inspector of Record (IOR).
  - 5. Testing Agency.
  - 6. Governing agency testing and inspection requirements.
- B. Testing and inspecting services are required to verify compliance with requirements specified or indicated. These services do not relieve Contractor of responsibility for compliance with the Contract Document requirements.
  - 1. Specific quality-assurance and control requirements for individual construction activities are specified in the Sections that specify those activities. Requirements in those Sections may also cover production of standard products.
  - 2. Specified tests, inspections, and related actions do not limit Contractor's other quality-assurance and control procedures that facilitate compliance with the Contract Document requirements.
  - 3. Requirements for Contractor to provide quality-assurance and control services required by Architect, Owner, or authorities having jurisdiction are not limited by provisions of this Section.
- C. Related Requirements:
  - 1. Divisions 02 through 33 Sections for specific test and inspection requirements.

D. DSA Testing and Inspection Requirements for School Construction: The following requirements are per the Division of the State Architect (DSA); requirements indicated below may be repeated elsewhere in this Section or in other Sections of the Project Manual, where conflicts occur, the most stringent condition shall apply.

1. Tests:
  - a. The owner will select an independent testing laboratory, approved by DSA, to conduct the tests. Selection of the material required to be tests shall be by the laboratory or the Owner's representative and not by the Contractor.
  - b. The Contractor shall notify the Owner's representative a sufficient time in advance of the manufacture of material to be supplied by him under the Contract Documents, which must by terms of the Contract be tested, in order that the Owner may arrange for the testing of same at the source of supply.
  - c. Any material shipped by the Contractor from the source of supply prior to having satisfactorily passed such testing and inspection or prior to the receipt of notice from said representative that such testing and inspection will not be required shall not be incorporated in the job.
  - d. The Owner will pay testing laboratory costs for all tests and inspections, but may be reimbursed by the Contractor for such costs under the Contract documents.
2. Tests Reports: One copy of all test reports shall be forwarded to the Division of the State Architect by the testing agency. Such reports shall include all the tests made, regardless of whether such tests indicate that the material is satisfactory or unsatisfactory. Samples taken but not tested shall also be reported. Records of special sampling operations as required shall also be reported. The reports shall show that the material or materials were sampled and tested in accordance with the requirements of Title 24 and with the approved specifications. Test reports shall show the specified design strength. They shall also state defiantly whether or not the material or materials tested comply with requirements.
3. Verification of Test Reports: Each testing agency shall submit to the Division of the State Architect a verified report in duplicate covering all the tests which are required to be made by that agency during the progress of the project. Such report shall be furnished each time that work on the project is suspended, covering the tests up to that time, and at the completion of the project, covering all tests.
4. Inspection by the Owner:
  - a. The Owner and his representatives shall at all times have access for the purpose of inspection to all parts of the work and to the shops wherein the work is in preparation, and the Contractor shall at all times maintain proper facilities and provide safe access for such inspection.
  - b. The Owner shall have the right to reject materials and workmanship which are defective, or to require their correction. Rejected workmanship shall be satisfactorily corrected and rejected materials shall be removed from the premises without charge to the Owner. If the Contractor does no correct such rejected work within a reasonable time, fixed by written notice, the Owner may correct same and charge expense to the Contractor.

- c. Should it be considered necessary or advisable by the Owner at any time before final acceptance of the entire work to make an examination of the work already completed by removing or tearing out the same, the Contractor shall on request promptly furnish all necessary facilities, labor and materials. If such work is found to be defective in any respect due to the fault of the Contractor or his subcontractor, he shall defray all expenses of such examinations and of satisfactory reconstruction. If however, such work is found to meet the requirements of the Contract, the additional cost of labor and material necessarily involved in the examination and replacement shall be allowed the Contractor.
5. Inspector – Owner’s:
- a. An Inspector employed by the Owner, and approved by DSA, in accordance with the requirements of the California Code of Regulations, Title 24 will be assigned to the work. His duties are specifically defined in Title 24, Part I, Sec. 4-342.
  - b. The work of construction in all stages of progress shall be subject to the personal continuous observation of the Inspector. He shall have free access to any or all parts of the work at any time. The Contractor shall furnish the Inspector reasonable facilities for obtaining such information as may be necessary to keep him fully informed respecting the progress and manner of the work and the character of materials. Inspection of the work shall not relieve the Contractor from any obligation to fulfill this contract.
6. Inspector – Owner – Field Office: The Contractor shall provide for the use of the Owner’s Inspector a temporary office to be located as directed by the Inspector and to be maintained until removal is authorized by the Owner. This office shall of substantial water proof construction with adequate natural light and ventilation by means of stock design windows. The door shall have a lock. A table satisfactory for the study of plans and two chairs shall be provided by the Contractor. The Contractor shall provide and pay for adequate electric lights, private local telephone service with a loud exterior bell, and adequate heat for this field office until the completion of the Contract.

### 1.3 DEFINITIONS

- A. Quality-Assurance Services: Activities, actions, and procedures performed before and during execution of the Work to guard against defects and deficiencies and substantiate that proposed construction will comply with requirements.
- B. Quality-Control Services: Tests, inspections, procedures, and related actions during and after execution of the Work to evaluate that actual products incorporated into the Work and completed construction comply with requirements. Services do not include contract enforcement activities performed by Architect.
- C. Preconstruction Testing: Tests and inspections performed specifically for Project before products and materials are incorporated into the Work, to verify performance or compliance with specified criteria.

- D. Product Testing: Tests and inspections that are performed by an NRTL, an NVLAP, or a testing agency qualified to conduct product testing and acceptable to authorities having jurisdiction, to establish product performance and compliance with specified requirements.
- E. Source Quality-Control Testing: Tests and inspections that are performed at the source, e.g., plant, mill, factory, or shop.
- F. Field Quality-Control Testing: Tests and inspections that are performed on-site for installation of the Work and for completed Work.
- G. Testing Agency: An entity engaged to perform specific tests, inspections, or both. Testing laboratory shall mean the same as testing agency.
- H. Installer/Applicator/Erector: Contractor or another entity engaged by Contractor as an employee, Subcontractor, or Sub-subcontractor, to perform a particular construction operation, including installation, erection, application, and similar operations.
  - 1. Use of trade-specific terminology in referring to a trade or entity does not require that certain construction activities be performed by accredited or unionized individuals, or that requirements specified apply exclusively to specific trade(s).
- I. Experienced: When used with an entity or individual, "experienced" means having successfully completed a minimum of 5 previous projects similar in nature, size, and extent to this Project; being familiar with special requirements indicated; and having complied with requirements of authorities having jurisdiction.

#### 1.4 CONFLICTING REQUIREMENTS

- A. Referenced Standards: If compliance with two or more standards is specified and the standards establish different or conflicting requirements for minimum quantities or quality levels, comply with the most stringent requirement. Refer conflicting requirements that are different, but apparently equal, to Architect for a decision before proceeding.
- B. Minimum Quantity or Quality Levels: The quantity or quality level shown or specified shall be the minimum provided or performed. The actual installation may comply exactly with the minimum quantity or quality specified, or it may exceed the minimum within reasonable limits. To comply with these requirements, indicated numeric values are minimum or maximum, as appropriate, for the context of requirements. Refer uncertainties to Architect for a decision before proceeding.

## 1.5 REPORTS AND DOCUMENTS

- A. Test and Inspection Reports: Prepare and submit certified written reports specified in other Sections. Reports shall be prepared by the person performing the testing and inspecting. Include the following:
1. Date of issue.
  2. Project title and number.
  3. Name, address, and telephone number of testing agency.
  4. Dates and locations of samples and tests or inspections.
  5. Names of individuals making tests and inspections.
  6. Description of the Work and test and inspection method.
  7. Identification of product and Specification Section.
  8. Complete test or inspection data.
  9. Test and inspection results and an interpretation of test results.
  10. Record of temperature and weather conditions at time of sample taking and testing and inspecting.
  11. Comments or professional opinion on whether tested or inspected Work complies with the Contract Document requirements.
  12. Name and signature of laboratory inspector.
  13. Recommendations on retesting and reinspecting.
- B. Governing Agency Verified Reports: Complete and submit Verified Reports as required by the Division of the State Architect and the 2019 California Administrative Code, Section 4-336. Reports are required to be completed by Architect, Architect's consulting Engineers, Owner's Inspector of Record, Contractor, and Testing Agency.
1. Form:
    - a. DSA form DSA-6C for Contractor.
    - b. DSA form DSA-6PI for Project Inspector.
    - c. DSA form DSA-6A/E for Architect and Architect's consulting Engineers.
- C. Manufacturer's Technical Representative's Field Reports: Provide written report documenting tests and inspections specified in other Sections. Reports shall be prepared by Manufacturer's technical representative performing the testing and inspecting. Include the following:
1. Name, address, and telephone number of technical representative making report.
  2. Statement on condition of substrates and their acceptability for installation of product.
  3. Statement that products at Project site comply with requirements.
  4. Summary of installation procedures being followed, whether they comply with requirements and, if not, what corrective action was taken.
  5. Results of operational and other tests and a statement of whether observed performance complies with requirements.
  6. Statement whether conditions, products, and installation will affect warranty.
  7. Other required items indicated in individual Specification Sections.

- D. **Factory-Authorized Service Representative's Reports:** Provide written report documenting tests and inspections specified in other Sections. Reports shall be prepared by Factory-authorized service representative performing the testing and inspecting. Include the following:
1. Name, address, and telephone number of factory-authorized service representative making report.
  2. Statement that equipment complies with requirements.
  3. Results of operational and other tests and a statement of whether observed performance complies with requirements.
  4. Statement whether conditions, products, and installation will affect warranty.
  5. Other required items indicated in individual Specification Sections.
- E. **Permits, Licenses, and Certificates:** For Owner's records, submit copies of permits, licenses, certifications, inspection reports, releases, jurisdictional settlements, notices, receipts for fee payments, judgments, correspondence, records, and similar documents, established for compliance with standards and regulations bearing on performance of the Work.

## 1.6 QUALITY ASSURANCE

- A. **General:** Qualifications paragraphs in this article establish the minimum qualification levels required; individual Specification Sections specify additional requirements.
- B. **Manufacturer Qualifications:** A firm experienced in manufacturing products or systems similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.
- C. **Fabricator Qualifications:** A firm experienced in producing products similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.
- D. **Installer Qualifications:** A firm or individual experienced in installing, erecting, or assembling work similar in material, design, and extent to that indicated for this Project, whose work has resulted in construction with a record of successful in-service performance.
- E. **Professional Engineer Qualifications:** A professional engineer who is legally licensed to practice in the state 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.



- F. Testing Agency Qualifications: An NRTL, an NVLAP, or an independent agency with the experience and capability to conduct testing and inspecting indicated, as documented according to ASTM E 329; and with additional qualifications specified in individual Sections; and, where required by authorities having jurisdiction, that is acceptable to authorities.
1. NRTL: A nationally recognized testing laboratory according to 29 CFR 1910.7.
  2. NVLAP: A testing agency accredited according to NIST's National Voluntary Laboratory Accreditation Program.
- G. Manufacturer's Technical Representative Qualifications: An authorized representative of manufacturer who is trained and approved by manufacturer to observe and inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.
- H. Factory-Authorized Service Representative Qualifications: An authorized representative of manufacturer who is trained and approved by manufacturer to inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.
- I. Preconstruction Testing: Where testing agency is indicated to perform preconstruction testing for compliance with specified requirements for performance and test methods, comply with the following:
1. Contractor responsibilities include the following:
    - a. Provide test specimens representative of proposed products and construction.
    - b. Submit specimens in a timely manner with sufficient time for testing and analyzing results to prevent delaying the Work.
    - c. Provide sizes and configurations of test assemblies, mockups, and laboratory mockups to adequately demonstrate capability of products to comply with performance requirements.
    - d. Build site-assembled test assemblies and mockups using installers who will perform same tasks for Project.
    - e. Build laboratory mockups at testing facility using personnel, products, and methods of construction indicated for the completed Work.
    - f. When testing is complete, remove test specimens, assemblies, and mockups; do not reuse products on Project.
  2. Testing Agency Responsibilities: Submit a written report of each test, inspection, and similar quality-assurance service to Architect, with copy to Contractor. Interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from the Contract Documents.

## 1.7 INSPECTOR OF RECORD

- A. General: Owner will employ an Inspector of Record (IOR) for continuous inspection of the Work. Inspector of Record shall be acceptable to Architect and approved by the Division of the State Architect.
1. Inspector of Record shall act under the direction of the Architect and shall be subject to supervision by a representative of the Division of the State Architect.
- B. Qualifications for Inspector of Record: Qualifications for the Inspector of Record shall be as stated in the California Code of Regulations, Title 24, Part 1, 2019 California Administrative Code, Section 4-333.1. Inspector of Record shall be DSA certified under one of the following classes:
1. Class 1: May inspect any project.
  2. Class 2: May inspect any project except a project containing one or more new large structures with a primary lateral load resisting system of steel, masonry, or concrete.
  3. Class 3: May inspect projects containing alterations to approved buildings, site placement of relocatable buildings, and construction of minor structures.
  4. Class 4: May inspect site placement of relocatable buildings and associated site work.
- C. Duties of the Inspector of Record: Duties of the Inspector of Record shall be as stated in the California Code of Regulations, Title 24, Part 1, 2019 California Administrative Code, Sections 4-333(b) and 4-342, and include the following:
1. Provide continuous inspection of the work.
  2. Maintain files and records of approved plans and specifications including addenda and change orders.
  3. Prepare semi-monthly reports of the progress of the work and submit copies to the Architect and the Division of the State Architect.
  4. Notify the Division of the State Architect at the following times:
    - a. At the start of construction of the project or restart of construction if work has suspended for a period of 2 or more weeks.
    - b. At least 48 hours in advance of the time when foundation trenches will be complete, ready for footing forms.
    - c. At least 48 hours in advance of the first placement of foundation concrete and 24 hours in advance of any subsequent or significant concrete placement.
    - d. When all work on the project has been suspended for a period of more than 2 weeks.
  5. Prepare and maintain records of certain phases of construction including but not limited to the following:
    - a. Concrete placing operations. Show date and time of placing concrete and the time and date of removal of forms in each portion of the structure.
    - b. Welding operations. The record shall include identification marks of welders, lists of defective welds, and manner of correction of defects.

6. Notify the Contractor, in writing, of any deviations from the approved construction documents.
7. Prepare and submit IOR's Verified Report as required by DSA.

## 1.8 TESTING AGENCY

- A. General: Where quality-control services are indicated as Owner's responsibility, Owner will engage a qualified testing agency to conduct tests and inspections required by authorities having jurisdiction. Testing agency shall be acceptable to Architect and the Division of the State Architect. Requirements for tests and testing agency shall be as stated in the California Code of Regulations, Title 24, Part 1, 2019 California Administrative Code, Section 4-335.
  1. Costs for testing agency services will be paid by the Owner.
  2. Costs for retesting and reinspecting construction that replaces or is necessitated by work that failed to comply with the Contract Documents will be paid by the Owner and the amount will be deducted from the Contract Sum by Change Order.
- B. Testing Agency Responsibilities: Cooperate with Architect and Contractor in performance of duties. Provide qualified personnel to perform required tests and inspections.
  1. Perform testing as required by the Contract Documents.
  2. Determine the location from which test samples will be taken and in which in-situ tests are conducted.
  3. Taking all test specimens.
  4. Prepare written reports of tests and inspections, and submit reports of each test, inspection, and similar quality-control service to Architect, Division of the State Architect, and Contractor.
  5. Interpreting tests and inspections and stating in each report whether tested and inspected work complies with or deviates from the Contract Documents.
  6. Notify Architect and Contractor promptly of irregularities or deficiencies observed in the Work during performance of its services.
  7. Verifying that manufacturer maintains detailed fabrication and quality-control procedures and reviews the completeness and adequacy of those procedures to perform the Work.
  8. Retesting and reinspecting corrected work.
  9. Do not release, revoke, alter, or increase the Contract Document requirements or approve or accept any portion of the Work.
  10. Do not perform any duties of Contractor.

## 1.9 CONTRACTOR REQUIREMENTS

- A. Contractor Responsibilities: Tests and inspections not explicitly assigned to Owner are Contractor's responsibility. Perform additional quality-control activities required to verify that the Work complies with requirements, whether specified or not.
1. Unless otherwise indicated, provide quality-control services specified and those required by authorities having jurisdiction. Perform quality-control services required of Contractor by authorities having jurisdiction, whether specified or not.
  2. Where services are indicated as Contractor's responsibility, engage a qualified testing agency to perform these quality-control services.
    - a. Contractor shall not employ same entity engaged by Owner, unless agreed to in writing by Owner.
  3. Notify testing agencies at least 24 hours in advance of time when Work that requires testing or inspecting will be performed.
  4. Where quality-control services are indicated as Contractor's responsibility, submit a certified written report, in duplicate, of each quality-control service.
  5. Testing and inspecting requested by Contractor and not required by the Contract Documents are Contractor's responsibility.
  6. Submit additional copies of each written report directly to authorities having jurisdiction, when they so direct.
  7. Cooperate with agencies performing required tests, inspections, and similar quality-control services, and provide reasonable auxiliary services as requested. Notify agency sufficiently in advance of operations to permit assignment of personnel. Provide the following:
    - a. Access to the Work.
    - b. Incidental labor and facilities necessary to facilitate tests and inspections.
    - c. Adequate quantities of representative samples of materials that require testing and inspecting. Assist agency in obtaining samples.
    - d. Facilities for storage and field curing of test samples.
    - e. Preliminary design mix proposed for use for material mixes that require control by testing agency.
    - f. Security and protection for samples and for testing and inspecting equipment at Project site.
  8. Coordinate sequence of activities to accommodate required quality-assurance and control services with a minimum of delay and to avoid necessity of removing and replacing construction to accommodate testing and inspecting.
    - a. Schedule times for tests, inspections, obtaining samples, and similar activities.
- B. Manufacturer's Field Services: Where indicated, engage a factory-authorized service representative to inspect field-assembled components and equipment installation, including service connections. Report results in writing as specified in Division 01 Section "Submittal Procedures."

- C. Manufacturer's Technical Services: Where indicated, engage a manufacturer's technical representative to observe and inspect the Work. Manufacturer's technical representative's services include participation in preinstallation conferences, examination of substrates and conditions, verification of materials, observation of Installer activities, inspection of completed portions of the Work, and submittal of written reports.

#### 1.10 TESTS AND INSPECTIONS

- A. Structural Tests and Inspections shall be as specified in Division 02 through 33 Sections for specific materials and as required by form DSA-103 which lists tests and inspections required by DSA as applicable to Project conditions.

### PART 2 - PRODUCTS (Not Used)

### PART 3 - EXECUTION

#### 3.1 TEST AND INSPECTION LOG

- A. Test and Inspection Log: Prepare a record of tests and inspections. Include the following:
  - 1. Date test or inspection was conducted.
  - 2. Description of the Work tested or inspected.
  - 3. Date test or inspection results were transmitted to Architect.
  - 4. Identification of testing agency or special inspector conducting test or inspection.
- B. Maintain log at Project site. Post changes and revisions as they occur. Provide access to test and inspection log for Architect's reference during normal working hours.

#### 3.2 REPAIR AND PROTECTION

- A. General: On completion of testing, inspecting, sample taking, and similar services, repair damaged construction and restore substrates and finishes.
  - 1. Provide materials and comply with installation requirements specified in other Specification Sections or matching existing substrates and finishes. Restore patched areas and extend restoration into adjoining areas with durable seams that are as invisible as possible. Comply with the Contract Document requirements for cutting and patching in Division 01 Section "Execution."
- B. Protect construction exposed by or for quality-control service activities.

- C. Repair and protection are Contractor's responsibility, regardless of the assignment of responsibility for quality-control services.

END OF SECTION

SECTION 015000  
TEMPORARY FACILITIES AND CONTROLS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes requirements for temporary utilities, support facilities, and security and protection facilities.
- B. Related Requirements:
  - 1. Division 01 Section "Summary of Work" for work restrictions and limitations on utility interruptions.
  - 2. Division 01 Section "Fire Safety During Construction" for fire safety requirements during construction.

1.3 USE CHARGES

- A. General: Installation, removal, and use charges for temporary facilities shall be included in the Contract Sum unless otherwise indicated. Allow other entities to use temporary services and facilities without cost, including, but not limited to Owner, Architect, testing agencies, and authorities having jurisdiction.
- B. Water Service from Existing System: Water from Owner's existing water system is available for use; provide connections and extensions of services as required for construction operations.
  - 1. Water service is available for use without metering and without payment of use charges.
- C. Electric Power Service from Existing System: Electric power from Owner's existing system is available for use; provide connections and extensions of services as required for construction operations.
  - 1. Electric power service is available for use without metering and without payment of use charges.

## 1.4 QUALITY ASSURANCE

- A. Electric Service: Comply with NECA, NEMA, and UL standards and regulations for temporary electric service. Install service to comply with CEC.
- B. Tests and Inspections: Arrange for authorities having jurisdiction to test and inspect each temporary utility before use. Obtain required certifications and permits.

## 1.5 REGULATORY REQUIREMENTS

- A. Regulatory Requirements: Comply with industry standards and applicable laws and regulations of authorities having jurisdiction including, but not limited to, the following:
  - 1. California Code of Regulations, Title 24, California Code requirements as applicable to the project.
  - 2. Health and safety regulations.
  - 3. Utility company regulations.
  - 4. Police, fire department, and rescue squad rules.
  - 5. Environmental protection regulations.
  - 6. Comply with NFPA 241 "Standard for Safeguarding Construction, Alterations, and Demolition Operations," ANSI A10 Series standards for "Safety Requirements for Construction and Demolition," and NECA Electrical Design Library "Temporary Electrical Facilities."

## 1.6 PROJECT CONDITIONS

- A. Temporary Use of Permanent Facilities: Engage Installer of each permanent service to assume responsibility for operation, maintenance, and protection of each permanent service during its use as a construction facility before Owner's acceptance, regardless of previously assigned responsibilities.
- B. Conditions of Use: Keep temporary services and facilities clean and neat in appearance. Operate in a safe and efficient manner. Relocate temporary services and facilities as the Work progresses. Do not overload facilities or permit them to interfere with progress. Take necessary fire-prevention measures. Do not allow hazardous, dangerous, or unsanitary conditions, or public nuisances to develop or persist on-site.

## PART 2 - PRODUCTS

### 2.1 MATERIALS

- A. General: Materials for temporary facilities shall be acceptable to Architect, Owner, and Authorities having Jurisdiction (AHJ), shall be appropriate for intended use, and shall comply with governing codes and regulations.
- B. Portable Chain-Link Fencing: Minimum 2-inch, 0.148-inch thick, galvanized-steel, chain-link fabric fencing; minimum 6 feet high with galvanized-steel pipe posts. Provide concrete or galvanized-steel bases for supporting posts.



- C. Fencing Windscreen: Polyester fabric scrim with grommets for attachment to chain link fence, size and color as acceptable to, or required by, authorities having jurisdiction.

## 2.2 TEMPORARY FIELD OFFICE FACILITIES

- A. Field Offices, General: Prefabricated or mobile units having weatherproof exteriors, lockable doors and windows, and with serviceable finishes, temperature controls, and foundations adequate for normal loading.
- B. Contractor's Field Office: Of sufficient size to accommodate needs of Contractor, Owner, Architect, construction personnel office activities, and to accommodate Project meetings specified in other Division 01 Sections. Keep office clean and orderly. Furnish and equip offices as follows:
  - 1. Furniture necessary for use and storage of Project documents including file cabinets, plan tables, plan racks, and bookcases.
  - 2. Conference room or area of sufficient size to accommodate meetings of 10 individuals; furnish with conference table, chairs, and 4-foot square tack and marker boards.
  - 3. Electrical power service, 120-VAC, with no fewer than one duplex receptacle on each wall.
  - 4. Heating and cooling equipment necessary to maintain a uniform indoor temperature of 68 to 78 deg F.
  - 5. Lighting fixtures capable of maintaining average illumination of 20 fc at desk height.
  - 6. Communication Service and Equipment: Equip field office with phone and internet services and equipment adequate for project conditions and for use by Contractor, Architect, and Owner to access Project electronic documents and maintain electronic communications.
    - a. Provide superintendent with cellular telephone or portable two-way radio for use when away from field office.
    - b. Equip office with not less than the following:
      - 1) Desktop computer with capabilities compatible with Architect's requirements. Provide external hard drive backup.
      - 2) Printer/Copier/Scanner: Single or multiple units as needed to accommodate color printing, photocopying, and scanning.
- C. Inspector of Record Field Office: Contractor shall provide temporary office facilities for the Owner's Inspector of Record (IOR). Temporary facilities shall be of sufficient size to accommodate the needs of the IOR and associated project records. IOR facilities shall be provided with its own lockable exterior access, if interconnected with Contractor's facilities, a lockable door, controlled from the IOR side, shall be provided between the spaces. Furnish and equip office as follows:
  - 1. Plan/layout table, 30 by 72 inches minimum.
  - 2. File cabinets having a total capacity of not less than eight (8) legal size file drawers.
  - 3. Open shelving/book case, 48 inches minimum in total shelving width.

4. Desk and Chair.
5. Plan rack.
6. Internet service.
7. Heating and cooling equipment necessary to maintain a uniform indoor temperature of 68 to 78 deg F.
8. Lighting fixtures capable of maintaining average illumination of 20 fc at desk height.

## 2.3 TEMPORARY STORAGE FACILITIES

- A. Storage and Fabrication Sheds: Provide sheds sized, furnished, and equipped to accommodate materials and equipment for construction operations.
  1. Store combustible materials apart from buildings.

## 2.4 TEMPORARY SANITARY FACILITIES

- A. Sanitary Facilities: Provide temporary toilets, wash facilities, and drinking water for use by construction and related administrative personnel. Comply with requirements of authorities having jurisdiction for type, number, location, operation, and maintenance of fixtures and facilities. Temporary toilets shall be self-contained, single-occupant units of the chemical, aerated recirculation type; provide units properly vented and fully enclosed with a glass-fiber-reinforced polyester shell or similar nonabsorbent material. Use of Owner's sanitary facilities is not permitted.
  1. Accessible Sanitary Facilities: Sanitary facilities serving support facilities such as offices, meeting rooms, plan rooms, and serving personnel not directly associated with the actual processes of construction shall be accessible for a person using a wheelchair and shall comply with CBC Section 11B-213 (Ref. CBC 11B-201.4).

## 2.5 EQUIPMENT

- A. Fire Extinguishers: Portable, UL rated; with class and extinguishing agent as required by locations and classes of fire exposures.
  1. Comply with NFPA 10 and NFPA 241 for classification, extinguishing agent, and size required by location and class of fire exposure.
- B. HVAC Equipment: Unless Owner authorizes use of permanent HVAC system, provide vented, self-contained, liquid-propane-gas heaters with individual space thermostatic control.
  1. Use of gasoline-burning space heaters, open-flame heaters, or salamander-type heating units is prohibited.
  2. Heating Units: Listed and labeled for type of fuel being consumed, by a qualified testing agency acceptable to authorities having jurisdiction, and marked for intended location and application.

3. Permanent HVAC System: If Owner authorizes use of permanent HVAC system for temporary use during construction, provide filter with MERV of 8 at each return-air grille in system and remove at end of construction and clean HVAC system as required in Division 01 Section "Closeout Procedures."

## PART 3 - EXECUTION

### 3.1 TEMPORARY FACILITIES, GENERAL

- A. Conservation: Coordinate construction and use of temporary facilities with consideration given to conservation of energy, water, and materials. Coordinate use of temporary utilities to minimize waste.

### 3.2 INSTALLATION, GENERAL

- A. Locate facilities at locations directed by the Owner where they will serve Project adequately and result in minimum interference with performance of the Work. Relocate and modify facilities as required by progress of the Work.
- B. Provide each facility ready for use when needed to avoid delay. Do not remove until facilities are no longer needed or are replaced by authorized use of completed permanent facilities.

### 3.3 TEMPORARY UTILITIES AND BUILDING HVAC

- A. General: Install temporary service or connect to existing service.
  1. Arrange with utility company, Owner, and existing users for time when service can be interrupted, if necessary, to make connections for temporary services.
- B. Sewers and Drainage: Provide temporary utilities to remove effluent lawfully.
  1. Connect temporary sewers to private or municipal system as indicated on Drawings and as directed by authorities having jurisdiction.
- C. Water Service: Install water service and distribution piping in sizes and pressures adequate for construction.
  1. Existing Water Service: Where connection to Owner's existing water service is available and allowed, clean and maintain water service facilities in a condition acceptable to Owner. At Substantial Completion, restore these facilities to condition existing before initial use.

- D. Heating and Cooling: Provide temporary heating and cooling required by construction activities for curing or drying of completed installations or for protecting installed construction from adverse effects of low temperatures or high humidity. Select equipment that will not have a harmful effect on completed installations or elements being installed.
1. Provide temporary dehumidification systems when required to reduce ambient and substrate moisture levels to level required to allow installation or application of finishes and their proper curing or drying.
- E. Isolation of Work Areas in Occupied Facilities: Prevent dust, fumes, and odors from entering occupied areas.
1. Prior to commencing work, isolate the HVAC system in area where work is to be performed according to coordination drawings.
    - a. Disconnect supply and return ductwork in work area from HVAC systems servicing occupied areas.
    - b. Maintain negative air pressure within work area using HEPA-equipped air-filtration units, starting with commencement of temporary partition construction, and continuing until removal of temporary partitions is complete.
  2. Maintain dust partitions during the Work. Use vacuum collection attachments on dust-producing equipment. Isolate limited work within occupied areas using portable dust-containment devices.
  3. Perform daily construction cleanup and final cleanup using approved, HEPA-filter-equipped vacuum equipment.
- F. Ventilation and Humidity Control: Provide temporary ventilation required by construction activities for curing or drying of completed installations or for protecting installed construction from adverse effects of high humidity. Select equipment that will not have a harmful effect on completed installations or elements being installed. Coordinate ventilation requirements to produce ambient condition required and minimize energy consumption.
1. Provide dehumidification systems when required to reduce substrate moisture levels to level required to allow installation or application of finishes.
- G. Electric Power Service: Provide electric power service and distribution system of sufficient size, capacity, and power characteristics required for construction operations.
1. Where Owner's existing power service is available, connect temporary service to Owner's existing power source, as directed by Owner, maintain equipment in a condition acceptable to Owner.

- H. Lighting: Provide temporary lighting with local switching that provides adequate illumination for construction operations, observations, inspections, and traffic conditions.
  - 1. Install and operate temporary lighting that fulfills security and protection requirements without operating entire system.
- I. Telephone Service: Provide temporary telephone service of sufficient size, capacity, and power characteristics required for construction operations in common-use facilities for use by all construction personnel. Install WiFi cell phone access equipment for each field office.
  - 1. Post a list of important telephone numbers at a conspicuous location, include the following:
    - a. Police and fire departments.
    - b. Ambulance service.
    - c. Contractor's home office.
    - d. Contractor's emergency after-hours telephone number.
    - e. Architect's office.
    - f. Engineers' offices.
    - g. Owner's office.
    - h. Principal subcontractors' field and home offices.

### 3.4 SUPPORT FACILITIES INSTALLATION

- A. General: Locate storage containers, and other temporary construction and support facilities for easy access in the areas designated and approved by the Architect and Owner. Comply with the following:
  - 1. Do not locate temporary offices, shops, and sheds within 30 feet of building lines.
  - 2. Maintain support facilities until Architect schedules Substantial Completion inspection. Remove before Substantial Completion. Personnel remaining after Substantial Completion will be permitted to use permanent facilities, under conditions acceptable to Owner.
- B. Traffic Controls: Comply with requirements of authorities having jurisdiction.
  - 1. Protect existing site improvements to remain including curbs, pavement, and utilities.
  - 2. Maintain access for fire-fighting equipment and access to fire hydrants.
- C. Parking: Parking areas for construction personnel shall be at location(s) as directed by Owner.
- D. Dewatering: Comply with requirements of authorities having jurisdiction. Maintain Project site, excavations, and construction free of water.
  - 1. Dispose of rainwater in a lawful manner that will not result in flooding Project or adjoining properties or endanger permanent Work or temporary facilities.

- E. Project Signs: Provide Project signs as indicated. Unauthorized signs are not permitted.
  - 1. Project Address Sign: Provide temporary project address sign as required by Authority having Jurisdiction.
  - 2. Temporary Signs: Provide other signs as indicated and as required to inform public and individuals seeking entrance to Project.
    - a. Provide temporary, directional signs for construction personnel and visitors.
  - 3. Maintain and touchup signs so they are legible at all times.
- F. Waste Disposal Facilities: Provide waste-collection containers in sizes adequate to handle waste from construction operations.
  - 1. Comply with requirements of the following:
    - a. Authorities having jurisdiction.
    - b. Division 01 Section "Execution" for progress cleaning.
    - c. Division 01 Section "Construction Waste Management and Disposal."
  - 2. Collect waste from construction areas and elsewhere daily. Comply with requirements of NFPA 241 for removal of combustible waste material and debris. Enforce requirements strictly. Do not hold materials more than 7 days during normal weather or 3 days when the temperature is expected to rise above 80 deg F. Handle hazardous, dangerous, or unsanitary waste materials separately from other waste by containerizing properly. Dispose of material lawfully.
- G. Lifts and Hoists: Provide facilities necessary for hoisting materials and personnel.
  - 1. Truck cranes and similar devices used for hoisting materials are considered "tools and equipment" and not temporary facilities.

### 3.5 SECURITY AND PROTECTION FACILITIES INSTALLATION

- A. Protection of Existing Facilities: Protect existing vegetation, equipment, structures, utilities, and other improvements at Project site and on adjacent properties, except those indicated to be removed or altered. Repair damage to existing facilities.
- B. Environmental Protection: Provide protection, operate temporary facilities, and conduct construction as required to comply with environmental regulations and that minimize possible air, waterway, and subsoil contamination or pollution or other undesirable effects.
  - 1. Comply with work restrictions specified in Division 01 Section "Summary of Work."

- C. Temporary Erosion and Sedimentation Control: Provide measures to prevent soil erosion and discharge of soil-bearing water runoff and airborne dust to undisturbed areas and to adjacent properties and walkways, according to requirements erosion and sedimentation-control Drawings, EPA Construction General Permit, or authorities having jurisdiction, whichever is more stringent.
  - 1. Verify that flows of water redirected from construction areas or generated by construction activity do not enter or cross tree or plant- protection zones.
  - 2. Inspect, repair, and maintain erosion and sedimentation-control measures during construction until permanent vegetation has been established.
  - 3. Clean, repair, and restore adjoining properties and roads affected by erosion and sedimentation from Project site during the course of Project.
  - 4. Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.
  
- D. Stormwater Control: Comply with requirements of authorities having jurisdiction. Provide barriers in and around excavations and subgrade construction to prevent flooding by runoff of stormwater from heavy rains.
  
- E. Tree and Plant Protection: Install temporary fencing located as indicated or outside the drip line of trees to protect vegetation from damage from construction operations. Protect tree root systems from damage, flooding, and erosion.
  
- F. Security Enclosure Fence and Lockup: Before construction operations begin, furnish and install project enclosure fence in a manner that will prevent people and animals from easily entering the site except by entrance gates. Provide lockable entrances to prevent unauthorized entrance, vandalism, theft, and similar violations of security. Lock entrances at end of each work day.
  - 1. Extent of Fence: As required to enclose entire Project site or portion determined sufficient to accommodate construction operations.
  
- G. Barricades, Warning Signs, and Lights: Comply with requirements of authorities having jurisdiction for erecting structurally adequate barricades, including warning signs and lighting.
  
- H. Temporary Egress: Maintain temporary egress from existing occupied facilities as indicated and as required by authorities having jurisdiction.
  
- I. Temporary Enclosures: Provide temporary enclosures for protection of construction, in progress and completed, from exposure, foul weather, other construction operations, and similar activities. Provide temporary weathertight enclosure for building exterior.
  - 1. Where heating or cooling is needed and permanent enclosure is incomplete, insulate temporary enclosures.
  
- J. Temporary Partitions: Provide floor-to-ceiling dustproof partitions to limit dust and dirt migration and to separate areas occupied by Owner from fumes and noise.
  - 1. Protect air-handling equipment.
  - 2. Provide walk-off mats at each entrance through temporary partition.

- K. Temporary Fire Protection: Install and maintain temporary fire-protection facilities of types needed to protect against reasonably predictable and controllable fire losses. Comply with NFPA 241; manage fire-prevention program.
  - 1. Prohibit smoking in construction areas. Comply with additional limits on smoking specified in other Sections.
  - 2. Supervise welding operations, combustion-type temporary heating units, and similar sources of fire ignition according to requirements of authorities having jurisdiction.
  - 3. Develop and supervise an overall fire-prevention and protection program for personnel at Project site. Review needs with local fire department and establish procedures to be followed. Instruct personnel in methods and procedures. Post warnings and information.

### 3.6 MOISTURE AND MOLD CONTROL

- A. General: Avoid trapping water in finished work. Document visible signs of mold that may appear during construction.
- B. Exposed Construction Phase: Before installation of weather barriers, when materials are subject to wetting and exposure and to airborne mold spores, protect as follows:
  - 1. Protect porous materials from water damage.
  - 2. Protect stored and installed material from flowing or standing water.
  - 3. Keep porous and organic materials from coming into prolonged contact with concrete.
  - 4. Remove standing water from decks.
  - 5. Keep deck openings covered or dammed.
- C. Partially Enclosed Construction Phase: After installation of weather barriers but before full enclosure and conditioning of building, when installed materials are still subject to infiltration of moisture and ambient mold spores, protect as follows:
  - 1. Do not load or install drywall or other porous materials or components, or items with high organic content, into partially enclosed building.
  - 2. Keep interior spaces reasonably clean and protected from water damage.
  - 3. Periodically collect and remove waste containing cellulose or other organic matter.
  - 4. Discard or replace water-damaged material.
  - 5. Do not install material that is wet.
  - 6. Discard, replace, or clean stored or installed material that begins to grow mold.
  - 7. Perform work in a sequence that allows any wet materials adequate time to dry before enclosing the material in drywall or other interior finishes.
- D. Controlled Construction Phase of Construction: After completing and sealing of the building enclosure but prior to the full operation of permanent HVAC systems, maintain as follows:
  - 1. Control moisture and humidity inside building by maintaining effective dry-in conditions.



2. Use temporary or permanent HVAC system to control humidity within ranges specified for installed and stored materials.
3. Comply with manufacturer's written instructions for temperature, relative humidity, and exposure to water limits.
  - a. Hygroscopic materials that may support mold growth, including wood and gypsum-based products, that become wet during the course of construction and remain wet for 48 hours are considered defective and require replacing.
  - b. Measure moisture content of materials that have been exposed to moisture during construction operations or after installation. Record readings beginning at time of exposure and continuing daily for 48hours. Identify materials containing moisture levels higher than allowed. Report findings in writing to Architect.
  - c. Remove materials that cannot be completely restored to their manufactured moisture level within 48hours.

### 3.7 OPERATION, TERMINATION, AND REMOVAL

- A. Supervision: Enforce strict discipline in use of temporary facilities. To minimize waste and abuse, limit availability of temporary facilities to essential and intended uses.
- B. Maintenance: Maintain facilities in good operating condition until removal.
  1. Maintain operation of temporary enclosures, heating, cooling, humidity control, ventilation, and similar facilities on a 24-hour basis where required to achieve indicated results and to avoid possibility of damage.
- C. Temporary Facility Changeover: Do not change over from using temporary security and protection facilities to permanent facilities until Substantial Completion.
- D. Termination and Removal: Remove each temporary facility when need for its service has ended, when it has been replaced by authorized use of a permanent facility, or no later than Substantial Completion. Complete or, if necessary, restore permanent construction that may have been delayed because of interference with temporary facility. Repair damaged Work, clean exposed surfaces, and replace construction that cannot be satisfactorily repaired.
  1. Materials and facilities that constitute temporary facilities are property of Contractor. Owner reserves right to take possession of Project identification signs.
  2. At Substantial Completion, repair, renovate, and clean permanent facilities used during construction period. Comply with final cleaning requirements specified in Division 01 Section "Closeout Procedures."

END OF SECTION



SECTION 015116  
FIRE SAFETY DURING CONSTRUCTION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes requirements for fire safety during construction and demolition.
- B. Related Sections:
  - 1. Division 01 Section "Temporary Facilities and Controls" for additional facilities, requirements, and procedures required during construction.

1.3 SUBMITTALS

- A. Fire-Safety Program: Show compliance with requirements of NFPA 241 and authorities having jurisdiction. Indicate Contractor personnel responsible for management of fire-prevention program.

1.4 REGULATORY REQUIREMENTS

- A. Regulatory Requirements: Comply with applicable provisions of the following:
  - 1. NFPA 241.
  - 2. California Fire Code, 2019 Edition, Chapter 33 "Fire Safety During Construction and Demolition" and the 2019 Editions of the following California Codes as Referenced by the California Fire Code:
    - a. California Building Code (CBC).
    - b. California Mechanical Code (CMC).
    - c. California Plumbing Code (CPC).
    - d. California Electrical Code (CEC).
- B. Temporary Heating Equipment (CFC 3303):
  - 1. General: Temporary heating devices shall be listed and labeled in accordance with the California Mechanical Code. Installation, maintenance and use of temporary heating devices shall be in accordance with the terms of the listing.

2. LP-Gas heaters: Heating devices shall be temporary, self-contained, liquid-propane-gas heaters with individual space thermostatic control. Fuel supplies for liquefied petroleum gas fired heaters shall comply with the California Fire Code, Chapter 61 Liquefied Petroleum Gases, and the California Mechanical Code.
3. Refueling: Refueling operations for liquid fueled equipment or appliances shall be conducted in accordance with the California Fire Code, Section 5705. The equipment or appliance shall be allowed to cool prior to refueling.
4. Installation: Clearance to combustibles from temporary heating devices shall be maintained in accordance with the labeled equipment. When in operation, temporary heating devices shall be fixed in place and protected from damage, dislodgement or overturning in accordance with the manufacturer's instructions.
5. Supervision: The use of temporary heating devices shall be supervised and maintained only by competent personnel.
6. Use of gasoline-burning space heaters, open-flame heaters, or salamander-type heating units is prohibited.

C. Precautions Against Fire (CFC 3304):

1. Smoking: Smoking shall not be allowed on the project site.
2. Combustible Debris, Rubbish and Waste:
  - a. Combustible debris, rubbish and waste shall not be accumulated within buildings.
  - b. Combustible debris, rubbish and waste material shall be removed from buildings at the end of each shift of work.
  - c. Rubbish containers with a capacity exceeding 5.33 cubic feet (40 gallons) used for temporary storage of combustible debris, rubbish and waste materials, shall have tight fitting or self-closing lids. Such containers shall be constructed entirely of materials that are non-combustible or materials that meet a peak rate of heat release not exceeding 300 kW/m<sup>2</sup> when tested in accordance with ASTM E 1354 at an incident heat flux of 50 kW/m<sup>2</sup> in the horizontal orientation.
  - d. Materials susceptible to spontaneous ignition, such as oily rags, shall be stored in a listed disposal container.
3. Burning: Burning of materials shall not be allowed on the project site.
4. Fire Watch: Where required by the fire code official, a fire watch shall be provided for building demolition and for building construction during working hours that is hazardous in nature, such as temporary heating or hot work.
  - a. Trained personnel shall be provided to serve as an on-site fire watch. Fire watch personnel shall be provided with not less than one approved means for notification of the fire department, and the sole duty of such personnel shall be to perform constant patrols and watch for the occurrence of fire. The combination of fire watch duties and site security is acceptable. Fire watch personnel shall be trained in the use of portable fire extinguishers.
  - b. The fire watch personnel shall keep a record of all time periods of duty, including a log entry each time the site was patrolled, and each time a structure under construction was entered and inspected. The records and log entries shall be made available for review by the fire code official upon request.

5. Cutting and Welding: Welding, cutting, open torches, and other hot work operations and equipment shall comply with California Fire Code, Chapter 35 "Welding and Other Hot Work."
6. Temporary Wiring for Electrical Power: Temporary wiring for electrical power and lighting installations used in connection with the construction, alteration or demolition of buildings, structures, equipment or similar activities shall comply with the California Electrical Code.

D. Flammable and Combustible Liquids (CFC 3305):

1. Storage of Flammable and Combustible Liquids: Storage of flammable and combustible liquids shall be in accordance with the California Fire Code, Section 5704.
2. Class I and Class II Liquids: Storage, use, and handling of flammable and combustible liquids at construction sites shall be in accordance with the California Fire Code, Section 5706.2. Ventilation shall be provided for operations involving the application of materials containing flammable solvents.
3. Housekeeping: Flammable and combustible liquid storage areas shall be maintained clear of combustible vegetation and waste materials. Such storage areas shall not be used for the storage of combustible materials.
4. Precautions Against Fire: Sources of ignition and smoking shall be prohibited in flammable and combustible liquid storage areas. Signs shall be posted in accordance the California Fire Code, Section 310.
5. Handling at Point of Final Use: Class I and Class II liquids shall be kept in approved safety containers.
6. Leakage and Spills: Leaking vessels shall be immediately repaired or taken out of service and spills shall be cleaned up and disposed of properly.

E. Flammable Gases (CFC 3306):

1. Storage and Handling: Storage and handling of flammable gasses shall comply with the California Fire Code, Chapter 58 "Flammable Gases and Flammable Cryogenic Fluids."
2. Cleaning with Flammable Gases: Flammable gases shall not be used to clean or remove debris from piping open to the atmosphere.

F. Explosive Materials (CFC 3307): Explosive materials shall not be allowed.

G. Owner's Responsibility for Fire Protection (CFC 3308)

1. Program Development: The Contractor shall be responsible for the development, implementation and maintenance of a written plan establishing a fire prevention program at the project site applicable throughout all phases of the construction.
2. Program Superintendent: The Contractor shall a person to be the Fire Prevention Program Superintendent who shall be responsible for the fire prevention program and ensure that it is carried out through completion of the project. The fire prevention program superintendent shall have the authority to enforce the provisions of the California Fire Code, Chapter 33, and other provisions as necessary to secure the intent of the California Fire Code, Chapter 33. Where guard service is provided in accordance with NFPA 241, the superintendent shall be responsible for the guard service.

3. Prefire Plans: The fire prevention program superintendent shall develop and maintain an approved prefire plan in cooperation with the fire chief. The fire chief and the fire code official shall be notified of changes affecting the utilization of information contained in such prefire plans.
4. Training: Training of responsible personnel in the use of fire protection equipment shall be the responsibility of the fire prevention program superintendent. Records of training shall be kept and made a part of the written plan for the fire prevention program.
5. Fire Protection Devices: The fire prevention program superintendent shall determine that all fire protection equipment is maintained and serviced in accordance with the California Fire Code. The quantity and type of fire protection equipment shall be approved. Fire protection equipment shall be inspected in accordance with the fire prevention program.
6. Hot Work Operations: The fire prevention program superintendent shall be responsible for supervising the permit system for hot work operations in accordance with the California Fire Code, Chapter 35.
7. Impairment of Fire Protection Systems: Impairments to any fire protection system shall be in accordance with the California Fire Code, Section 901.
  - a. Smoke detectors and smoke alarms located in an area where airborne construction dust is expected shall be covered to prevent exposure to dust or shall be temporarily removed. smoke detectors and alarms that were removed shall be replaced upon conclusion of dust producing work. Smoke detectors and smoke alarms that were covered shall be inspected and cleaned, as necessary, upon conclusion of dust producing work.
8. Temporary Covering of Fire Protection Devices: Temporary coverings placed on or over fire protection devices to protect them from damage during construction processes shall be immediately removed upon the completion of the construction processes in the room or area in which the devices are installed.

#### H. Fire Reporting (CFC 3309)

1. Emergency Telephone: Emergency telephone facilities with ready access shall be provided in an approved location at the construction site, or an approved equivalent means of communication shall be provided. The street address of the construction site and the emergency telephone number of the fire department shall be posted adjacent to the telephone. Alternatively, where an equivalent means of communication has been approved, the site address and fire department emergency telephone number shall be posted at the main entrance to the site, in guard shacks, and in the construction site office.

#### I. Access for Fire Fighting (CFC 3310):

1. Required Access: Approved vehicle access for firefighting shall be provided to all construction or demolition sites. Vehicle access shall be provided to within 100 feet of temporary or permanent fire department connections. Vehicle access shall be provided by either temporary or permanent roads capable of supporting vehicle loading under all weather conditions. Vehicle access shall be maintained until permanent fire apparatus access roads are available.

2. Key Boxes: Key boxes shall be provided as required by the California Fire Code, Chapter 5 "Fire Service Features."
- J. Means of Egress (CFC 3311):
1. Means of Egress: Required means of egress and required accessible means of egress shall be maintained during construction and demolition, remodeling or alterations and additions to any building unless an approved temporary means of egress system is provided.
- K. Water Supply for Fire Protection (CFC 3312):
1. Water Supply for Fire Protection: An approved water supply for fire protection, either temporary or permanent, shall be made available as soon as combustible material arrives on site.
- L. Portable Fire Extinguishers (CFC 3315):
1. Portable Fire Extinguishers: Structures under construction, alteration or demolition shall be provided with not less than one approved portable fire extinguisher in accordance with the California Fire Code, Section 906 and sized for not less than ordinary hazard, as follows:
    - a. At each stairway on all floor levels where combustible materials have accumulated.
    - b. In every storage and construction shed.
    - c. Additional portable fire extinguishers shall be provided where special hazards exist including, but not limited to, the storage and use of flammable and combustible liquids.
- M. Motorized Construction Equipment (CFC 3316):
1. Conditions of Use: Internal combustion powered construction equipment shall be used in accordance with all of the following conditions:
    - a. Equipment shall be located so that exhausts do not discharge against combustible material.
    - b. Exhausts shall be piped to the outside of the building.
    - c. Equipment shall not be refueled while in operation.
    - d. Fuel for equipment shall be stored in approved areas outside of the building.
- N. Safeguarding Roofing Operations (CFC 3317):
1. General: Roofing operations utilizing heat producing systems or other ignition sources shall be conducted in accordance with California Fire Code Sections 3317.2 and 3317.3, and Chapter 35.
  2. Asphalt and Tar Kettles: Asphalt and tar kettles shall be operated in accordance with the California Fire Code, Section 303.

3. Fire Extinguishers for Roofing Operations: Fire extinguishers shall comply with the California Fire Code, Section 906. There shall be not less than one multi-purpose portable fire extinguisher with a minimum 3-A 40-B:C rating on the roof being covered or repaired.

## PART 2 - PRODUCTS

### 2.1 TEMPORARY EQUIPMENT, GENERAL

- A. Temporary Equipment: Temporary equipment shall comply with requirements of Division 01 Section "Temporary Facilities and Controls," and shall comply with the requirements of this Section.

## PART 3 - EXECUTION

- A. Fire Safety Observation, Procedures, and Features: Provide fire safety observation activities, procedures, and features as required and in compliance with regulatory requirements.

END OF SECTION



SECTION 016000  
PRODUCT REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for selection of products for use in Project; product delivery, storage, and handling; manufacturers' standard warranties on products; special warranties; and comparable products.
- B. Related Requirements:
  - 1. Division 01 Section "Substitution Procedures" for requests for substitutions.

1.3 DEFINITIONS

- A. Products: Items obtained for incorporating into the Work, whether purchased for Project or taken from previously purchased stock. The term "product" includes the terms "material," "equipment," "system," and terms of similar intent.
  - 1. Named Products: Items identified by manufacturer's product name, including make or model number or other designation shown or listed in manufacturer's published product literature, which is current as of date of the Contract Documents.
  - 2. New Products: Items that have not previously been incorporated into another project or facility. Products salvaged or recycled from other projects are not considered new products.
  - 3. Comparable Products: Products of a listed manufacturer that are demonstrated to meet or exceed the indicated qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics that equal or exceed those of specified 'Basis of Design' product.
- B. Basis-of-Design Product Specification: A specification in which a specific manufacturer's product is named and accompanied by the words "basis-of-design," including make or model number or other designation, to establish the significant qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics for purposes of evaluating comparable products of additional manufacturers named in the specification.

#### 1.4 SUBMITTALS

- A. Product Submittals: Comply with requirements in Division 01 Section "Submittal Procedures" and submittal requirements of Division 02 through 33 Sections to show compliance with product requirements.

#### 1.5 QUALITY ASSURANCE

- A. Compatibility of Options: If Contractor is given option of selecting between two or more products for use on Project, select product compatible with products previously selected, even if previously selected products were also options.

#### 1.6 PRODUCT DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, and handle products using means and methods that will prevent damage, deterioration, and loss, including theft and vandalism. Comply with manufacturer's written instructions.

- B. Delivery and Handling:

1. Schedule delivery to minimize long-term storage at Project site and to prevent overcrowding of construction spaces.
2. Coordinate delivery with installation time to ensure minimum holding time for items that are flammable, hazardous, easily damaged, or sensitive to deterioration, theft, and other losses.
3. Deliver products to Project site in an undamaged condition in manufacturer's original sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting, and installing.
4. Inspect products on delivery to determine compliance with the Contract Documents and to determine that products are undamaged and properly protected.

- C. Storage:

1. Store products to allow for inspection and measurement of quantity or counting of units.
2. Store materials in a manner that will not endanger Project structure.
3. Store products that are subject to damage by the elements, under cover in a weathertight enclosure above ground, with ventilation adequate to prevent condensation.
4. Protect foam plastic from exposure to sunlight, except to extent necessary for period of installation and concealment.
5. Comply with product manufacturer's written instructions for temperature, humidity, ventilation, and weather-protection requirements for storage.
6. Protect stored products from damage and liquids from freezing.

## 1.7 PRODUCT WARRANTIES

- A. Warranties specified in other Sections shall be in addition to, and run concurrent with, other warranties required by the Contract Documents. Manufacturer's disclaimers and limitations on product warranties do not relieve Contractor of obligations under requirements of the Contract Documents.
  - 1. Manufacturer's Warranty: Written warranty furnished by individual manufacturer for a particular product and specifically endorsed by manufacturer to Owner.
  - 2. Special Warranty: Written warranty required by the Contract Documents to provide specific rights for Owner.
- B. Special Warranties: Prepare a written document that contains appropriate terms and identification, ready for execution.
  - 1. Manufacturer's Standard Form: Modified to include Project-specific information and properly executed.
  - 2. Specified Form: When specified forms are included with the Specifications, prepare a written document using indicated form properly executed.
  - 3. See Divisions 02 through 33 Sections for specific content requirements and particular requirements for submitting special warranties.
- C. Warranty Submittals: Comply with requirements in Division 01 Section "Closeout Procedures."

## PART 2 - PRODUCTS

### 2.1 PRODUCT SELECTION PROCEDURES

- A. General Product Requirements: Provide products that comply with the Contract Documents, are undamaged and, unless otherwise indicated, are new at time of installation.
  - 1. Provide products complete with accessories, trim, finish, fasteners, and other items needed for a complete installation and indicated use and effect.
  - 2. Standard Products: If available, and unless custom products or nonstandard options are specified, provide standard products of types that have been produced and used successfully in similar situations on other projects.
  - 3. Owner reserves the right to limit selection to products with warranties not in conflict with requirements of the Contract Documents.
  - 4. Where products are accompanied by the term "as selected," Architect will make selection.
  - 5. Descriptive, performance, and reference standard requirements in the Specifications establish salient characteristics of products.

B. Product Selection Procedures:

1. Restricted List: Where Specifications include the phrase “provide one of the following” or similar phrase and lists 2 or more manufacturers and/or products, provide one of the products indicated. Comply with requirements in Division 01 Section "Substitution Procedures" for consideration of an unnamed manufacturer or product.
2. Non-restricted List: Where Specifications include the phrase “includes, but are not limited to the following” or similar phrase, provide one of the products indicated or an unnamed product that complies with requirements indicated.
3. Basis of Design: Where Specifications include the phrase “Basis of Design” and lists a named manufacturer and product, provide the product indicated.
  - a. Where a “Comparable” product of listed manufacturers is indicated following a “Basis of Design” manufacturer/product, a comparable product of one of the listed manufacturers may be provided in lieu of the basis of design manufacturer/product subject to compliance with product requirements and the following:
    - 1) Evidence that the proposed product:
      - a) Does not require revisions to the Contract Documents.
      - b) Is consistent with the Contract Documents and will produce the indicated results.
      - c) Is compatible with other portions of the Work.
    - 2) Detailed comparison of significant qualities of proposed product with those named in the Specifications. Significant qualities include attributes such as performance, weight, size, durability, visual effect, and specific features and requirements indicated.
    - 3) Evidence that proposed product provides specified warranty.
  - b. Where no “Comparable” manufacturers/products are indicated following a “Basis of Design” manufacturer/product, comply with requirements in Division 01 Section "Substitution Procedures" for consideration of an unnamed manufacturer or product.

C. Visual Matching Specification: Where Specifications require "match Architect's sample", provide a product that complies with requirements and matches Architect's sample. Architect's decision will be final on whether a proposed product matches.

1. If no product available within specified category matches and complies with other specified requirements, comply with requirements in Division 01 Section "Substitution Procedures" for proposal of product.

D. Visual Selection Specification: Where Specifications include the phrase "as selected by Architect from manufacturer's full range" or similar phrase, select a product that complies with requirements. Architect will select color, gloss, pattern, density, or texture from manufacturer's product line that includes both standard and premium items.

## PART 3 - EXECUTION

### 3.1 PRODUCT INSTALLATION

- A. General: Install products in accordance with Drawings, Specifications, and product manufacturer's written installation instructions. Installation shall include examination of conditions and preparations necessary for proper installation.

END OF SECTION



SECTION 017300  
EXECUTION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes general administrative and procedural requirements governing execution of the Work including, but not limited to, the following:
  - 1. Construction layout.
  - 2. Field engineering and surveying.
  - 3. Installation of the Work.
  - 4. Cutting, patching and repairing.
  - 5. Coordination of Owner-installed products.
  - 6. Progress cleaning.
  - 7. Starting and adjusting.
  - 8. Protection of installed construction.
  - 9. Correction of the Work.
- B. Related Requirements:
  - 1. Division 01 Section "Summary of Work" for limits on use of Project site.
  - 2. Division 01 Section "Submittal Procedures" for submitting surveys.
  - 3. Division 02 Section "Selective Demolition" for demolition and removal of selected portions of the building.

1.3 DEFINITIONS

- A. Accessible Route: A continuous unobstructed path connecting accessible elements and spaces of an accessible site, building or facility that can be negotiated by a person with a disability using wheelchair, and that is also safe for and usable by persons with other disabilities. Interior accessible routes may include corridors, hallways, floors, ramps, elevators and lifts. Exterior accessible routes may include accessible parking stalls and access aisles, curb ramps, crosswalks at vehicular ways, walks, ramps and lifts.
- B. Cutting: Removal of in-place construction necessary to permit installation or performance of other work.
- C. Patching: Fitting and repair work required to restore construction to original conditions after installation of other work.

## 1.4 SUBMITTALS

- A. Surveys: Submit survey of accessible route improvements stamped and signed by land surveyor or professional engineer certifying that elevations and slopes of improvements comply with disabled access requirements.
  - 1. Survey shall be a separate submittal and shall also be included in the Project Record Documents.

## 1.5 QUALITY ASSURANCE

- A. Surveyor Qualifications: A professional engineer or land surveyor who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing land-surveying services of the kind indicated.
- B. Cutting and Patching: Comply with requirements for and limitations on cutting and patching of construction elements.
  - 1. Structural Elements: When cutting of structural elements must be performed, notify Architect of locations and details of cutting and await directions from Architect before proceeding. Shore, brace, and support structural elements during cutting and patching. Do not cut and patch structural elements in a manner that could change their load-carrying capacity or increase deflection.
  - 2. Operational Elements: Do not cut and patch operating elements and related components in a manner that results in reducing their capacity to perform as intended or that results in increased maintenance or decreased operational life or safety. Operational elements include the following:
    - a. Primary operational systems and equipment.
    - b. Air or smoke barriers.
    - c. Mechanical systems piping and ducts.
    - d. Control systems.
    - e. Communication systems.
    - f. Fire-detection and alarm systems.
    - g. Electrical wiring systems.
    - h. Operating systems of special construction.
  - 3. Other Construction Elements: Do not cut and patch other construction elements or components in a manner that could change their load-carrying capacity, that results in reducing their capacity to perform as intended, or that results in increased maintenance or decreased operational life or safety. Other construction elements include but are not limited to the following:
    - a. Water, moisture, or vapor barriers.
    - b. Membranes and flashings.
    - c. Equipment supports.
    - d. Piping, ductwork, vessels, and equipment.



4. Visual Elements: Cut and patch construction in a manner that results in no visual evidence of cutting and patching. Do not cut and patch exposed construction in a manner that would, in Architect's opinion, reduce the building's aesthetic qualities. Remove and replace construction that has been cut and patched in a visually unsatisfactory manner.
- C. Manufacturer's Installation Instructions: Obtain and maintain on-site manufacturer's written recommendations and instructions for installation of products and equipment.

## PART 2 - PRODUCTS

### 2.1 MATERIALS

- A. General: Comply with requirements specified in Division 02 through 33 Sections.
- B. In-Place Materials: Use materials for patching identical to in-place materials. For exposed surfaces, use materials that visually match in-place adjacent surfaces to the fullest extent possible.
1. If identical materials are unavailable or cannot be used, use materials that, when installed, will provide a match acceptable to Architect for the visual and functional performance of in-place materials.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Existing Conditions: The existence and location of underground and other utilities and construction indicated as existing are not guaranteed. Before beginning sitework, investigate and verify the existence and location of underground utilities, and other construction affecting the Work.
1. Before construction, verify the location and invert elevation at points of connection of sanitary sewer, storm sewer, and water-service piping; underground electrical services, and other utilities.
  2. Furnish location data for work related to Project that must be performed by public utilities serving Project site.
- B. Examination and Acceptance of Conditions: Before proceeding with each component of the Work, examine substrates, areas, and conditions, with Installer or Applicator present where indicated, for compliance with requirements for installation tolerances and other conditions affecting performance. Record observations.
1. Examine roughing-in for mechanical and electrical systems to verify actual locations of connections before equipment and fixture installation.
  2. Examine walls, floors, and roofs for suitable conditions where products and systems are to be installed.

3. Verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.
- C. Written Report: Where a written report listing conditions detrimental to performance of the Work is required by other Sections, include the following:
1. Description of the Work.
  2. List of detrimental conditions, including substrates.
  3. List of unacceptable installation tolerances.
  4. Recommended corrections.
- D. Proceed with installation only after unsatisfactory conditions have been corrected. Proceeding with the Work indicates acceptance of surfaces and conditions.

### 3.2 PREPARATION

- A. Existing Utility Information: Furnish information to local utility and Owner that is necessary to adjust, move, or relocate existing utility structures, utility poles, lines, services, or other utility appurtenances located in or affected by construction. Coordinate with authorities having jurisdiction.
- B. Field Measurements: Take field measurements as required to fit the Work properly. Recheck measurements before installing each product. Where portions of the Work are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication. Coordinate fabrication schedule with construction progress to avoid delaying the Work.
- C. Space Requirements: Verify space requirements and dimensions of items shown diagrammatically on Drawings.
- D. Review of Contract Documents and Field Conditions: Immediately on discovery of the need for clarification of the Contract Documents caused by differing field conditions outside the control of Contractor, submit a request for information to Architect according to requirements in Division 01 Section "Request for Information."

### 3.3 CONSTRUCTION LAYOUT

- A. Verification: Before proceeding to lay out the Work, verify layout information shown on Drawings, in relation to the property survey and existing benchmarks. If discrepancies are discovered, notify Architect promptly.
- B. Site Improvements: Locate and lay out site improvements, including pavements, grading, fill and topsoil placement, utility slopes, and rim and invert elevations.

### 3.4 FIELD ENGINEERING

- A. Survey of Accessible Routes: On completion of site improvements, prepare a topographic survey of accessible routes showing dimensions, locations, and elevations of accessible features in order to certify compliance with requirements for disabled access. Survey shall be limited to site features included in the Work of the Project.

### 3.5 INSTALLATION

- A. General: Locate the Work and components of the Work accurately, in correct alignment and elevation, as indicated.
  - 1. Make vertical work plumb and make horizontal work level.
  - 2. Where space is limited, install components to maximize space available for maintenance and ease of removal for replacement.
  - 3. Conceal pipes, ducts, and wiring in finished areas unless otherwise indicated.
  - 4. Maintain minimum headroom clearance of 96 inches in occupied spaces and 90 inches in unoccupied spaces.
- B. Comply with manufacturer's written instructions and recommendations for installing products in applications indicated.
- C. Install products at the time and under conditions that will ensure the best possible results. Maintain conditions required for product performance until Substantial Completion.
- D. Conduct construction operations so no part of the Work is subjected to damaging operations or loading in excess of that expected during normal conditions of occupancy.
- E. Sequence the Work and allow adequate clearances to accommodate movement of construction items on site and placement in permanent locations.
- F. Tools and Equipment: Do not use tools or equipment that produce harmful noise levels.
- G. Templates: Obtain and distribute to the parties involved templates for work specified to be factory prepared and field installed. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing products to comply with indicated requirements.
- H. Attachment: Provide blocking and attachment plates and anchors and fasteners of adequate size and number to securely anchor each component in place, accurately located and aligned with other portions of the Work. Where size and type of attachments are not indicated, verify size and type required for load conditions.
  - 1. Mounting Heights: Where mounting heights are not indicated, mount components at heights directed by Architect.
  - 2. Allow for building movement, including thermal expansion and contraction.

3. Coordinate installation of anchorages. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.

- I. Joints: Make joints of uniform width. Where joint locations in exposed work are not indicated, arrange joints for the best visual effect. Fit exposed connections together to form hairline joints.
- J. Hazardous Materials: Use products, cleaners, and installation materials that are not considered hazardous.

### 3.6 CUTTING, PATCHING, AND REPAIRING

- A. Cutting, Patching and Repairing, General: Employ skilled workers to perform cutting, patching, and/or repairing. Proceed with cutting, patching, and repairing at the earliest feasible time, and complete without delay.
  - 1. Cut in-place construction to provide for installation of other components or performance of other construction, and subsequently patch as required to restore surfaces to their original condition.
- B. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during installation or cutting and patching operations, by methods and with materials so as not to void existing warranties.
- C. Temporary Support: Provide temporary support of work to be cut.
- D. Protection: Protect in-place construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of Project that might be exposed during cutting and patching operations.
- E. Adjacent Occupied Areas: Where interference with use of adjoining areas or interruption of free passage to adjoining areas is unavoidable, coordinate cutting and patching according to requirements in Division 01 Section "Summary."
- F. Existing Utility Services and Mechanical/Electrical Systems: Where existing services/systems are required to be removed, relocated, or abandoned, bypass such services/systems before cutting to prevent interruption to occupied areas.
- G. Cutting: Cut in-place construction by sawing, drilling, breaking, chipping, grinding, and similar operations, including excavation, using methods least likely to damage elements retained or adjoining construction. If possible, review proposed procedures with original Installer; comply with original Installer's written recommendations.
  - 1. In general, use hand or small power tools designed for sawing and grinding, not hammering and chopping. Cut holes and slots neatly to minimum size required, and with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.

2. Finished Surfaces: Cut or drill from the exposed or finished side into concealed surfaces.
  3. Concrete and Masonry: Cut using a cutting machine, such as an abrasive saw or a diamond-core drill.
  4. Excavating and Backfilling: Comply with requirements in applicable Division 31 Sections where required by cutting and patching operations.
  5. Mechanical and Electrical Services: Cut off pipe or conduit in walls or partitions to be removed. Cap, valve, or plug and seal remaining portion of pipe or conduit to prevent entrance of moisture or other foreign matter after cutting.
  6. Proceed with patching after construction operations requiring cutting are complete.
- H. Patching and Repairing: Patch and repair construction by grinding, filling, leveling, refinishing, closing up, and similar operations following performance of other work. Provide materials and comply with installation requirements specified in other Sections, where applicable.
1. Inspection: Where feasible, test and inspect patched areas after completion to demonstrate physical integrity of installation.
  2. Exposed Finishes: Restore exposed finishes of patched and repaired areas and extend finish restoration into retained adjoining construction in a manner that will minimize evidence of patching and refinishing.
    - a. Clean piping, conduit, and similar features before applying paint or other finishing materials.
    - b. Restore damaged pipe covering to its original condition.
  3. Floors and Walls: Where walls or partitions that are removed extend one finished area into another, patch and repair floor and wall surfaces in the new space. Provide an even surface of uniform finish, color, texture, and appearance. Remove in-place floor and wall coverings and replace with new materials, if necessary, to achieve uniform color and appearance.
    - a. Where patching occurs in a painted surface, prepare substrate and apply primer and intermediate paint coats appropriate for substrate over the patch, and apply final paint coat over entire unbroken surface containing the patch. Provide additional coats until patch blends with adjacent surfaces.
    - b. Where finishes have been removed, patch and repair substrates to receive new finishes; substrates shall be prepared to comply with requirements of manufacturer of final finish material.
  4. Ceilings: Patch, repair, or rehang in-place ceilings as necessary to provide an even-plane surface of uniform appearance.
  5. Exterior Building Enclosure: Patch components in a manner that restores enclosure to a weathertight condition and ensures thermal and moisture integrity of building enclosure.
- I. Cleaning: Clean areas and spaces where cutting and patching are performed. Remove paint, mortar, oils, putty, and similar materials from adjacent finished surfaces.

### 3.7 OWNER-INSTALLED PRODUCTS

- A. Site Access: Provide access to Project site for Owner's construction personnel.
- B. Coordination: Coordinate construction and operations of the Work with work performed by Owner's construction personnel.
  - 1. Construction Schedule: Inform Owner of Contractor's preferred construction schedule for Owner's portion of the Work. Adjust construction schedule based on a mutually agreeable timetable. Notify Owner if changes to schedule are required due to differences in actual construction progress.
  - 2. Preinstallation Conferences: Include Owner's construction personnel at preinstallation conferences covering portions of the Work that are to receive Owner's work. Attend preinstallation conferences conducted by Owner's construction personnel if portions of the Work depend on Owner's construction.

### 3.8 PROGRESS CLEANING

- A. General: Clean Project site and work areas daily, including common areas. Enforce requirements strictly. Dispose of materials lawfully.
  - 1. Comply with requirements in NFPA 241 for removal of combustible waste materials and debris.
  - 2. Do not hold waste materials more than seven days during normal weather or three days if the temperature is expected to rise above 80 deg F.
  - 3. Containerize hazardous and unsanitary waste materials separately from other waste. Mark containers appropriately and dispose of legally, according to regulations.
    - a. Use containers intended for holding waste materials of type to be stored.
- B. Site: Maintain Project site free of waste materials and debris.
- C. Work Areas: Clean areas where work is in progress to the level of cleanliness necessary for proper execution of the Work.
  - 1. Remove liquid spills promptly.
  - 2. Where dust would impair proper execution of the Work, broom-clean or vacuum the entire work area, as appropriate.
- D. Installed Work: Keep installed work clean. Clean installed surfaces according to written instructions of manufacturer or fabricator of product installed, using only cleaning materials specifically recommended. If specific cleaning materials are not recommended, use cleaning materials that are not hazardous to health or property and that will not damage exposed surfaces.
- E. Concealed Spaces: Remove debris from concealed spaces before enclosing the space.

- F. Exposed Surfaces in Finished Areas: Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Substantial Completion.
- G. Waste Disposal: Do not bury or burn waste materials on-site. Do not wash waste materials down sewers or into waterways. Comply with waste disposal requirements in Division 01 Section "Construction Waste Management and Disposal."
- H. During handling and installation, clean and protect construction in progress and adjoining materials already in place. Apply protective covering where required to ensure protection from damage or deterioration at Substantial Completion.
- I. Clean and provide maintenance on completed construction as frequently as necessary through the remainder of the construction period. Adjust and lubricate operable components to ensure operability without damaging effects.
- J. Limiting Exposures: Supervise construction operations to assure that no part of the construction, completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period.

### 3.9 STARTING AND ADJUSTING

- A. Start equipment and operating components to confirm proper operation. Remove malfunctioning units, replace with new units, and retest.
- B. Adjust equipment for proper operation. Adjust operating components for proper operation without binding.
- C. Test each piece of equipment to verify proper operation. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
- D. Manufacturer's Field Service: Comply with qualification requirements in Division 01 Section "Quality Requirements."

### 3.10 PROTECTION OF INSTALLED CONSTRUCTION

- A. Provide final protection and maintain conditions that ensure installed Work is without damage or deterioration at time of Substantial Completion.
- B. Comply with manufacturer's written instructions for temperature and relative humidity.

END OF SECTION





SECTION 017419  
CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for the following:
  - 1. Salvaging nonhazardous construction and demolition waste.
  - 2. Recycling nonhazardous construction and demolition waste.
  - 3. Disposing of nonhazardous construction and demolition waste.
- B. Related Requirements:
  - 1. Division 02 Section "Selective Demolition" for disposition of waste resulting from partial demolition of buildings, structures, and site improvements.
  - 2. Division 04 Sections as applicable to masonry for disposal requirements for masonry waste.
  - 3. Division 31 Section "Site Clearing" for disposition of waste resulting from site clearing and removal of above- and below-grade improvements.

1.3 DEFINITIONS

- A. Construction Waste: Building and site improvement materials and other solid waste resulting from construction, remodeling, renovation, or repair operations. Construction waste includes packaging.
- B. Demolition Waste: Building and site improvement materials resulting from demolition or selective demolition operations.
- C. Disposal: Removal off-site of demolition and construction waste and subsequent sale, recycling, reuse, or deposit in landfill or incinerator acceptable to authorities having jurisdiction.
- D. Recycle: Recovery of demolition or construction waste for subsequent processing in preparation for reuse.
- E. Salvage: Recovery of demolition or construction waste and subsequent sale or reuse in another facility.

- F. Salvage and Reuse: Recovery of demolition or construction waste and subsequent incorporation into the Work.

#### 1.4 MATERIALS OWNERSHIP

- A. Unless otherwise indicated, demolition and construction waste becomes property of Contractor.

#### 1.5 ACTION SUBMITTALS

- A. Waste Management Plan: Submit Waste Management Plan within 30 days of date established for the Notice to Proceed indicating method of compliance with the California Green Building Standards Code.

#### 1.6 INFORMATIONAL SUBMITTALS

- A. Waste Reduction Progress Reports: Concurrent with each Application for Payment, submit report. Use separate forms for construction waste and demolition waste. Include the following information:
  - 1. Material category.
  - 2. Generation point of waste.
  - 3. Total quantity of waste in tons.
  - 4. Quantity of waste salvaged, both estimated and actual in tons.
  - 5. Quantity of waste recycled, both estimated and actual in tons.
  - 6. Total quantity of waste recovered (salvaged plus recycled) in tons.
  - 7. Total quantity of waste recovered (salvaged plus recycled) as a percentage of total waste.
- B. Waste Reduction Calculations: Before request for Substantial Completion, submit calculated end-of-Project rates for salvage, recycling, and disposal as a percentage of total waste generated by the Work.
- C. Records of Donations: Indicate receipt and acceptance of salvageable waste donated to individuals and organizations. Indicate whether organization is tax exempt.
- D. Records of Sales: Indicate receipt and acceptance of salvageable waste sold to individuals and organizations. Indicate whether organization is tax exempt.
- E. Recycling and Processing Facility Records: Indicate receipt and acceptance of recyclable waste by recycling and processing facilities licensed to accept them. Include manifests, weight tickets, receipts, and invoices.
- F. Landfill and Incinerator Disposal Records: Indicate receipt and acceptance of waste by landfills and incinerator facilities licensed to accept them. Include manifests, weight tickets, receipts, and invoices.
- G. Qualification Data: For waste management coordinator and refrigerant recovery technician.

- H. Statement of Refrigerant Recovery: Signed by refrigerant recovery technician responsible for recovering refrigerant, stating that all refrigerant that was present was recovered and that recovery was performed according to EPA regulations. Include name and address of technician and date refrigerant was recovered.

## 1.7 QUALITY ASSURANCE

- A. Waste Management Coordinator Qualifications: Experienced firm, or individual employee assigned by the General Contractor, with a record of successful waste management coordination of projects with similar requirements. Individual of firm, or Contractor's employee, shall be a LEED-Accredited Professional, certified by the USGBC, as waste management coordinator.
- B. Refrigerant Recovery Technician Qualifications: Certified by EPA-approved certification program.
- C. Regulatory Requirements: Comply with transportation and disposal regulations of authorities having jurisdiction.
- D. Waste Management Conference: Conduct conference at Project site to comply with requirements in Division 01 Section "Project Management and Coordination." Review methods and procedures related to waste management including, but not limited to, the following:
  - 1. Review and discuss waste management plan including responsibilities of waste management coordinator.
  - 2. Review requirements for documenting quantities of each type of waste and its disposition.
  - 3. Review and finalize procedures for materials separation and verify availability of containers and bins needed to avoid delays.
  - 4. Review procedures for periodic waste collection and transportation to recycling and disposal facilities.
  - 5. Review waste management requirements for each trade.

## 1.8 WASTE MANAGEMENT PLAN/REGULATORY REQUIREMENTS

- A. Construction Waste Management, General: Recycle and/or salvage for reuse a minimum of 65 percent of the non-hazardous construction and demolition waste in accordance with one of the following 2019 California Green Standards Code (GBSC) Sections, or meet a local construction and demolition waste management ordinance, whichever is more stringent:
  - 1. Construction Waste Management Plan (GBSC Section 5.408.1.1): Where a local jurisdiction does not have a construction and demolition waste management ordinance that is more stringent, provide Waste Management Plan that:
    - a. Identifies the construction and demolition waste materials to be diverted from disposal by efficient usage, recycling, reuse on the project or salvage for future use or sale.

- b. Determines if construction and demolition waste materials will be sorted on-site (source separated) or bulk mixed (single stream).
  - c. Identifies diversion facilities where construction and demolition waste material collected will be taken.
  - d. Specifies the amount of construction and demolition waste materials diverted shall be calculated by weight or volume, but not by both.
2. Waste Management Company (GBSC Section 5.408.1.2): Utilize a waste management company that can provide verifiable documentation that the percentage of construction and demolition waste material diverted from the landfill complies with CGBSC Section 5.408.1.
- a. Exception 1: Excavated soil and land-clearing debris.
  - b. Exception 2: Alternate waste reduction methods developed by working with local agencies if diversion or recycle facilities capable of compliance with this item do not exist.
  - c. Demolition waste meeting local ordinance or calculated in consideration of local recycling facilities and markets.
3. Waste Stream Reduction Alternative (GBSC Section 5.408.1.3): The combined weight of new construction disposal that does not exceed two pounds per square foot of building area may be deemed to meet the 65 percent minimum requirement as approved by the enforcing agency.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 PLAN IMPLEMENTATION

- A. General: Implement approved waste management procedures. Provide handling, containers, storage, signage, transportation, and other items as required to implement waste management procedures during the entire duration of the Contract.
  - 1. Comply with operation, termination, and removal requirements in Division 01 Section "Temporary Facilities and Controls."
- B. Training: Train workers, subcontractors, and suppliers on proper waste management procedures, as appropriate for the Work.
  - 1. Distribute waste management procedures to everyone concerned within three days of submittal return.
  - 2. Distribute waste management procedures to entities when they first begin work on-site. Review procedures and locations established for salvage, recycling, and disposal.

- C. Site Access and Temporary Controls: Conduct waste management operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.
  - 1. Designate and label specific areas on Project site necessary for separating materials that are to be salvaged, recycled, reused, donated, and sold.
  - 2. Comply with Division 01 Section "Temporary Facilities and Controls" for controlling dust and dirt, environmental protection, and noise control.

### 3.2 SALVAGING DEMOLITION WASTE

- A. General: Contract Documents identify items to be salvaged for reinstallation and items to be salvaged to the Owner; items indicated to be removed become the Contractor's property, Contractor may salvage removed items and offer for sale and/or donation.
- B. Salvaged Items for Reuse/Reinstallion in the Work: Salvage items for reuse and handle as follows:
  - 1. Clean salvaged items.
  - 2. Pack or crate items after cleaning. Identify contents of containers with label indicating elements, date of removal, quantity, and location where removed.
  - 3. Store items in a secure area until installation.
  - 4. Protect items from damage during transport and storage.
  - 5. Install salvaged items to comply with installation requirements for new materials and equipment. Provide connections, supports, and miscellaneous materials necessary to make items functional for use indicated.
- C. Salvaged Items to Owner: Salvage items for Owner's use and handle as follows:
  - 1. Clean salvaged items.
  - 2. Pack or crate items after cleaning. Identify contents of containers with label indicating elements, date of removal, quantity, and location where removed.
  - 3. Store items in a secure area until delivery to Owner.
  - 4. Transport items to Owner's storage area designated by Owner.
  - 5. Protect items from damage during transport and storage.
- D. Salvaged Items for Sale and/or Donation: Not permitted on Project site.
- E. Salvaged Items for Reinstallation or Owner's Use:
  - 1. Doors and Hardware: Brace open end of door frames. Except for removing door closers, leave door hardware attached to doors.
  - 2. Equipment: Drain tanks, piping, and fixtures. Seal openings with caps or plugs. Protect equipment from exposure to weather.
  - 3. Plumbing Fixtures: Separate by type and size.
  - 4. Lighting Fixtures: Separate lamps by type and protect from breakage.
  - 5. Electrical Devices: Separate switches, receptacles, switchgear, transformers, meters, panelboards, circuit breakers, and other devices by type.

### 3.3 RECYCLING DEMOLITION AND CONSTRUCTION WASTE, GENERAL

- A. General: Recycle paper and beverage containers used by on-site workers.
- B. Recycling Receivers and Processors: Refer to local county websites for the county in which the Project is located for listings of available recycling receivers and processors, and materials accepted.
- C. Recycling Incentives: Revenues, savings, rebates, tax credits, and other incentives received for recycling waste materials shall accrue to Contractor.
- D. Preparation of Waste: Prepare and maintain recyclable waste materials according to recycling or reuse facility requirements. Maintain materials free of dirt, adhesives, solvents, petroleum contamination, and other substances deleterious to the recycling process.
- E. Procedures: Separate recyclable waste from other waste materials, trash, and debris. Separate recyclable waste by type at Project site to the maximum extent practical according to approved construction waste management plan.
  - 1. Provide appropriately marked containers or bins for controlling recyclable waste until removed from Project site. Include list of acceptable and unacceptable materials at each container and bin.
    - a. Inspect containers and bins for contamination and remove contaminated materials if found.
  - 2. Stockpile processed materials on-site without intermixing with other materials. Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust.
  - 3. Stockpile materials away from construction area. Do not store within drip line of remaining trees.
  - 4. Store components off the ground and protect from the weather.
  - 5. Remove recyclable waste from Owner's property and transport to recycling receiver or processor.

### 3.4 RECYCLING DEMOLITION WASTE

- A. Asphalt Paving: Break up and transport paving to asphalt-recycling facility.
- B. Concrete: Remove reinforcement and other metals from concrete and sort with other metals.
- C. Masonry: Remove metal reinforcement, anchors, and ties from masonry and sort with other metals.
  - 1. Clean and stack undamaged, whole masonry units on wood pallets.

- D. Wood Materials: Sort and stack members according to size, type, and length. Separate lumber, engineered wood products, panel products, and treated wood materials.
- E. Metals: Separate metals by type.
  - 1. Structural Steel: Stack members according to size, type of member, and length.
  - 2. Remove and dispose of bolts, nuts, washers, and other rough hardware.
- F. Asphalt Shingle Roofing: Separate organic and glass-fiber asphalt shingles and felts. Remove and dispose of nails, staples, and accessories.
- G. Gypsum Board: Stack large clean pieces on wood pallets or in container and store in a dry location. Remove edge trim and sort with other metals. Remove and dispose of fasteners.
- H. Acoustical Ceiling Panels and Tile: Stack large clean pieces on wood pallets and store in a dry location.
- I. Metal Suspension System: Separate metal members including trim, and other metals from acoustical panels and tile and sort with other metals.
- J. Carpet and Pad: Roll large pieces tightly after removing debris, trash, adhesive, and tack strips.
  - 1. Store clean, dry carpet and pad in a closed container or trailer provided by Carpet Reclamation Agency or carpet recycler.
- K. Metal Piping: Reduce piping to straight lengths and store by type and size. Separate supports, hangers, valves, sprinklers, and other components by type and size.
- L. Metal Conduit: Reduce conduit to straight lengths and store by type and size.

### 3.5 RECYCLING CONSTRUCTION WASTE

- A. Packaging:
  - 1. Cardboard and Boxes: Break down packaging into flat sheets. Bundle and store in a dry location.
  - 2. Polystyrene Packaging: Separate and bag materials.
  - 3. Wood Pallets: As much as possible, require deliveries using pallets to remove pallets from Project site. For pallets that remain on-site, break down pallets into component wood pieces and comply with requirements for recycling wood.
  - 4. Crates: Break down crates into component wood pieces and comply with requirements for recycling wood.
- B. Wood Materials:
  - 1. Clean Cut-Offs of Lumber: Grind or chip into small pieces.
  - 2. Clean Sawdust: Bag sawdust that does not contain painted or treated wood.

- C. Gypsum Board: Stack large clean pieces on wood pallets or in container and store in a dry location.

### 3.6 DISPOSAL OF WASTE

- A. General: Except for items or materials to be salvaged, recycled, or otherwise reused, remove waste materials from Project site and legally dispose of them in a landfill or incinerator acceptable to authorities having jurisdiction.
  - 1. Except as otherwise specified, do not allow waste materials that are to be disposed of accumulate on-site.
  - 2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
- B. Burning: Do not burn waste materials.
- C. Disposal: Remove waste materials from Owner's property and legally dispose of them.

END OF SECTION



SECTION 017700  
CLOSEOUT PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for contract closeout, including, but not limited to, the following:
  - 1. Closeout procedures at completion.
  - 2. Final cleaning.
  - 3. Repair of the Work.
- B. Related Requirements:
  - 1. Division 01 Section "Operation and Maintenance Data" for operation and maintenance documentation requirements.
  - 2. Division 01 Section "Project Record Drawings" for preparing and submitting Project Record Drawings.
  - 3. Division 01 Section "Warranties" for submitting final warranty information.
  - 4. Division 01 Section "Demonstration and Training" for requirements for instructing Owner's personnel.
  - 5. Divisions 02 through 33 Sections for specific closeout and special cleaning requirements for the Work in those Sections.

1.3 SUBSTANTIAL COMPLETION PROCEDURES

- A. Contractor's List of Incomplete Items: Prepare and submit a list of items to be completed and corrected (Contractor's punch list), indicating the value of each item on the list and reasons why the Work is incomplete.
- B. Submittals Prior to Substantial Completion: Submit the following a minimum of 10 days prior to requesting inspection for determining date of Substantial Completion. List items below that are incomplete at time of request.
  - 1. Certificates of Release: Obtain and submit releases from authorities having jurisdiction permitting Owner unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.

2. Submit closeout documentation specified in other Division 01 Sections, including project record drawings, operation and maintenance data, construction photographic documentation, warranties, and similar final record information.
  3. Submit closeout documentation specified in individual Division 02 through 33 Sections, including specific warranties, workmanship bonds, maintenance service agreements, final certifications, and similar documents.
  4. Submit maintenance materials specified in individual Division 02 through 33 Sections, including tools, spare parts, extra materials, and similar items, and deliver to location designated by Architect. Label with manufacturer's name and model number where applicable.
  5. Submit test/adjust/balance records.
  6. Submit sustainable design submittals not previously submitted.
  7. Submit changeover information related to Owner's occupancy, use, operation, and maintenance.
- C. Procedures Prior to Substantial Completion: Complete the following a minimum of 10 days prior to requesting inspection for determining date of Completion. List items below that are incomplete at time of request.
1. Advise Owner of pending insurance changeover requirements.
  2. Make final changeover of permanent locks and deliver keys to Owner. Advise Owner's personnel of changeover in security provisions.
  3. Complete startup and testing of systems and equipment.
  4. Perform preventive maintenance on equipment used prior to Substantial Completion.
  5. Instruct Owner's personnel in operation, adjustment, and maintenance of products, equipment, and systems. Submit demonstration and training video recordings specified in Division 01 Section "Demonstration and Training."
  6. Advise Owner of changeover in utilities.
  7. Terminate and remove temporary facilities from Project site, along with mockups, construction tools, and similar elements.
  8. Complete final cleaning requirements, including touchup painting.
  9. Touch up and otherwise repair and restore marred exposed finishes to eliminate visual defects.
- D. Inspection: Submit a written request for inspection for Completion a minimum of 10 days prior to date the work will be completed and ready for inspection. On receipt of request, Architect will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will notify Contractor of items, either on Contractor's list or additional items identified by Architect, that must be completed or corrected.
1. Architect's Punch List: During inspection, Architect will prepare a list of items needing completion or correction (punch list), a copy of the punch list will be distributed to the Contractor and Owner.
  2. Reinspection: Request reinspection when the Work identified in previous inspection as incomplete is completed or corrected.
  3. Results of completed inspection will form the basis of requirements for final completion.

- E. Contractor's Cost for Reinspection: Architect will perform one inspection and one reinspection at no additional cost to the Contractor. The expense for the Architect's time for additional inspections will be paid by the Owner with the amount being deducted from the Contract Sum. The expense will be based on an hourly rate in accordance with the Architect's standard hourly rate schedule in effect at the time the work is performed with a minimum of \$400.00 dollars for each additional reinspection.

#### 1.4 LIST OF INCOMPLETE ITEMS (PUNCH LIST)

- A. Organization of List: Include name and identification of each space and area affected by construction operations for incomplete items and items needing correction including, if necessary, areas disturbed by Contractor that are outside the limits of construction.
  - 1. Organize list of spaces in sequential order, starting with exterior areas first and proceeding from lowest floor to highest floor.
  - 2. Organize items applying to each space by major element, including categories for ceiling, individual walls, floors, equipment, and building systems.
  - 3. Include the following information at the top of each page:
    - a. Project name.
    - b. Date.
    - c. Name of Architect (Company name).
    - d. Name of Contractor (Company Name).
    - e. Page number.
  - 4. Submit list of incomplete items in one of the following formats:
    - a. MS Excel electronic file. Architect will return annotated file.
    - b. PDF electronic file. Architect will return annotated file.

### PART 2 - PRODUCTS

#### 2.1 MATERIALS

- A. Cleaning Agents: Use cleaning materials and agents recommended by manufacturer or fabricator of the surface to be cleaned. Do not use cleaning agents that are potentially hazardous to health or property or that might damage finished surfaces.
  - 1. Use cleaning products that comply with the California Green Building Standards Code maximum allowable VOC levels.

## PART 3 - EXECUTION

### 3.1 FINAL CLEANING

- A. General: Perform final cleaning. Conduct cleaning and waste-removal operations to comply with local laws and ordinances and Federal and local environmental and antipollution regulations.
- B. Cleaning: Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to condition expected in an average commercial building cleaning and maintenance program. Comply with manufacturer's written instructions.
  - 1. Complete the following cleaning operations before requesting inspection for Completion for entire Project or for a designated portion of Project:
    - a. Clean Project site, yard, and grounds, in areas disturbed by construction activities, including landscape development areas, of rubbish, waste material, litter, and other foreign substances.
    - b. Sweep paved areas broom clean. Remove petrochemical spills, stains, and other foreign deposits.
    - c. Rake grounds that are neither planted nor paved to a smooth, even-textured surface.
    - d. Remove tools, construction equipment, machinery, and surplus material from Project site.
    - e. Clean exposed exterior and interior hard-surfaced finishes to a dirt-free condition, free of stains, films, and similar foreign substances. Avoid disturbing natural weathering of exterior surfaces. Restore reflective surfaces to their original condition.
    - f. Remove debris and surface dust from limited access spaces, including roofs, plenums, shafts, trenches, equipment vaults, manholes, attics, and similar spaces.
    - g. Sweep concrete floors broom clean in unoccupied spaces.
    - h. Vacuum carpet and similar soft surfaces, removing debris and excess nap; clean according to manufacturer's recommendations if visible soil or stains remain.
    - i. Clean transparent materials, including mirrors and glass in doors and windows. Remove glazing compounds and other noticeable, vision-obscuring materials. Polish mirrors and glass, taking care not to scratch surfaces.
    - j. Remove labels that are not permanent.
    - k. Wipe surfaces of mechanical, electrical, and similar equipment. Remove excess lubrication, paint and mortar droppings, and other foreign substances.
    - l. Clean plumbing fixtures to a sanitary condition, free of stains, including stains resulting from water exposure.
    - m. Replace disposable air filters and clean permanent air filters. Clean exposed surfaces of diffusers, registers, and grills.
    - n. Clean ducts, blowers, and coils if units were operated without filters during construction or that display contamination with particulate matter on inspection.

- o. Clean light fixtures, lamps, globes, and reflectors to function with full efficiency.
  - p. Leave Project clean and ready for occupancy.
- C. Construction Waste Disposal: Comply with waste disposal requirements in Division 01 Section "Construction Waste Management and Disposal."

### 3.2 REPAIR OF THE WORK

- A. Complete repair and restoration operations before requesting inspection for determination of Substantial Completion.
  - 1. Comply with requirements of Division 02 through 33 Sections as applicable to the Work to be restored and/or repaired.
- B. Repair or remove and replace defective construction. Repairing includes replacing defective parts, refinishing damaged surfaces, touching up with matching materials, and properly adjusting operating equipment. Where damaged or worn items cannot be repaired or restored, provide replacements. Remove and replace operating components that cannot be repaired. Restore damaged construction and permanent facilities used during construction to specified condition.
  - 1. Remove and replace chipped, scratched, and broken glass, reflective surfaces, and other damaged transparent materials.
  - 2. Touch up and otherwise repair and restore marred or exposed finishes and surfaces. Replace finishes and surfaces that already show evidence of repair or restoration.
    - a. Do not paint over "UL" and other required labels and identification, including mechanical and electrical nameplates. Remove paint applied to required labels and identification.
  - 3. Replace parts subject to operating conditions during construction that may impede operation or reduce longevity.
  - 4. Replace burned-out bulbs, bulbs noticeably dimmed by hours of use, and defective and noisy starters in fluorescent and mercury vapor fixtures to comply with requirements for new fixtures.

END OF SECTION



SECTION 017823  
OPERATION AND MAINTENANCE DATA

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for preparing operation and maintenance documentation, including the following:

1. Operation and maintenance documentation directory manuals.
2. Emergency manuals.
3. Systems and equipment operation manuals.
4. Systems and equipment maintenance manuals.
5. Product maintenance manuals.

- B. Related Sections:

1. Division 01 Section "Submittal Procedures" for submitting copies of submittals for operation and maintenance manuals.
2. Division 01 Section "Demonstration and Training" for demonstration and training materials.
3. Divisions 02 through 33 Sections for specific operation and maintenance manual requirements for the Work in those Sections.

1.3 SUBMITTALS

- A. Closeout Submittal: Submit operation and maintenance manuals indicated. Provide content for each manual as specified in individual Specification Sections, and as previously reviewed and approved at the time of individual Section submittals; where applicable, clarify and update previously reviewed content to correspond to revisions and field conditions. Submit reviewed manual content formatted and organized as required by this Section.

1. Initial Submittal: Submit draft electronic copy of each manual at least 30 days before commencing demonstration and training. Architect will comment on whether content of operations and maintenance submittal is acceptable.
  - a. Correct or revise each manual to comply with Architect's comments. Submit final submittal copies of each corrected manual within 15 days of receipt of Architect's comments and prior to commencing demonstration and training.

2. Final Submittal: Submit in final form prior to requesting inspection for Substantial Completion and at least 15 days before commencing demonstration and training. Submit the following:
  - a. Paper Copy: Submit one paper-copy set of marked-up record prints that have been revised to address Architect's comments from the initial submittal.
  - b. Digital Data Files: Submit digital data files of Project Record Drawings as PDF files on a thumb-drive.
- B. Comply with Division 01 Section "Closeout Procedures" for schedule for submitting operation and maintenance documentation.

#### 1.4 FORMAT OF OPERATION AND MAINTENANCE MANUALS

- A. Electronic File Manuals: Submit manuals in the form of a multiple file composite electronic PDF file for each manual type required.
  1. Electronic Files: Use electronic files prepared by manufacturer where available. Where scanning of paper documents is required, configure scanned file for minimum readable file size.
  2. File Names and Bookmarks: Bookmark individual documents based on file names. Name document files to correspond to system, subsystem, and equipment names used in manual directory and table of contents. Group documents for each system and subsystem into individual composite bookmarked files, then create composite manual, so that resulting bookmarks reflect the system, subsystem, and equipment names in a readily navigated file tree. Configure electronic manual to display bookmark panel on opening file.
- B. Paper Copy Manuals: Submit manuals in the form of hard-copy, bound and labeled volumes.
  1. Binders: Heavy-duty, three-ring, vinyl-covered, loose-leaf or post-type binders, in thickness necessary to accommodate contents, sized to hold 8-1/2-by-11-inch paper; with clear plastic sleeve on spine to hold label describing contents and with pockets inside covers to hold folded oversize sheets.
    - a. If two or more binders are necessary to accommodate data of a system, organize data in each binder into groupings by subsystem and related components. Cross-reference other binders if necessary to provide essential information for proper operation or maintenance of equipment or system.
    - b. Identify each binder on front and spine, with printed title "OPERATION AND MAINTENANCE MANUAL," Project title or name, and subject matter of contents, and indicate Specification Section number(s) on bottom of spine. Indicate volume number for multiple-volume sets.



2. Dividers: Heavy-paper dividers with plastic-covered tabs for each section of the manual. Mark each tab to indicate contents. Include typed list of products and major components of equipment included in the section on each divider, cross-referenced to Specification Section number and title of Project Manual.
3. Protective Plastic Sleeves: Transparent plastic sleeves designed to enclose diagnostic software storage media for computerized electronic equipment. Enclose title pages and directories in clear plastic sleeves.
4. Supplementary Text: Prepared on 8-1/2-by-11-inch white bond paper.
5. Drawings: Attach reinforced, punched binder tabs on drawings and bind with text.
  - a. If oversize drawings are necessary, fold drawings to same size as text pages and use as foldouts.
  - b. If drawings are too large to be used as foldouts, fold and place drawings in labeled envelopes and bind envelopes in rear of manual. At appropriate locations in manual, insert typewritten pages indicating drawing titles, descriptions of contents, and drawing locations.

#### 1.5 REQUIREMENTS FOR OPERATION AND MAINTENANCE MANUALS

- A. Organization: Unless otherwise indicated, organize each manual into a separate section for each system and subsystem, and a separate section for each piece of equipment not part of a system. Each manual shall contain the following materials and in the order listed:
  1. Title page.
  2. Table of contents.
  3. Manual contents.
- B. Title Page: Include the following information as applicable:
  1. Subject matter included in the manual.
  2. Name and address of Project.
  3. Name and address of Owner.
  4. Date of submittal.
  5. Name and contact information for the following:
    - a. Contractor.
    - b. Installer.
    - c. Architect.
    - d. Commissioning Authority if applicable.
    - e. Architect's major consultants that designed the systems contained in the manuals.
  6. Cross-reference to related systems in other operation and maintenance manuals.

- C. Table of Contents: List each product included in manual, identified by product name, indexed to the content of the volume, and cross-referenced to Specification Section number in Project Manual.
  - 1. If operation or maintenance documentation requires more than one volume to accommodate data, include comprehensive table of contents for all volumes in each volume of the set.
- D. Manual Contents: Organize into sets of manageable size. Arrange contents alphabetically by system, subsystem, and equipment. If possible, assemble instructions for subsystems, equipment, and components of one system into a single binder.
- E. Identification: In the documentation directory and in each operation and maintenance manual, identify each system, subsystem, and piece of equipment with same designation used in the Contract Documents. If no designation exists, assign a designation according to ASHRAE Guideline 4, "Preparation of Operating and Maintenance Documentation for Building Systems."

#### 1.6 OPERATION AND MAINTENANCE DOCUMENTATION DIRECTORY MANUAL

- A. Operation and Maintenance Documentation Directory: Prepare a separate manual that provides an organized reference to emergency, operation, and maintenance manuals. List items and their location to facilitate ready access to desired information. Include the following:
  - 1. List of Systems and Subsystems: List systems alphabetically. Include references to operation and maintenance manuals that contain information about each system.
  - 2. List of Equipment: List equipment for each system, organized alphabetically by system. For pieces of equipment not part of system, list alphabetically in separate list.
  - 3. Tables of Contents: Include a table of contents for each emergency, operation, and maintenance manual.

#### 1.7 EMERGENCY MANUALS

- A. Emergency Manual: Assemble a complete set of emergency information indicating procedures for use by emergency personnel and by Owner's operating personnel for types of emergencies indicated.
- B. Content: Organize manual into a separate section for each of the following:
  - 1. Type of emergency.
  - 2. Emergency instructions.
  - 3. Emergency procedures.

- C. Type of Emergency: Where applicable for each type of emergency indicated below, include instructions and procedures for each system, subsystem, piece of equipment, and component:
  - 1. Fire.
  - 2. Flood.
  - 3. Gas leak.
  - 4. Water leak.
  - 5. Power failure.
  - 6. Water outage.
  - 7. System, subsystem, or equipment failure.
  - 8. Chemical release or spill.
- D. Emergency Instructions: Describe and explain warnings, trouble indications, error messages, and similar codes and signals. Include responsibilities of Owner's operating personnel for notification of Installer, supplier, and manufacturer to maintain warranties.
- E. Emergency Procedures: Include the following, as applicable:
  - 1. Instructions on stopping.
  - 2. Shutdown instructions for each type of emergency.
  - 3. Operating instructions for conditions outside normal operating limits.
  - 4. Required sequences for electric or electronic systems.
  - 5. Special operating instructions and procedures.

## 1.8 SYSTEMS AND EQUIPMENT OPERATION MANUALS

- A. Systems and Equipment Operation Manual: Assemble a complete set of data indicating operation of each system, subsystem, and piece of equipment not part of a system. Include information required for daily operation and management, operating standards, and routine and special operating procedures.
  - 1. Engage a factory-authorized service representative to assemble and prepare information for each system, subsystem, and piece of equipment not part of a system.
  - 2. Prepare a separate manual for each system and subsystem, in the form of an instructional manual for use by Owner's operating personnel.
- B. Content: In addition to requirements in this Section, include operation data required in individual Specification Sections and the following information:
  - 1. System, subsystem, and equipment descriptions. Use designations for systems and equipment indicated on Contract Documents.
  - 2. Performance and design criteria if Contractor is delegated design responsibility.
  - 3. Operating standards.
  - 4. Operating procedures.
  - 5. Operating logs.
  - 6. Wiring diagrams.
  - 7. Control diagrams.
  - 8. Piped system diagrams.

9. Precautions against improper use.
10. License requirements including inspection and renewal dates.

C. Descriptions: Include the following:

1. Product name and model number. Use designations for products indicated on Contract Documents.
2. Manufacturer's name.
3. Equipment identification with serial number of each component.
4. Equipment function.
5. Operating characteristics.
6. Limiting conditions.
7. Performance curves.
8. Engineering data and tests.
9. Complete nomenclature and number of replacement parts.

D. Operating Procedures: Include the following, as applicable:

1. Startup procedures.
2. Equipment or system break-in procedures.
3. Routine and normal operating instructions.
4. Regulation and control procedures.
5. Instructions on stopping.
6. Normal shutdown instructions.
7. Seasonal and weekend operating instructions.
8. Required sequences for electric or electronic systems.
9. Special operating instructions and procedures.

E. Systems and Equipment Controls: Describe the sequence of operation, and diagram controls as installed.

F. Piped Systems: Diagram piping as installed, and identify color-coding where required for identification.

## 1.9 SYSTEMS AND EQUIPMENT MAINTENANCE MANUALS

A. Systems and Equipment Maintenance Manuals: Assemble a complete set of data indicating maintenance of each system, subsystem, and piece of equipment not part of a system. Include manufacturers' maintenance documentation, preventive maintenance procedures and frequency, repair procedures, wiring and systems diagrams, lists of spare parts, and warranty information.

1. Engage a factory-authorized service representative to assemble and prepare information for each system, subsystem, and piece of equipment not part of a system.
2. Prepare a separate manual for each system and subsystem, in the form of an instructional manual for use by Owner's operating personnel.

- B. Content: For each system, subsystem, and piece of equipment not part of a system, include source information, manufacturers' maintenance documentation, maintenance procedures, maintenance and service schedules, spare parts list and source information, maintenance service contracts, and warranties and bonds as described below.
- C. Source Information: List each system, subsystem, and piece of equipment included in manual, identify by product name and arrange to match table of contents. For each piece of equipment, list name, address, and telephone number of Installer or supplier and maintenance service agent, and cross-reference Specification Section number and title in Project Manual and drawing or schedule designation or identifier where applicable.
- D. Manufacturers' Maintenance Documentation: Manufacturers' maintenance documentation including the following information for each component part or piece of equipment:
  - 1. Standard maintenance instructions and bulletins; include only sheets pertinent to product or component installed. Mark each sheet to identify each product or component incorporated into the Work. If data include more than one item in a tabular format, identify each item using appropriate references from the Contract Documents. Identify data applicable to the Work and delete references to information not applicable.
    - a. Prepare supplementary text if manufacturers' standard printed data are not available and where the information is necessary for proper operation and maintenance of equipment or systems.
  - 2. Drawings, diagrams, and instructions required for maintenance, including disassembly and component removal, replacement, and assembly.
  - 3. Identification and nomenclature of parts and components.
  - 4. List of items recommended to be stocked as spare parts.
- E. Maintenance Procedures: Include the following information and items that detail essential maintenance procedures:
  - 1. Test and inspection instructions.
  - 2. Troubleshooting guide.
  - 3. Precautions against improper maintenance.
  - 4. Disassembly; component removal, repair, and replacement; and reassembly instructions.
  - 5. Aligning, adjusting, and checking instructions.
  - 6. Demonstration and training video recording, if available.
- F. Maintenance and Service Schedules: Include service and lubrication requirements, list of required lubricants for equipment, and separate schedules for preventive and routine maintenance and service with standard time allotment.
  - 1. Scheduled Maintenance and Service: Tabulate actions for daily, weekly, monthly, quarterly, semiannual, and annual frequencies.

2. Maintenance and Service Record: Include manufacturers' forms for recording maintenance.
- G. Spare Parts List and Source Information: Include lists of replacement and repair parts, with parts identified and cross-referenced to manufacturers' maintenance documentation and local sources of maintenance materials and related services.
  - H. Maintenance Service Contracts: Include copies of maintenance agreements with name and telephone number of service agent.
  - I. Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.
    1. Include procedures to follow and required notifications for warranty claims.
  - J. Drawings: Prepare drawings supplementing manufacturers' printed data to illustrate the relationship of component parts of equipment and systems and to illustrate control sequence and flow diagrams. Coordinate these drawings with information contained in record Drawings to ensure correct illustration of completed installation.
    1. Do not use original project record documents as part of maintenance manuals.
- 1.10 PRODUCT MAINTENANCE MANUALS
- A. Product Maintenance Manual: Assemble a complete set of maintenance data indicating care and maintenance of each product, material, and finish incorporated into the Work.
  - B. Content: Organize manual into a separate section for each product, material, and finish. Include source information, product information, maintenance procedures, repair materials and sources, and warranties and bonds, as described below.
  - C. Source Information: List each product included in data identified by product name and arranged to match table of contents. For each product, list name, address, and telephone number of Installer or supplier and maintenance service agent, and cross-reference Specification Section number and title in Project Manual and drawing or schedule designation or identifier where applicable.
  - D. Product Information: Include the following, as applicable:
    1. Product name and model number.
    2. Manufacturer's name.
    3. Color, pattern, and texture.
    4. Material and chemical composition.
    5. Reordering information for specially manufactured products.
  - E. Maintenance Procedures: Include manufacturer's written recommendations and the following:
    1. Inspection procedures.
    2. Types of cleaning agents to be used and methods of cleaning.

3. List of cleaning agents and methods of cleaning detrimental to product.
  4. Schedule for routine cleaning and maintenance.
  5. Repair instructions.
- F. Repair Materials and Sources: Include lists of materials and local sources of materials and related services.
- G. Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.
1. Include procedures to follow and required notifications for warranty claims.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION





SECTION 017836  
WARRANTIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for warranties required by the Contract Documents, including manufacturers' standard warranties on products and special warranties.
- B. Related Sections include but are not limited to the following:
  - 1. Division 01 Section "Closeout Procedures."
  - 2. Division 01 Section "Operation and Maintenance Data."
  - 3. Division 02 through 33 Sections for specific warranty requirements.

1.3 DEFINITIONS

- A. Standard product warranties are preprinted written warranties published by individual manufacturers for particular products and are specifically endorsed by the manufacturer to the Owner.
- B. Special project warranties are written warranties required by or incorporated in the Contract Documents, either to extend time limits provided by standard warranties or to provide greater rights for the Owner.

1.4 WARRANTY REQUIREMENTS

- A. Disclaimers and Limitations: Manufacturer's disclaimers and limitations on product warranties do not relieve the Contractor of the warranty on the Work that incorporates the products. Manufacturer's disclaimers and limitations on product warranties do not relieve suppliers, manufacturers, and subcontractors required to countersign special warranties with the Contractor.
- B. Related Damages and Losses: When correcting failed or damaged warranted construction, remove and replace construction that has been damaged as a result of such failure or must be removed and replaced to provide access for correction of warranted construction.

- C. Reinstatement of Warranty: When Work covered by a warranty has failed and been corrected by replacement or rebuilding, reinstate the warranty by written endorsement. The reinstated warranty shall be equal to the original warranty with an equitable adjustment for depreciation.
- D. Replacement Cost: Upon determination that Work covered by a warranty has failed, replace or rebuild the Work to an acceptable condition complying with requirements of the Contract Documents. The Contractor is responsible for the cost of replacing or rebuilding defective Work regardless of whether the Owner has benefited from use of the Work through a portion of its anticipated useful service life.
- E. Owner's Recourse: Expressed warranties made to the Owner are in addition to implied warranties and shall not limit the duties, obligations, rights, and remedies otherwise available under the law. Expressed warranty periods shall not be interpreted as limitations on the time in which the Owner can enforce such other duties, obligations, rights, or remedies.
  - 1. Rejection of Warranties: The Owner reserves the right to reject warranties and to limit selection to products with warranties not in conflict with requirements of the Contract Documents.
- F. Where the Contract Documents require a special warranty, or similar commitment on the Work or part of the Work, the Owner reserves the right to refuse to accept the Work, until the Contractor presents evidence that entities required to countersign such commitments are willing to do so.

#### 1.5 SUBMITTAL OF PROJECT WARRANTIES

- A. Time of Submittal: Submit written warranties on request of Architect for designated portions of the Work where commencement of warranties other than date of Substantial Completion is indicated, or when delay in submittal of warranties might limit Owner's rights under warranty.
- B. Organize warranty documents into an orderly sequence based on the table of contents of Project Manual.
- C. Warranties: Submit (2) copies of each required warranty properly executed by the Contractor, or by the Contractor, subcontractor, supplier, or manufacturer. Organize warranty documents into an orderly sequence based on the table of contents of the Project Manual.
  - 1. Warranty Electronic File: Scan warranties and bonds and assemble complete warranty and bond submittal package into a single indexed electronic PDF file with links enabling navigation to each item. Provide bookmarked table of contents at beginning of document.
  - 2. Include copy of each warranty in operation and maintenance documentation.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION



SECTION 017839  
PROJECT RECORD DRAWINGS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for Project Record Drawings:
- B. Related Sections:
  - 1. Division 01 Section "Use of Architect's Electronic Files" for requirements related to use of Architect's digital data files.
  - 2. Division 01 Section "Execution" for surveys of exterior accessible routes.
  - 3. Division 01 Section "Closeout Procedures" for general closeout procedures.
  - 4. Division 01 Section "Operation and Maintenance Data" for operation and maintenance manual requirements.

1.3 RECORD DRAWING SUBMITTAL

- A. Closeout Submittal: Submit Record Drawings as follows:
  - 1. Initial Submittal: Submit one paper-copy set of marked-up record prints.
    - a. Architect will indicate whether record prints are acceptable or if additional information or documentation is needed, and will return the set to the Contractor.
  - 2. Final Submittal:
    - a. Paper Copy: Submit one paper-copy set of marked-up record prints that have been revised to address Architect's comments from the initial submittal.
    - b. Digital Data Files: Submit digital data files of Project Record Drawings as PDF files on a thumb-drive.

## 1.4 PROJECT RECORD DRAWINGS

- A. Record Drawings: Maintain one set of paper copies of the Contract Drawings during the construction period for Project Record Drawing Purposes.
1. Project Record Drawing print sets shall include all drawings of the Contract Documents including original project Drawings, Shop Drawings, Supplemental Drawings, Coordination Drawings, Clarification Drawings, Change Orders, and similar drawings. Record Drawing set shall include all drawings of Contract Documents whether or not changes and additional information were recorded.
  2. Store Project Record Drawings in the field office apart from the Contract Documents used for construction; do not use Project Record Drawings for construction purposes.
  3. Maintain Record Drawings in good order and in a clean, dry, legible condition, protected from deterioration and loss.
  4. Provide access to Project Record Drawings for Architect's reference during normal working hours.
  5. Incorporate new and revised drawings into Project Record Drawings as modifications are issued; do not wait until the end of Project.
  6. Mark Record Prints to show the actual installation where installation varies from that shown originally. Require individual or entity who obtained record data, whether individual or entity is Installer, subcontractor, or similar entity, to provide information for preparation of corresponding marked-up record prints.
    - a. Give particular attention to information on concealed elements that would be difficult to identify or measure and record later.
    - b. Accurately record information in an understandable drawing technique.
    - c. Record data as soon as possible after obtaining it.
    - d. Record and check the markup before enclosing concealed installations.
    - e. Cross-reference record prints to corresponding archive photographic documentation.
  7. Content: Types of items requiring marking include, but are not limited to, the following:
    - a. Dimensional changes to Drawings.
    - b. Revisions to details shown on Drawings.
    - c. Depths of foundations below first floor.
    - d. Locations and depths of underground utilities.
    - e. Revisions to routing of piping and conduits.
    - f. Revisions to electrical circuitry.
    - g. Actual equipment locations.
    - h. Duct size and routing.
    - i. Locations of concealed internal utilities.
    - j. Changes made by Change Order or Construction Change Directive.
    - k. Changes made following Architect's written orders.
    - l. Details not on the original Contract Drawings.
    - m. Field records for variable and concealed conditions.
    - n. Record information on the Work that is shown only schematically.

8. Mark the Contract Drawings and Shop Drawings completely and accurately. Use personnel proficient at recording graphic information in production of marked-up record prints.
  9. Mark record prints with erasable, red-colored pencil. Use other colors to distinguish between changes for different categories of the Work at same location.
  10. Mark important additional information that was either shown schematically or omitted from original Drawings.
  11. Note Construction Change Directive numbers, Change Order numbers, and similar identification, where applicable.
- B. Newly Prepared Record Drawings: Prepare new Drawings instead of preparing Record Drawings where Architect determines that neither the original Contract Drawings nor Shop Drawings are suitable to show actual installation.
1. New Drawings may be required when a Change Order is issued as a result of accepting an alternate, substitution, or other modification.
  2. Consult Architect for proper scale and scope of detailing and notations required to record the actual physical installation and its relation to other construction. Integrate newly prepared Record Drawings into Record Drawing sets; comply with procedures for formatting, organizing, copying, binding, and submitting.
- C. Record Digital Data Files: Immediately before inspection for Certificate of Substantial Completion, submit marked-up record prints to Architect, following Architect's review and action, prepare a full set of corrected digital data files of the Contract Drawings, as follows:
1. Format: PDF electronic file.
  2. Incorporate changes and additional information previously marked on record prints. Delete, redraw, and add details and notations where applicable.
  3. Refer instances of uncertainty to Architect for resolution.
  4. Architect will furnish Contractor one set of digital data files of the Contract Drawings in PDF format for use in recording information.
    - a. Refer to Division 01 Section 011105 "Use of Architect's Electronic Files" for requirements related to use of Architect's digital data files.
- D. Format:
1. Record Prints: Organize record prints into manageable sets. Bind each set with durable paper cover sheets. Include identification on cover sheets.
  2. Record Digital Data Files:
    - a. Format: Annotated PDF electronic file.
    - b. Organize digital data information into separate electronic files corresponding with each building design discipline of the Contract Documents; name each file with the corresponding design discipline.

E. Identification: Include the following information on each Record Drawing:

1. "PROJECT RECORD DRAWING" designation located in a prominent location.
2. Project name if Project name is not included in a title block as part of the drawing.
3. Date.
4. Name of Architect if Architect's name is not included in a title block as part of the drawing.
5. Name of Contractor.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION



SECTION 017900  
DEMONSTRATION AND TRAINING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for instructing Owner's personnel in demonstration and training of operation and maintenance of systems, subsystems, and equipment.
- B. Related Sections:
  - 1. Division 01 Section "Operation and Maintenance Data" for operation and maintenance manuals and data.
  - 2. Divisions 02 through 33 Sections for specific requirements for demonstration and training for products in those Sections.

1.3 SUBMITTALS

- A. Training materials in addition to Operation and Maintenance manuals required in Division 01 Section "Operation and Maintenance Data."
- B. Instruction Program Schedule: Submit outline schedule of instructional program that includes and coordinates programs for all products, equipment, and systems requiring demonstration and training. Schedule shall include a list of training sessions, proposed dates, times, length of instruction time.
  - 1. Schedule shall be coordinated and finalized with the Owner.

1.4 QUALITY ASSURANCE

- A. Instructor Qualifications: A factory-authorized service representative experienced in operation and maintenance procedures and training of Owner's personnel.

1.5 COORDINATION

- A. Coordinate instruction schedule with Owner, adjust schedule as required to minimize disrupting Owner's operations.

- B. Coordinate instructors, including providing notification of dates, times, length of instruction time, and course content.
- C. Coordinate content of training sessions with content of approved operation and maintenance manuals. Do not submit instruction program until operation and maintenance data has been reviewed and approved by Architect.

## PART 2 - PRODUCTS

### 2.1 INSTRUCTION PROGRAM

- A. Provide instruction programs that include training sessions for each system and for equipment not part of a system, as required by individual Specification Sections. Include instruction for the following as applicable to the system, equipment, or component:
  - 1. Basis of System Design, Operational Requirements, and Criteria: Include the following:
    - a. System, subsystem, and equipment descriptions.
    - b. Operating standards.
    - c. Regulatory requirements.
    - d. Equipment function.
    - e. Operating characteristics.
    - f. Limiting conditions.
    - g. Performance curves.
  - 2. Documentation: Review the following items in detail:
    - a. Emergency manuals.
    - b. Operations manuals.
    - c. Maintenance manuals.
    - d. Project record documents.
    - e. Identification systems.
    - f. Warranties and bonds.
    - g. Maintenance service agreements and similar continuing commitments.
  - 3. Emergencies: Include the following, as applicable:
    - a. Instructions on meaning of warnings, trouble indications, and error messages.
    - b. Instructions on stopping.
    - c. Shutdown instructions for each type of emergency.
    - d. Operating instructions for conditions outside of normal operating limits.
    - e. Sequences for electric or electronic systems.
    - f. Special operating instructions and procedures.

4. Operations: Include the following, as applicable:
  - a. Startup procedures.
  - b. Equipment or system break-in procedures.
  - c. Routine and normal operating instructions.
  - d. Regulation and control procedures.
  - e. Control sequences.
  - f. Safety procedures.
  - g. Instructions on stopping.
  - h. Normal shutdown instructions.
  - i. Operating procedures for emergencies.
  - j. Operating procedures for system, subsystem, or equipment failure.
  - k. Seasonal and weekend operating instructions.
  - l. Required sequences for electric or electronic systems.
  - m. Special operating instructions and procedures.
  
5. Adjustments: Include the following:
  - a. Alignments.
  - b. Checking adjustments.
  - c. Noise and vibration adjustments.
  - d. Economy and efficiency adjustments.
  
6. Troubleshooting: Include the following:
  - a. Diagnostic instructions.
  - b. Test and inspection procedures.
  
7. Maintenance: Include the following:
  - a. Inspection procedures.
  - b. Types of cleaning agents to be used and methods of cleaning.
  - c. List of cleaning agents and methods of cleaning detrimental to product.
  - d. Procedures for routine cleaning
  - e. Procedures for preventive maintenance.
  - f. Procedures for routine maintenance.
  - g. Instruction on use of special tools.
  
8. Repairs: Include the following:
  - a. Diagnosis instructions.
  - b. Repair instructions.
  - c. Disassembly; component removal, repair, and replacement; and reassembly instructions.
  - d. Instructions for identifying parts and components.
  - e. Review of spare parts needed for operation and maintenance.

## PART 3 - EXECUTION

### 3.1 PREPARATION

- A. Assemble educational materials necessary for instruction and training. Assemble training manuals organized in coordination with requirements in Division 01 Section "Operations and Maintenance Data."
- B. Coordinate with Owner for number of instruction times, location, and number of participants.
- C. Set up instructional equipment at instruction location.

### 3.2 INSTRUCTION

- A. Instruct Owner's personnel to adjust, operate, and maintain systems, subsystems, and equipment not part of a system.
  - 1. Owner will furnish Contractor with names and positions of participants.
- B. Scheduling: Provide instruction at mutually agreed on times. For equipment that requires seasonal operation, provide similar instruction at start of each season.
  - 1. Schedule initial training with Owner, through Architect with at least 7 days' advance notice.
- C. Cleanup: Collect used and leftover educational materials and give to Owner. Remove instructional equipment. Restore systems and equipment to condition existing before initial training use.

END OF SECTION

SECTION 024119  
SELECTIVE DEMOLITION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes the following:

- 1. Demolition and removal of selected portions of building or structure.
- 2. Demolition and removal of selected site elements.
- 3. Salvage of existing items to be reused, recycled, or returned to Owner.

- B. Related Sections include the following:

- 1. Division 01 Section "Temporary Facilities and Controls" for temporary construction and environmental-protection measures for selective demolition operations.
- 2. Division 01 Section "Photographic Documentation" for photographic documentation of pre-demolition conditions.
- 3. Division 01 Section "Execution" for cutting and patching procedures.
- 4. Division 01 Section "Construction Waste Management and Disposal" for salvaging, recycling, and disposing of nonhazardous demolition and construction waste.
- 5. Division 09 Sections as applicable to adhered floor systems.
- 6. Division 31 Section "Site Clearing" for removing above and below-grade site improvements not part of selective demolition.

1.3 DEFINITIONS

- A. Remove: Detach items from existing construction and legally dispose of them off-site, unless indicated to be salvaged or reinstalled.
- B. Remove and Salvage to Owner: Detach item from existing construction in a manner to prevent damage and deliver to Owner ready for reuse.
- C. Remove and Salvage for Reinstallation: Detach item from existing construction in a manner to prevent damage, prepare for reuse, and securely store item until it is to be reinstalled at locations indicated.

- D. Existing to Remain: Existing items or improvements that are to remain and not be removed. Existing items to remain shall be protected from damage during the course of construction.

#### 1.4 MATERIALS OWNERSHIP

- A. Unless otherwise indicated, demolition waste becomes property of Contractor.

#### 1.5 SUBMITTALS

- A. Proposed Protection Measures: Submit report, including drawings, that indicates the measures proposed for protecting individuals and property, for physical damage, for dust control, and for noise control. Indicate proposed locations and construction of barriers.
- B. Schedule of Selective Demolition Activities: Indicate the following:
  - 1. Detailed sequence of selective demolition and removal work, with starting and ending dates for each activity. Ensure Owner's on-site operations are uninterrupted.
  - 2. Interruption of utility services. Indicate how long utility services will be interrupted.
  - 3. Coordination for shutoff, capping, and continuation of utility services.
- C. Inventory of Items to be Salvaged: Prior to start of demolition, submit lists of items to be removed and salvaged as follows:
  - 1. Items to be removed, salvaged, and delivered to Owner.
  - 2. Items to be removed, salvaged, and reinstalled.
- D. Predemolition Photographs: Show existing conditions of adjoining construction, including finish surfaces, that might be misconstrued as damage caused by demolition operations. Comply with Division 01 Section "Photographic Documentation." Submit before Work begins.
- E. Qualification Data: For refrigerant recovery technician.
- F. Statement of Refrigerant Recovery: Signed by refrigerant recovery technician responsible for recovering refrigerant, stating that all refrigerant that was present was recovered and that recovery was performed according to EPA regulations. Include name and address of technician and date refrigerant was recovered.
- G. Warranties: Documentation indicated that existing warranties are still in effect after completion of selective demolition.

#### 1.6 QUALITY ASSURANCE

- A. Demolition Firm Qualifications: An experienced firm that has specialized in demolition work similar in material and extent to that indicated for this Project.

- B. Refrigerant Recovery Technician Qualifications: Certified by an EPA-approved certification program.
- C. Predemolition Conference: Conduct conference at Project site to comply with requirements in Division 01 Section "Project Management and Coordination." Review methods and procedures related to selective demolition.

## 1.7 FIELD CONDITIONS

- A. Conditions existing at time of inspection for bidding purpose will be maintained by Owner as far as practical.
- B. Notify Architect of discrepancies between existing conditions and Drawings before proceeding with selective demolition.
- C. Hazardous Materials: Hazardous materials are known to be present in some buildings included in the project scope. A report on the presence of hazardous materials is included in the Appendix of this Project Manual; examine report to become aware of locations where hazardous materials are present.
  - 1. Hazardous materials survey report identifies the presence of lead based paint.
  - 2. Comply with Federal, local and State regulations regarding disturbing surfaces contaminated with lead based paint. Comply with EPA's Lead Renovation, Repair, and Painting Rule (RRP Rule); contractors and individuals disturbing surfaces suspected of having lead containing paint shall be certified through an EPA RRP Rule training program.
- D. Utility Services: Maintain existing utilities indicated to remain in service and protect them against damage during selective demolition operations.
  - 1. Maintain fire-protection facilities in service during selective demolition operations.
- E. Storage or sale of removed items or materials on-site is not permitted.

## PART 2 - PRODUCTS

### 2.1 PERFORMANCE REQUIREMENTS

- A. Regulatory Requirements: Comply with governing EPA notification regulations before beginning selective demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.
- B. Standards: Comply with ASSE A10.6 and NFPA 241.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Verify that utilities have been disconnected and capped before starting selective demolition operations.
- B. Survey existing conditions and correlate with requirements indicated to determine extent of selective demolition required.
  - 1. If unanticipated mechanical, electrical, or structural elements are encountered and found to be in conflict with intended function or design, investigate and measure the nature and extent of conflict. Promptly submit a written report to Architect.
- C. Inventory and record the condition of items to be removed and salvaged or removed and reinstalled. Provide photographs of conditions that might be misconstrued as damage caused by salvage operations.

### 3.2 PREPARATION

- A. Site Access and Temporary Controls: Conduct selective demolition and debris-removal operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.
  - 1. Comply with requirements for access and protection specified in Division 01 Section "Temporary Facilities and Controls."
- B. Temporary Facilities: Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent buildings and facilities to remain.
  - 1. Provide temporary weather protection, during interval between selective demolition of existing construction on exterior surfaces and new construction, to prevent water leakage and damage to structure and interior areas.
  - 2. Protect walls, ceilings, floors, and other existing finish work that are to remain or that are exposed during selective demolition operations.

### 3.3 PROTECTION

- A. Temporary Protection: Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent buildings and facilities to remain.
  - 1. Provide protection to ensure safe passage of people around selective demolition area and to and from occupied portions of building.
  - 2. Provide temporary weather protection, during interval between selective demolition of existing construction on exterior surfaces and new construction, to prevent water leakage and damage to structure and interior areas.
  - 3. Protect walls, ceilings, floors, and other existing finish work that are to remain or that are exposed during selective demolition operations.



4. Cover and protect furniture, furnishings, and equipment that have not been removed.
  5. Comply with requirements for temporary enclosures, dust control, heating, and cooling specified in Division 01 Section "Temporary Facilities and Controls."
- B. Temporary Shoring: Design, provide, and maintain shoring, bracing, and structural supports as required to preserve stability and prevent movement, settlement, or collapse of construction and finishes to remain, and to prevent unexpected or uncontrolled movement or collapse of construction being demolished.
1. Strengthen or add new supports when required during progress of selective demolition.
- C. Remove temporary barricades and protections where hazards no longer exist.

### 3.4 UTILITY SERVICES AND MECHANICAL/ELECTRICAL SYSTEMS

- A. HVAC Equipment Refrigerant: Before starting demolition, remove refrigerant from mechanical equipment according to 40 CFR 82 and regulations of authorities having jurisdiction.
- B. Existing Services/Systems to Remain: Maintain services/systems indicated to remain and protect them against damage.
- C. Existing Services/Systems to Be Removed, Relocated, or Abandoned: Locate, identify, disconnect, and seal or cap off utility services and mechanical/electrical systems serving areas to be selectively demolished.
1. Arrange to shut off utilities with Owner and/or utility companies.
  2. If services/systems are required to be removed, relocated, or abandoned, provide temporary services/systems that bypass area of selective demolition and that maintain continuity of services/systems to other parts of building.
  3. Disconnect, demolish, and remove fire-suppression systems, plumbing, and HVAC systems, equipment, and components indicated on Drawings to be removed.
    - a. Piping to Be Removed: Remove portion of piping indicated to be removed and cap or plug remaining piping with same or compatible piping material.
    - b. Piping to Be Abandoned in Place: Drain piping and cap or plug piping with same or compatible piping material and leave in place.
    - c. Equipment to Be Removed: Disconnect and cap services and remove equipment.
    - d. Equipment to Be Removed and Reinstalled: Disconnect and cap services and remove, clean, and store equipment; when appropriate, reinstall, reconnect, and make equipment operational.
    - e. Equipment to Be Removed and Salvaged: Disconnect and cap services and remove equipment and deliver to Owner.
    - f. Ducts to Be Removed: Remove portion of ducts indicated to be removed and plug remaining ducts with same or compatible ductwork material.

- g. Ducts to Be Abandoned in Place: Cap or plug ducts with same or compatible ductwork material and leave in place.

### 3.5 SELECTIVE DEMOLITION, GENERAL

- A. General: Remove existing construction only to the extent required by new construction and as indicated. Use methods required to complete the Work within limitations of governing regulations and as follows:
  1. Proceed with selective demolition systematically, from higher to lower level. Complete selective demolition operations above each floor or tier before disturbing supporting members on the next lower level.
  2. Neatly cut openings and holes plumb, square, and true to dimensions required. Use cutting methods least likely to damage construction to remain or adjoining construction. Use hand tools or small power tools designed for sawing or grinding, not hammering and chopping, to minimize disturbance of adjacent surfaces. Temporarily cover openings to remain.
  3. Cut or drill from the exposed or finished side into concealed surfaces to avoid marring existing finished surfaces.
  4. Do not use plasma or flame cutting torches without written approval from Architect. Where allowed, clear area of flammable materials. At concealed spaces, such as duct and pipe interiors, verify condition and contents of hidden space before starting flame-cutting operations. Maintain portable fire-suppression devices during flame-cutting operations. Maintain fire watch during and for at least two hours after flame-cutting operations. Maintain adequate ventilation when using cutting torches.
  5. Remove decayed, vermin-infested, or otherwise dangerous or unsuitable materials and promptly dispose of off-site.
  6. Locate selective demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.
  7. Dispose of demolished items and materials promptly, comply with requirements of Division 01 Section "Construction Waste Management and Disposal."
- B. Minor Accessories and Fixtures: Remove minor accessories and fixtures as required to accommodate removal of existing finishes or application new finishes whether items are indicated to be removed or not.
  1. Minor accessories and fixtures shall include but not be limited to toilet room accessories; classroom accessories such as pencil sharpeners coat hooks, flag holders, and similar items.
  2. Where new replacement items are not indicated or specified in other sections, minor accessories and fixtures shall be considered to be items to be removed and reinstalled.
- C. Removed and Salvaged Items:
  1. Clean salvaged items.
  2. Pack or crate items after cleaning. Identify contents of containers.
  3. Store items in a secure area until delivery to Owner.
  4. Transport items to Owner's storage area.

5. Protect items from damage during transport and storage.

D. Removed and Reinstalled Items:

1. Clean and repair items to functional condition adequate for intended reuse.
2. Pack or crate items after cleaning and repairing. Identify contents of containers.
3. Protect items from damage during transport and storage.
4. Reinstall items in locations indicated. Comply with installation requirements for new materials and equipment. Provide connections, supports, and miscellaneous materials necessary to make item functional for use indicated.

E. Existing Items to Remain: Protect construction indicated to remain against damage and soiling during selective demolition. When permitted by Architect, items may be removed to a suitable, protected storage location during selective demolition and reinstalled in their original locations after selective demolition operations are complete.

1. Items removed, salvaged, and reinstalled for the Contractor's convenience shall be considered the same as items to be removed and salvaged for reinstallation.

### 3.6 SELECTIVE DEMOLITION PROCEDURES FOR SPECIFIC MATERIALS

A. Concrete: Demolish in sections. Cut concrete full depth at junctures with construction to remain and at regular intervals using power-driven saw, and then remove concrete between saw cuts.

B. Concrete Slabs-on-Grade: Using power-driven saw, cut perimeter of area to be demolished, then break up and remove.

1. Where possible or feasible, cut concrete at existing joints.

C. Masonry: Demolish in small sections. Cut masonry at junctures with construction to remain, using power-driven saw, and then remove masonry between saw cuts.

D. Suspended Acoustic Panel Ceilings:

1. Ceiling Panels: Ceiling panels may be removed and reinstalled, or replaced, as necessary to accomplish Work above suspended acoustic panel ceilings as required by the Project conditions.
2. Suspended Ceiling Grid: Suspended ceiling grid systems and grid members shall not be cut or altered in any way unless indicated on drawings.
  - a. Unauthorized alteration of suspended ceiling grid systems or members will result in the Contractor upgrading the suspension system to current code requirements at no additional cost to the Owner.

E. Resilient Floor Coverings: Remove floor coverings and adhesive according to recommendations in RFCI's "Recommended Work Practices for the Removal of Resilient Floor Coverings." Do not use methods requiring solvent-based adhesive strippers.

- F. Roofing: Remove no more existing roofing than what can be covered in one day by new roofing and so that building interior remains watertight and weathertight. Refer to applicable Division 07 Section for new roofing requirements.
  - 1. Remove existing roof membrane, flashings, copings, and roof accessories.
  - 2. Remove existing roofing system down to substrate.

### 3.7 DISPOSAL OF DEMOLISHED MATERIALS

- A. Recycle or dispose demolition waste materials according to Division 01 Section "Construction Waste Management and Disposal." Remove demolition waste materials from Project site and legally dispose of them in an EPA-approved construction and demolition waste landfill acceptable to authorities having jurisdiction.
  - 1. Do not allow demolished materials to accumulate on-site.
  - 2. Remove and transport debris in accordance with local regulations and in a manner that will prevent spillage on adjacent surfaces and areas.
- B. Burning: Do not burn demolished materials.

### 3.8 CLEANING

- A. Clean adjacent structures and improvements of dust, dirt, and debris caused by selective demolition operations. Return adjacent areas to condition existing before selective demolition operations began.

END OF SECTION

SECTION 033053  
MISCELLANEOUS CAST-IN-PLACE CONCRETE

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 cast-in-place concrete for slabs-on-grade and minor footings, including reinforcement, concrete materials, mixture design, placement procedures, and finishes.
- B. Related Requirements:
  - 1. Division 07 Section "Underslab Vapor Retarder."
  - 2. Division 32 Section "Concrete Paving and Walks" for concrete pavement and walks.

1.3 SUBMITTALS

- A. Product Data: For each type of product.
- B. Design Mixtures: For each concrete mixture.
- C. Delivery Tags: Delivery tags for all concrete.

1.4 QUALITY ASSURANCE

- A. Installer Qualifications: A qualified installer who employs on Project personnel who shall be thoroughly familiar with the specified requirements, completely trained and experienced in the necessary skills required for work performed under this Section. In actual installation of the work of this Section, use adequate numbers of skilled workmen to insure installation in strict accordance with the contract documents design.
- B. Concrete Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM C 94/C 94M requirements for production facilities and equipment.

## PART 2 - PRODUCTS

### 2.1 GENERAL REQUIREMENTS

- A. Comply with the following sections of ACI 301 unless modified by requirements in the Contract Documents:
  - 1. "General Requirements."
  - 2. "Formwork and Formwork Accessories."
  - 3. "Reinforcement and Reinforcement Supports."
  - 4. "Concrete Mixtures."
  - 5. "Handling, Placing, and Constructing."
- B. Comply with ACI 117.

### 2.2 FORM MATERIALS

- A. Smooth-Formed Finished Concrete: For concrete that will be exposed in the finished work, fabricate forms of form-facing panels that will provide continuous, true, and smooth concrete surfaces. Furnish in largest practicable sizes to minimize number of joints.

### 2.3 STEEL REINFORCEMENT

- A. Reinforcing Bars: ASTM A 615/A 615M, Grade 60, deformed.
- B. Plain-Steel Wire: ASTM A 1064/A 1064M, as drawn.
- C. Plain-Steel Welded-Wire Reinforcement: ASTM A 1064/A 1064M, plain, fabricated from as-drawn steel wire into flat sheets.
- D. Deformed-Steel Welded-Wire Reinforcement: ASTM A 1064/A 1064M, flat sheet.
- E. Joint Dowel Bars: ASTM A 615/A 615M, Grade 60, plain-steel bars, cut true to length with ends square and free of burrs.
- F. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded wire reinforcement in place. Manufacture bar supports from steel wire, plastic, or precast concrete according to CRSI's "Manual of Standard Practice," of greater compressive strength than concrete.
  - 1. Slabs on Grade and Foundations: Use precast concrete blocks, plastic-coated steel with bearing plates or specifically designed wire-fabric supports fabricated of plastic. Precast blocks shall be not less than 3 inches by 3 inches square and shall have a compressive strength equal to or greater than the strength of the surrounding concrete.

- G. Fabricating Reinforcement: Fabricate steel reinforcement according to CRSI's "Manual of Standard Practice" or ACI SP-66 and the details shown on the Drawings.
1. Bends shall be made cold using pin sizes as recommended ACI 318 as modified by T24, CCR, Part 2.
  2. In the case of fabricating errors, do not rebend or straighten reinforcement in a manner that will damage or weaken the material.

## 2.4 CONCRETE MATERIALS

- A. Source Limitations: Obtain each type or class of cementitious material of the same brand from the same manufacturer's plant, obtain aggregate from single source, and obtain admixtures from single source from single manufacturer.
- B. Cementitious Materials:
1. Portland Cement: ASTM C 150/C 150M, Type II, gray.
  2. Fly Ash: ASTM C 618, Class F. The use of a quality fly ash will be permitted as a cement-reducing admixture up to a maximum of 15% of the weight of portland-cement.
- C. Normal-Weight Aggregate: ASTM C 33/C 33M, 1-1/2-inch nominal maximum aggregate size.
- D. Water: ASTM C 94/C 94M.
- E. Chemical Admixtures: Certified by manufacturer to be compatible with other admixtures and that do not contribute water-soluble chloride ions exceeding those permitted in hardened concrete. Do not use calcium chloride or admixtures containing calcium chloride.
1. Admixtures shall be reviewed and approved by the Architect and the Division of the State Architect.
  2. Calcium chloride, thiocyanates or admixtures containing more than 0.05% chloride ions are not permitted.
  3. Admixtures shall comply with the following:
    - a. Air-Entraining Admixture: ASTM C 260/C 260M.
    - b. Water-Reducing Admixture: ASTM C 494/C 494M, Type A.
    - c. Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type D.
    - d. High-Range, Water-Reducing Admixture: ASTM C 494/C 494M, Type F.
    - e. High-Range, Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type G.
    - f. Plasticizing and Retarding Admixture: ASTM C 1017/C 1017M, Type II.
    - g. Retarding Admixture: ASTM C 494/C 494M, Type B.

## 2.5 RELATED MATERIALS

- A. Underslab Vapor Retarder: Single ply membrane extruded from virgin grade high-impact polyolefin, 15 mil thickness complying with ASTM E 1745, Class A.
  - 1. Available Products: Subject to compliance with requirements, provide one of the following products:
    - a. Raven Industries Inc.; Vapor Block 15.
    - b. Stego Industries, LLC; Stego Wrap 15 mil.
    - c. W.R. Meadows, Inc., Perminator 15.
- B. Expansion- and Isolation-Joint-Filler Strips: ASTM D 1751, asphalt-saturated cellulosic fiber.
- C. Semirigid Joint Filler: Two-component, semirigid, 100 percent solids, epoxy resin with a Type A shore durometer hardness of 80 per ASTM D 2240.
- D. Bonding Agent: ASTM C 1059/C 1059M, Type II, non-redispersible, acrylic emulsion or styrene butadiene.
- E. Epoxy Bonding Adhesive: ASTM C 881, two-component epoxy resin, capable of humid curing and bonding to damp surfaces, of class suitable for application temperature and of grade to suit requirements.

## 2.6 CURING MATERIALS

- A. Evaporation Retarder: Waterborne, monomolecular film forming; manufactured for application to fresh concrete.
- B. Absorptive Cover: AASHTO M 182, Class 3, burlap cloth or cotton mats.
- C. Moisture-Retaining Cover: ASTM C 171, clear or white polyethylene film, 6 mil minimum thickness, or white burlap-polyethylene sheet.
- D. Water: Potable.
- E. Clear, Waterborne, Membrane-Forming Curing Compound: ASTM C 309, Type 1, Class B, dissipating.
- F. Clear, Waterborne, Membrane-Forming Curing and Sealing Compound: ASTM C 1315, Type 1, Class A.
  - 1. VOC Content: Curing and sealing compounds shall have a VOC content of 200 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).



## 2.7 CONCRETE MIXTURES

- A. Prepare design mixtures for each type and strength of concrete, proportioned on the basis of laboratory trial mixture or field test data, or both, according to ACI 301, ACI 318, Chapter 26, and Chapter 19A of the California Building Code.
  - 1. Use a qualified independent testing agency for preparing and reporting proposed mixture designs based on laboratory trial mixtures.
    - a. The testing agency used for preparing mixture designs shall be different from the testing agency retained by the Owner for testing concrete strength and materials.
- B. Proportion normal-weight concrete mixture as indicated below for strength, slump, water/cement ratio, and maximum aggregate size.
  - 1. Slabs-on-Grade:
    - a. Strength: 4000 psi at 28 days.
    - b. Aggregate Size: 1 inch maximum.
    - c. Slump: 4 inches.
    - d. Water Cement Ratio: 0.45 Maximum.
  - 2. Footings:
    - a. Strength: 3000 psi at 28 days.
    - b. Aggregate Size: 1-1/2 inches maximum.
    - c. Slump: 4 inches.
    - d. Water Cement Ratio: 0.53 Maximum.
- C. Fly Ash: Limit fly ash to 15 percent maximum, by weight, of fly ash to portland cement.
- D. Limit water-soluble, chloride-ion content in hardened concrete to 1.00 percent.
- E. Admixtures: Use admixtures according to manufacturer's written instructions.

## 2.8 CONCRETE MIXING

- A. Ready-Mixed Concrete: Measure, batch, mix, and deliver concrete according to ASTM C 94/C 94M, and furnish batch ticket information.
  - 1. When air temperature is above 90 deg F, reduce mixing and delivery time to 60 minutes.
- B. Project-Site Mixing: Project site mixing of structural concrete will not be permitted. Project site mixing of concrete for other purposes may be permitted only when reviewed and approved by the Architect. When allowed, measure, batch, and mix concrete materials and concrete according to ASTM C 94/C 94M and ACI 318. Mix concrete materials in appropriate drum-type batch machine mixer, the capacity of the mixer shall be such that it will handle one or more full sack batches.

## PART 3 - EXECUTION

### 3.1 FORMWORK INSTALLATION

- A. Design, construct, erect, brace, and maintain formwork according to ACI 301.
- B. Construct formwork, so concrete members and structures are of size, shape, alignment, elevation, and position indicated, within tolerance limits of ACI 117.

### 3.2 EMBEDDED ITEMS

- A. Place and secure anchorage devices and other embedded items required for adjoining work that is attached to or supported by cast-in-place concrete. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.

### 3.3 VAPOR-RETARDER INSTALLATION

- A. Install, protect, and repair vapor retarders according to ASTM E 1643; place sheets in position with longest dimension parallel with direction of pour.
  - 1. Lap joints 6 inches and seal with manufacturer's recommended adhesive or joint tape.

### 3.4 STEEL REINFORCEMENT INSTALLATION

- A. Comply with CRSI's "Manual of Standard Practice" for fabricating, placing, and supporting reinforcement.
  - 1. Do not cut or puncture vapor retarder. Repair damage and reseal vapor retarder before placing concrete.
- B. Clean reinforcement of loose rust and mill scale, earth, ice, and other foreign materials that would reduce bond to concrete.
- C. Accurately position, support, and secure reinforcement against displacement. Locate and support reinforcement with bar supports to maintain minimum concrete cover. Do not tack weld crossing reinforcing bars.

### 3.5 JOINTS

- A. General: Construct joints true to line with faces perpendicular to surface plane of concrete.
- B. Construction Joints: Install so strength and appearance of concrete are not impaired, at locations indicated or as approved by Architect.

- C. Contraction Joints in Slabs-on-Grade: Form weakened-plane contraction joints, sectioning concrete into areas as indicated. Construct contraction joints for a depth equal to at least one-fourth of concrete thickness, as follows:
  - 1. Grooved Joints: Form contraction joints after initial floating by grooving and finishing each edge of joint to a radius of 1/8 inch. Repeat grooving of contraction joints after applying surface finishes. Eliminate groover marks on concrete surfaces.
    - a. Use grooved joints for concrete surfaces that will be permanently exposed to view.
  - 2. Sawed Joints: Form contraction joints with power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut 1/8-inch- wide joints into concrete when cutting action does not tear, abrade, or otherwise damage surface and before concrete develops random contraction cracks.
    - a. Sawn joints shall not be used for concrete surfaces that will be permanently exposed to view.
- D. Isolation Joints in Slabs-on-Grade: After removing formwork, install joint-filler strips at slab junctions with vertical surfaces, such as column pedestals, foundation walls, grade beams, and other locations, as indicated.
  - 1. Extend joint-filler strips full width and depth of joint, terminating flush with finished concrete surface unless otherwise indicated.
- E. Doweled Joints: Install dowel bars and support assemblies at joints where indicated. Lubricate or asphalt coat one-half of dowel length to prevent concrete bonding to one side of joint.

### 3.6 CONCRETE PLACEMENT

- A. Comply with ACI 301 for placing concrete.
- B. Before placing concrete, verify that installation of formwork, reinforcement, and embedded items is complete and that required inspections have been performed. Reposition any misaligned reinforcement.
- C. Do not add water to concrete during delivery, at Project site, or during placement unless approved by Architect.
- D. Consolidate concrete with mechanical vibrating equipment according to ACI 301.
- E. Equipment Bases and Foundations:
  - 1. Coordinate sizes and locations of concrete bases with actual equipment provided.

2. Construct concrete bases 6 inches high unless otherwise indicated; and extend base not less than 6 inches in each direction beyond the maximum dimensions of supported equipment unless otherwise indicated or unless required for seismic anchor support.
3. Minimum Compressive Strength: 3000 psi at 28 days.
4. Install dowel rods to connect concrete base to concrete floor. Unless otherwise indicated, install dowel rods on 18-inch centers around the full perimeter of concrete base.
5. For supported equipment, install epoxy-coated anchor bolts that extend through concrete base, and anchor them into structural concrete substrate.
6. Prior to pouring concrete, place and secure anchorage devices. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
7. Cast anchor-bolt insert into bases. Install anchor bolts to elevations required for proper attachment to supported equipment.

### 3.7 FINISHING FORMED SURFACES

- A. Rough-Formed Finish: As-cast concrete texture imparted by form-facing material with tie holes and defects repaired and patched. Remove fins and other projections exceeding 1/2 inch.
  1. Apply to concrete surfaces not permanently exposed to public view.
- B. Smooth-Formed Finish: As-cast concrete texture imparted by form-facing material, arranged in an orderly and symmetrical manner with a minimum of seams. Repair and patch tie holes and defective areas. Remove fins and other projections exceeding 1/8 inch.
  1. Apply to concrete surfaces permanently exposed to public view.
- C. Related Unformed Surfaces: At tops of walls, horizontal offsets, and similar unformed surfaces adjacent to formed surfaces, strike off smooth and finish with a texture matching adjacent formed surfaces. Continue final surface treatment of formed surfaces uniformly across adjacent unformed surfaces unless otherwise indicated.

### 3.8 FINISHING SLABS

- A. General: Comply with ACI 302.1R for screeding, restraightening, and finishing operations for concrete surfaces. Do not wet concrete surfaces.
- B. Screed surfaces with a straightedge and strike off. Begin initial floating using bull floats or darbies to form a uniform and open-textured surface plane before excess moisture or bleedwater appears on surface.
  1. Do not further disturb surfaces before starting finishing operations.

- C. Scratch Finish: Apply scratch finish to surfaces indicated and surfaces to receive concrete floor topping or mortar setting beds for ceramic or quarry tile, portland cement terrazzo, and other bonded cementitious floor finishes unless otherwise indicated.
- D. Float Finish: Apply float finish to surfaces indicated, to surfaces to receive trowel finish, and to floor and slab surfaces to be covered with fluid-applied or sheet waterproofing, fluid-applied or direct-to-deck-applied membrane roofing, or sand-bed terrazzo.
- E. Trowel Finish: Apply a hard trowel finish to surfaces indicated and to floor and slab surfaces exposed to view or to be covered with resilient flooring, carpet, ceramic or quarry tile set over a cleavage membrane, paint, or another thin film-finish coating system.
- F. Trowel and Fine-Broom Finish: Apply a partial trowel finish, stopping after second troweling, to surfaces indicated and to surfaces where ceramic or quarry tile is to be installed by either thickset or thinset methods. Immediately after second troweling, and when concrete is still plastic, slightly scarify surface with a fine broom.
- G. Slip-Resistive Broom Finish: Apply a slip-resistive finish to surfaces indicated and to exterior concrete platforms, steps, and ramps. Immediately after float finishing, slightly roughen trafficked surface by brooming with fiber-bristle broom perpendicular to main traffic route.

### 3.9 CONCRETE PROTECTING AND CURING

- A. General: 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.
- B. Evaporation Retarder: Apply evaporation retarder to concrete surfaces if hot, dry, or windy conditions cause moisture loss approaching 0.2 lb/sq. ft. x h before and during finishing operations. Apply according to manufacturer's written instructions after placing, screeding, and bull floating or darbying concrete, but before float finishing.
- C. Begin curing after finishing concrete but not before free water has disappeared from concrete surface.
- D. Curing Methods: Cure formed and unformed concrete for at least seven days by one or a combination of the following methods:
  - 1. Moisture Curing: Keep surfaces continuously moist for not less than seven days with the following materials:
    - a. Water.
    - b. Continuous water-fog spray.
    - c. Absorptive cover, water saturated, and kept continuously wet. Cover concrete surfaces and edges with 12-inch lap over adjacent absorptive covers.

2. Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least 12 inches, and sealed by waterproof tape or adhesive. Cure for not less than seven days. Immediately repair any holes or tears during curing period, using cover material and waterproof tape.
3. Curing Compound: Apply uniformly in continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Maintain continuity of coating and repair damage during curing period.
4. Curing and Sealing Compound: Apply uniformly to floors and slabs indicated in a continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Repeat process 24 hours later and apply a second coat. Maintain continuity of coating and repair damage during curing period.

### 3.10 FIELD QUALITY CONTROL

- A. Testing and Inspecting Agency: Owner will engage and pay for a qualified independent testing and inspecting agency to perform tests and inspections as applicable and prepare reports.
  1. Testing and Inspection Agency shall be acceptable to the Architect and the Division of the State Architect.
- B. The Architect and the Division of the State Architect shall have the right to order the testing of any materials used in the concrete construction to determine if they are of the quality specified.
- C. Contractor Responsibilities:
  1. The Contractor shall maintain control of the quality of materials and workmanship in order to conform with the drawings and specifications.
  2. To facilitate testing and inspection, the Contractor shall:
    - a. Schedule tests and inspections with the Testing and Inspection Agency sufficiently in advance of operations to allow for the assignment of personnel and for the completion of testing and inspecting responsibilities.
    - b. Provide access to the Work for the designated Testing and Inspection Agency.
    - c. Furnish all necessary materials and labor to assist the designated Testing and Inspection Agency in obtaining and handling samples at the project or other sources of materials.
    - d. Provide and maintain for the sole use of the Testing and Inspection Agency adequate facilities for safe storage and proper curing of concrete test specimens on the project site for the first 24 hr. as required by ASTM C31.
  3. The Contractor shall correct deficiencies in Work that test reports and inspections indicate does not comply with the Contract Documents.

D. Testing and Inspection Services:

1. Testing and inspections shall be performed by the designated Testing and Inspection Agency.
2. Testing and inspections shall be in accordance with the 2019 California Building Code, Section 1705A.3 and Table 1705A.3, DSA Statement of Structural Tests and Inspections form DSA 103, Structural Drawings Special Inspection Criteria, and shall include but not be limited to the following:
  - a. Inspection of steel reinforcement.
  - b. Verification of use of required design mixture.
  - c. Sampling of concrete for strength tests, slump, air content, and temperature of concrete at time of placement.
  - d. Inspection of concrete placement, including conveying and depositing.
  - e. Inspection of curing procedures and maintenance of curing temperature.
  - f. Verification of concrete strength before removal of shores and forms from beams and slabs.
  - g. Inspection of formwork.

E. Tests: Perform according to ACI 301.

1. Testing Frequency: Obtain one composite sample for each day's pour of each concrete mixture exceeding 5 cu. yd., but less than 25 cu. yd., plus one set for each additional 50 cu. yd. or fraction thereof.

END OF SECTION





SECTION 033518  
CONCRETE CURE-SEALER-HARDENER

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:

- 1. Single application sealer-hardener for cured concrete floors.
- 2. Precautions for avoiding staining concrete before and after application.

- B. Related Sections:

- 1. Division 03 Section "Miscellaneous Cast-In-Place Concrete."

1.3 REFERENCES

- A. ASTM International (ASTM):

- 1. ASTM C39 Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens.
- 2. ASTM C779 Standard Test Method for Abrasion Resistance of Horizontal Concrete Surfaces.
- 3. ASTM C805 Standard Test Method for Rebound Number of Hardened Concrete.
- 4. ASTM C1028 Standard Test Method for Determining the Static Coefficient of Friction of Ceramic Tile and Other Like Surfaces by the Horizontal Dynamometer Pull-Meter Method.
- 5. ASTM D3359 Standard Test Methods for Measuring Adhesion by Tape Test.
- 6. ASTM G23 Practice for Operating Light-Exposure Apparatus (Carbon-Arc Type) With and Without Water for Exposure of Nonmetallic Materials (Withdrawn 2000).

1.4 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Qualification Data: For qualified installer.
- C. Maintenance Data: Maintenance instructions, including precautions for avoiding staining after application.

## 1.5 QUALITY ASSURANCE

- A. Installer Qualifications: A qualified installer who is certified in writing by manufacturer as qualified to install manufacturer's products.
- B. VOC Content: Provide materials that comply with VOC limits of authorities having jurisdiction.

## 1.6 DELIVERY, STORAGE & HANDLING

- A. Delivery: Deliver materials in manufacturer's original, unopened, undamaged containers with identification labels intact.
- B. Storage and Protection: Store materials protected from exposure to harmful environmental conditions and at temperature and humidity conditions recommended by the manufacturer.
- C. Handling: Protect materials from dirt, corrosion, oil, grease and other contaminants.

## PART 2 - PRODUCTS

### 2.1 CURE-SEAL-HARDENER

- A. Basis of Design: Drawings and Specifications are based on the following:
  - 1. Curecrete Distribution, Inc.; Ashford Formula.
    - a. Subject to compliance with requirements, submit specified product or a comparable product subject to request for substitution.
- B. Cure-Seal-Hardener: Water-based chemically reactive penetrating sealer and hardener that seals by densifying concrete so that water molecules cannot pass through but air and water vapor can, and allows concrete to achieve full compressive strength, minimizing surface crazing and eliminating dusting.
  - 1. Abrasion Resistance to Revolving Disks: At least a 32.5% improvement over untreated samples when tested in accordance with ASTM C779.
  - 2. Surface Adhesion: At least a 22% increase in adhesion for epoxy when tested in accordance with ASTM D3359.
  - 3. Hardening: As follows when tested in accordance with ASTM C39:
    - a. After 7 Days: An increase of at least 40% over untreated samples.
    - b. After 28 Days: An increase of at least 38% over untreated samples.
  - 4. Coefficient of Friction: 0.86 dry, 0.69 wet when tested in accordance with ASTM C1028.
  - 5. Rebound Number: An increase of at least 13.3% over untreated samples when tested in accordance with ASTM C805.

6. Light Exposure Degradation: No evidence of adverse effects on treated samples when tested in accordance with ASTM G23.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine substrates and conditions, with Installer present, for conditions affecting performance of the Work of this Section.
- B. Proceed with application only after unsatisfactory conditions have been corrected.

### 3.2 PREPARATION

- A. Clean surfaces thoroughly prior to installation.
- B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.
- C. Do not use frozen material. Thaw and agitate prior to use.
- D. If construction equipment must be used for application, diaper all components that might drip oil, hydraulic fluid or other liquids.

### 3.3 INSTALLATION

- A. General: Comply with manufacturer's product data, including product technical bulletins, product catalog installation instructions and product carton instructions for installation.
  1. Apply cure-seal-hardener to exposed interior concrete floor slabs indicated to have a sealed concrete finish.
- B. Existing or Cured Concrete: Apply cure-seal-hardener only to clean bare concrete.
  1. Thoroughly remove previous treatments, laitance, oil and other contaminants.
  2. Saturate surface with cure-seal-hardener; re-spray or broom excess onto dry spots.
  3. Keep surface wet with cure-seal-hardener for a minimum soak-in period of 30 to 40 minutes.
  4. If most of the material has been absorbed after the 30 minute soak-in period, remove all excess material, especially from low spots, using broom or squeegee.
  5. If most of the material remains on the surface after the 30 minute soak-in period, wait until the surface becomes slippery and then flush with water, removing all cure-seal-hardener residue. Squeegee completely dry, flushing any remaining slippery areas until no residue remains.
  6. If water is not available, remove residue using squeegee.

### 3.4 PROTECTION

- A. Protect installed floors for at least 3 months until chemical reaction process is complete.
1. Do not allow traffic on floors for 3 hours after application.
  2. Do not allow parking of vehicles on concrete slab.
  3. If vehicles must be temporarily parked on slab, place dropcloths under vehicles during entire time parked.
  4. Do not allow pipe cutting using pipe cutting machinery on concrete slab.
  5. Do not allow temporary placement and storage of steel members on concrete slabs.
  6. Clean up spills immediately and spot-treat stains with degreaser or oil emulsifier.
  7. Clean floor regularly in accordance with manufacturer's recommendations.

END OF SECTION

SECTION 042613  
MASONRY VENEER

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:
  - 1. Decorative concrete masonry units.
  - 2. Mortar.
  - 3. Ties and anchors.
  - 4. Miscellaneous masonry accessories.

1.3 SUBMITTALS

- A. Product Data: For each type of product indicated or incorporated into the Work.
- B. Shop Drawings: For the following:
  - 1. Masonry Units: Show sizes, profiles, coursing, and locations of special shapes.
- C. Samples for Initial Selection:
  - 1. Decorative CMUs, in the form of small-scale units.
  - 2. Colored mortar.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Store masonry units on elevated platforms in a dry location. If units are not stored in an enclosed location, cover tops and sides of stacks with waterproof sheeting, securely tied. If units become wet, do not install until they are dry.
- B. Store cementitious materials on elevated platforms, under cover, and in a dry location. Do not use cementitious materials that have become damp.
- C. Store aggregates where grading and other required characteristics can be maintained and contamination avoided.

- D. Deliver preblended, dry mortar mix in moisture-resistant containers. Store preblended, dry mortar mix in delivery containers on elevated platforms in a dry location or in covered weatherproof dispensing silos.
- E. Store masonry accessories, including metal items, to prevent corrosion and accumulation of dirt and oil.

## 1.5 FIELD CONDITIONS

- A. Protection of Masonry: During construction, cover tops of veneer, projections, and sills with waterproof sheeting at end of each day's work. Cover partially completed masonry when construction is not in progress.
  - 1. Extend cover a minimum of 24 inches down face of veneer, and hold cover securely in place.
- B. Stain Prevention: Prevent grout, mortar, and soil from staining the face of masonry. Immediately remove grout, mortar, and soil that come in contact with masonry.
  - 1. Protect base of walls from rain-splashed mud and from mortar splatter by spreading coverings on ground and over wall surface.
  - 2. Protect sills, ledges, and projections from mortar droppings.
  - 3. Protect surfaces of window and door frames, as well as similar products with painted and integral finishes, from mortar droppings.
  - 4. Turn scaffold boards near the wall on edge at the end of each day to prevent rain from splashing mortar and dirt onto completed masonry.
- C. Cold-Weather Requirements: Do not use frozen materials or materials mixed or coated with ice or frost. Do not build on frozen substrates. Remove and replace unit masonry damaged by frost or by freezing conditions. Comply with cold-weather construction requirements contained in TMS 602/ACI 530.1/ASCE 6.
- D. Hot-Weather Requirements: Comply with hot-weather construction requirements contained in TMS 602/ACI 530.1/ASCE 6.

## 1.6 COORDINATION

- A. Coordinate work of other trades for installation of metal trim, flashing, and similar items to be built into masonry veneer.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

- A. Source Limitations for Masonry Units: Obtain exposed masonry units of a uniform texture and color, or a uniform blend within the ranges accepted for these characteristics, from a single source from a single manufacturer for each product required.

- B. Source Limitations for Mortar Materials: Obtain mortar ingredients of a uniform quality, including color for exposed masonry, from a single manufacturer for each cementitious component and from single source or producer for each aggregate.

## 2.2 UNIT MASONRY, GENERAL

- A. Masonry Standard: Comply with TMS 602/ACI 530.1/ASCE 6, except as modified by requirements in the Contract Documents.
- B. Defective Units: Referenced masonry unit standards may allow a certain percentage of units to contain chips, cracks, or other defects exceeding limits stated. Do not use units where such defects will be exposed in the completed Work.

## 2.3 CONCRETE MASONRY UNITS

- A. Shapes: Provide shapes indicated and as follows, with exposed surfaces matching exposed faces of adjacent units unless otherwise indicated.
- B. Decorative CMUs: ASTM C90.
  - 1. Density Classification: Medium weight.
  - 2. Size (Width): Manufactured to dimensions 3/8 inch less than nominal dimensions.
    - a. 4 x 8 x 16 inch nominal, 3 5/8 x 7 5/8 x 15 5/8 inch actual.
    - b. 4 x 8 x 8 inch nominal, 3 5/8 x 7 5/8 x 7 5/8 inch actual.
  - 3. Pattern and Texture:
    - a. Precision-face finish, match existing.
    - b. Rib-split, match existing.
  - 4. Colors: Match existing.

## 2.4 MORTAR MATERIALS

- A. Portland Cement: ASTM C150/C150M, Type I or II, except Type III may be used for cold-weather construction. Provide natural color or white cement as required to produce mortar color indicated.
  - 1. Alkali content shall not be more than 0.1 percent when tested according to ASTM C114.
- B. Hydrated Lime: ASTM C207, Type S.
- C. Portland Cement-Lime Mix: Packaged blend of portland cement and hydrated lime containing no other ingredients.
- D. Masonry Cement: ASTM C91/C91M.

- E. Mortar Cement: ASTM C1329/C1329M.
- F. Mortar Pigments: Natural and synthetic iron oxides and chromium oxides, compounded for use in mortar mixes and complying with ASTM C 979. Use only pigments with a record of satisfactory performance in masonry mortar.
  - 1. Products: Subject to compliance with requirements, provide one of the following:
    - a. Davis Colors; True Tone Mortar Colors.
    - b. Approved equivalent.
- G. Colored Cement Product: Packaged blend made from portland cement and lime, masonry cement, or mortar cement and mortar pigments, all complying with specified requirements, and containing no other ingredients.
  - 1. Formulate blend as required to match existing color.
  - 2. Pigments shall not exceed 10 percent of portland cement by weight.
  - 3. Pigments shall not exceed 5 percent of masonry cement or mortar cement by weight.
  - 4. Products:
    - a. Colored Portland Cement-Lime Mix:
      - 1) Capital Materials Corporation; Riverton Portland Cement Lime Custom Color.
      - 2) Holcim (US) Inc.; Rainbow Mortamix Custom Color Cement/Lime.
      - 3) Lafarge North America Inc.; Eaglebond.
      - 4) Lehigh Cement Company; Lehigh Custom Color Portland/Lime Cement.
      - 5) Or approved equal.
    - b. Colored Masonry Cement:
      - 1) Capital Materials Corporation; Flamingo Color Masonry Cement.
      - 2) Essroc, Italcementi Group; Brixment-in-Color.
      - 3) Holcim (US) Inc.; Rainbow Mortamix Custom Color Masonry Cement.
      - 4) Lafarge North America Inc.; Florida Custom Color Masonry or Magnolia Masonry Cement.
      - 5) Lehigh Cement Company; Lehigh Custom Color Masonry Cement.
      - 6) National Cement Company, Inc.; Coosa Masonry Cement.
      - 7) Or approved equal.
    - c. Colored Mortar Cement:
      - 1) Lafarge North America Inc.; Magnolia Superbond Mortar Cement.
      - 2) Or approved equal.



H. Aggregate for Mortar: ASTM C 144.

1. For mortar that is exposed to view, use washed aggregate consisting of natural sand or crushed stone.
2. For joints less than 1/4 inch thick, use aggregate graded with 100 percent passing the No. 16 sieve.
3. White-Mortar Aggregates: Natural white sand or crushed white stone.
4. Colored-Mortar Aggregates: Natural sand or crushed stone of color necessary to produce required mortar color.

I. Water: Potable.

## 2.5 TIES, ANCHORS AND JOINT REINFORCEMENT

A. General: Ties and anchors shall extend at least 1-1/2 inches into veneer but with at least a 5/8-inch cover on outside face. Anchor shall provide a hook, clip, notch, or other means to mechanically engage the joint reinforcement.

B. Materials: Provide ties, anchors and joint reinforcement specified in this article that are made from materials that comply with the following unless otherwise indicated:

1. Hot-Dip Galvanized, Carbon-Steel Wire: ASTM A82/A82M, with ASTM A153/A153M, Class B-2 coating.
2. Steel Sheet, Galvanized after Fabrication: ASTM A1008/A1008M, Commercial Steel, with ASTM A153/A153M, Class B coating.
3. Joint Reinforcement: ASTM A951/A951M, with ASTM A153/A153M, Class B, minimum coating of 1.5 oz/ft<sup>2</sup>

C. Masonry Veneer Joint Reinforcement: Provide continuous single wire joint reinforcement of wire size W1.7 (MW11).

D. Corrugated-Metal Ties: Metal strips not less than 7/8 inch wide with corrugations having a wavelength of 0.3 to 0.5 inch and an amplitude of 0.06 to 0.10 inch made from 0.030-inch-thick, steel sheet, galvanized after fabrication.

E. Adjustable Masonry-Veneer Anchors:

1. General: Provide anchors that allow vertical adjustment but resist a 100-lbf load in both tension and compression perpendicular to plane of wall without deforming or developing play in excess of 1/16 inch.
2. Fabricate sheet metal anchor sections and other sheet metal parts from 0.075-inch-thick steel sheet, galvanized after fabrication.
3. Fabricate wire ties from 0.187-inch-diameter, hot-dip galvanized steel wire unless otherwise indicated.
4. Fabricate wire connector sections from 0.187-inch-diameter, hot-dip galvanized, carbon steel wire.

## 2.6 MISCELLANEOUS MASONRY ACCESSORIES

- A. Compressible Filler: Premolded filler strips complying with ASTM D1056, Grade 2A1; compressible up to 35 percent; of width and thickness indicated; formulated from neoprene, urethane or PVC.

## 2.7 MASONRY CLEANERS

- A. Proprietary Acidic Cleaner: Manufacturer's standard-strength cleaner designed for removing mortar/grout stains, efflorescence, and other new construction stains from new masonry without discoloring or damaging masonry surfaces. Use product expressly approved for intended use by cleaner manufacturer and manufacturer of masonry units being cleaned.
  - 1. Manufacturers: Subject to compliance with requirements, provide one of the following:
    - a. Diedrich Technologies, Inc.
    - b. EaCo Chem, Inc.
    - c. ProSoCo, Inc.
    - d. Approved equivalent.

## 2.8 MORTAR MIXES

- A. General: Do not use admixtures, including pigments, air-entraining agents, accelerators, retarders, water-repellent agents, antifreeze compounds, or other admixtures unless otherwise indicated.
  - 1. Do not use calcium chloride in mortar or grout.
  - 2. Limit cementitious materials in mortar to portland cement, mortar cement, and lime.
- B. Preblended, Dry Mortar Mix: Furnish dry mortar ingredients in form of a preblended mix. Measure quantities by weight to ensure accurate proportions, and thoroughly blend ingredients before delivering to Project site.
- C. Mortar for Unit Masonry: Comply with ASTM C270, Proportion Specification. Use Type S unless another type is indicated.
- D. Pigmented Mortar: Use colored cement product or select and proportion pigments with other ingredients to produce color required. Do not add pigments to colored cement products.
  - 1. Pigments shall not exceed 5 percent of masonry cement or mortar cement by weight.
  - 2. Mix to match existing.
  - 3. Application: Use pigmented mortar for exposed mortar joints.

- E. Colored-Aggregate Mortar: Produce required mortar color by using colored aggregates and natural color or white cement as necessary to produce required mortar color.
  - 1. Mix to match existing.
  - 2. Application: Use colored aggregate mortar for exposed mortar joints.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
  - 1. For the record, prepare written report, endorsed by Installer, listing conditions detrimental to performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 INSTALLATION, GENERAL

- A. Use full-size units without cutting if possible. If cutting is required to provide a continuous pattern or to fit adjoining construction, cut units with motor-driven saws; provide clean, sharp, unchipped edges. Allow units to dry before laying unless wetting of units is specified. Install cut units with cut surfaces and, where possible, cut edges concealed.
- B. Select and arrange units for exposed unit masonry to produce a uniform blend of colors and textures. Mix units from several pallets or cubes as they are placed.
- C. Matching Existing Masonry: Match coursing, bonding, color, and texture of existing masonry.

### 3.3 TOLERANCES

- A. Dimensions and Locations of Elements:
  - 1. For dimensions in cross section or elevation, do not vary by more than plus 1/2 inch or minus 1/4 inch.
  - 2. For location of elements in plan, do not vary from that indicated by more than plus or minus 1/2 inch.
  - 3. For location of elements in elevation, do not vary from that indicated by more than plus or minus 1/4 inch in a story height or 1/2 inch total.

B. Lines and Levels:

1. For bed joints and top surfaces of bearing walls, do not vary from level by more than 1/4 inch in 10 feet, or 1/2 inch maximum.
2. For conspicuous horizontal lines, such as lintels, sills, parapets, and reveals, do not vary from level by more than 1/8 inch in 10 feet, 1/4 inch in 20 feet, or 1/2 inch maximum.
3. For vertical lines and surfaces, do not vary from plumb by more than 1/4 inch in 10 feet, 3/8 inch in 20 feet, or 1/2 inch maximum.
4. For conspicuous vertical lines, such as external corners, door jambs, reveals, and expansion and control joints, do not vary from plumb by more than 1/8 inch in 10 feet, 1/4 inch in 20 feet, or 1/2 inch maximum.
5. For lines and surfaces, do not vary from straight by more than 1/4 inch in 10 feet, 3/8 inch in 20 feet, or 1/2 inch maximum.
6. For vertical alignment of exposed head joints, do not vary from plumb by more than 1/4 inch in 10 feet, or 1/2 inch maximum.
7. For faces of adjacent exposed masonry units, do not vary from flush alignment by more than 1/16 inch except due to warpage of masonry units within tolerances specified for warpage of units.

C. Joints:

1. For bed joints, do not vary from thickness indicated by more than plus or minus 1/8 inch, with a maximum thickness limited to 1/2 inch.
2. For exposed bed joints, do not vary from bed-joint thickness of adjacent courses by more than 1/8 inch.
3. For head and collar joints, do not vary from thickness indicated by more than plus 3/8 inch or minus 1/4 inch.
4. For exposed head joints, do not vary from thickness indicated by more than plus or minus 1/8 inch. Do not vary from adjacent bed-joint and head-joint thicknesses by more than 1/8 inch.
5. For exposed bed joints and head joints of stacked bond, do not vary from a straight line by more than 1/16 inch from one masonry unit to the next.

### 3.4 LAYING MASONRY WALLS

- A. Lay out walls in advance for accurate spacing of surface bond patterns with uniform joint thicknesses and for accurate location of openings, movement-type joints, returns, and offsets. Avoid using less-than-half-size units, particularly at corners, jambs, and, where possible, at other locations.
- B. Bond Pattern for Exposed Masonry: Lay exposed masonry to match existing.
- C. Stopping and Resuming Work: Stop work by stepping back units in each course from those in course below; do not tooth. When resuming work, clean masonry surfaces that are to receive mortar, remove loose masonry units and mortar, and wet brick if required before laying fresh masonry.
- D. Built-in Work: As construction progresses, build in items specified in this and other Sections. Fill in solidly with masonry around built-in items.

- E. Fill space between steel frames and masonry solidly with mortar unless otherwise indicated.

### 3.5 MORTAR BEDDING AND JOINTING

- A. Lay masonry units with completely filled bed and head joints; butter ends with sufficient mortar to fill head joints and shove into place. Do not deeply furrow bed joints or slush head joints.
- B. Tool exposed joints slightly concave when thumbprint hard, using a jointer larger than joint thickness unless otherwise indicated.

### 3.6 ANCHORED MASONRY VENEERS

- A. Anchor masonry veneers to wall framing with masonry-veneer anchors to comply with the following requirements:
  - 1. Fasten anchors through sheathing to wall framing with metal fasteners of type indicated. Use two fasteners unless anchor design only uses one fastener.
  - 2. Embed anchor and joint reinforcement in masonry joints.
  - 3. Locate anchor sections to allow maximum vertical differential movement of ties up and down.
  - 4. Space anchors as indicated, but not more than 16 inches on center vertically and 16 inches on center horizontally, with not less than one anchor for each 2 square feet of wall area. Install additional anchors within 12 inches of openings and at intervals, not exceeding 8 inches, around perimeter.

### 3.7 LINTELS

- A. Install steel lintels where indicated.
- B. Provide minimum bearing of 8 inches at each jamb unless otherwise indicated.

### 3.8 FIELD QUALITY CONTROL

- A. Testing and Inspecting Agency: Owner will engage and pay for a qualified independent testing and inspecting agency to perform tests and inspections as applicable and prepare reports.
  - 1. Testing and Inspection Agency shall be acceptable to the Architect and the Division of the State Architect.
- B. The Architect and the Division of the State Architect shall have the right to order the testing of any materials used in the masonry construction to determine if they are of the quality specified.

C. Contractor Responsibilities:

1. The Contractor shall maintain control of the quality of materials and workmanship in order to conform with the drawings and specifications.
2. To facilitate testing and inspection, the Contractor shall:
  - a. Schedule tests and inspections with the Testing and Inspection Agency sufficiently in advance of operations to allow for the assignment of personnel and for the completion of testing and inspecting responsibilities.
  - b. Provide access to the Work for the designated Testing and Inspection Agency.
  - c. Furnish all necessary materials and labor to assist the designated Testing and Inspection Agency in obtaining and handling samples at the project or other sources of materials.
  - d. Provide and maintain for the sole use of the Testing and Inspection Agency adequate facilities for safe storage and proper curing of test specimens on the project site.
3. The Contractor shall correct deficiencies in Work that test reports and inspections indicate does not comply with the Contract Documents.

D. Testing and Inspection Services:

1. Testing and inspections shall be performed by the designated Testing and Inspection Agency.
2. Testing and inspections shall be in accordance with the 2019 California Building Code, Section 1705A.4, TMS 402-16, Table 3 (Level 2), and DSA Testing and Inspections form DSA 103.
3. Begin masonry construction only after inspectors have verified proportions of site-prepared mortar.

E. Additional testing and inspecting will be performed to determine compliance of replaced or additional work with specified requirements.

1. The cost of additional testing and inspection of replaced work will be paid for by the Owner with the amount being deducted from the Contract Amount by a Change Order.

### 3.9 REPAIRING, POINTING, AND CLEANING

- A. Remove and replace masonry units that are loose, chipped, broken, stained, or otherwise damaged or that do not match adjoining units. Install new units to match adjoining units; install in fresh mortar, pointed to eliminate evidence of replacement.
- B. Pointing: During the tooling of joints, enlarge voids and holes, except weep holes, and completely fill with mortar. Point up joints, including corners, openings, and adjacent construction, to provide a neat, uniform appearance. Prepare joints for sealant application, where indicated.

- C. In-Progress Cleaning: Clean unit masonry as work progresses by dry brushing to remove mortar fins and smears before tooling joints.
- D. Final Cleaning: After mortar is thoroughly set and cured, clean exposed masonry as follows:
  - 1. Remove large mortar particles by hand with wooden paddles and nonmetallic scrape hoes or chisels.
  - 2. Test cleaning methods on sample wall panel; leave one-half of panel uncleaned for comparison purposes. Obtain Architect's approval of sample cleaning before proceeding with cleaning of masonry.
  - 3. Protect adjacent stone and nonmasonry surfaces from contact with cleaner by covering them with liquid strippable masking agent or polyethylene film and waterproof masking tape.
  - 4. Wet wall surfaces with water before applying cleaners; remove cleaners promptly by rinsing surfaces thoroughly with clear water.
  - 5. Clean masonry with a proprietary acidic cleaner applied according to manufacturer's written instructions.

### 3.10 MASONRY WASTE DISPOSAL

- A. Salvageable Materials: Unless otherwise indicated, excess masonry materials are Contractor's property. At completion of unit masonry work, remove from Project site and recycle or legally dispose of off Owner's property.

END OF SECTION





SECTION 055000  
METAL FABRICATIONS

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:

- 1. Steel framing and supports for applications where framing and supports are not specified in other Sections.
- 2. Steel framing and supports for mechanical and electrical equipment.
- 3. Steel weld plates and angles for casting into concrete not specified in other Sections.

B. Related Sections:

- 1. Division 03 Section "Miscellaneous Cast-in-Place Concrete" for installing anchor bolts, steel pipe sleeves, wedge-type inserts and other items indicated to be cast into concrete.

1.3 SUBMITTALS

A. Product Data: For the following:

- 1. Fasteners.
- 2. Shop primers.
- 3. Shrinkage-resisting grout.
- 4. Slotted channel framing.

- B. Shop Drawings: For metal fabrications, include plans, elevations, sections, and details of metal fabrications and their connections; show anchorage and accessory items. Show fabrication and installation details for metal fabrications.

C. Welding certificates.

- D. Paint Compatibility Certificates: From manufacturers of topcoats applied over shop primers, certifying that shop primers are compatible with topcoats.

E. Research Reports: For post-installed anchors.

#### 1.4 QUALITY ASSURANCE

- A. Installer Qualifications: Fabricator of products.
- B. Welding Qualifications: Qualify procedures and personnel according to the following:
  - 1. AWS D1.1, "Structural Welding Code--Steel."
  - 2. AWS D1.3, "Structural Welding Code--Sheet Steel."

#### 1.5 FIELD CONDITIONS

- A. Field Measurements: Verify actual locations of in-place construction contiguous with metal fabrications by field measurements before fabrication and indicate measurements on Shop Drawings.
  - 1. Established Dimensions: Where field measurements cannot be made without delaying the Work, establish dimensions and proceed with fabricating metal fabrications without field measurements. Coordinate contiguous construction to ensure that actual dimensions correspond to established dimensions.

#### 1.6 COORDINATION

- A. Coordinate selection of shop primers with topcoats to be applied over them. Comply with paint and coating manufacturers' written instructions to ensure that shop primers and topcoats are compatible with one another.
- B. Coordinate installation of metal fabrications that are anchored to or that receive other work. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.
- C. Schedule installation so wall attachments are made only to completed walls. Do not support metal fabrications temporarily by any means that do not satisfy structural performance requirements.

### PART 2 - PRODUCTS

#### 2.1 PERFORMANCE REQUIREMENTS

- A. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes acting on exterior metal fabrications by preventing buckling, opening of joints, overstressing of components, failure of connections, and other detrimental effects.
  - 1. Temperature Change: 120 deg. F ambient; 180 deg F, material surfaces.

## 2.2 METAL PRODUCTS

- A. Metal Surfaces, General: Provide materials with smooth, flat surfaces, unless otherwise indicated. For metal fabrications exposed to view in the completed Work, provide materials without seam marks, roller marks, rolled trade names, or blemishes.
- B. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.
- C. Steel Tubing: ASTM A 500, cold-formed steel tubing.
- D. Steel Pipe: ASTM A 53/A 53M, standard weight (Schedule 40), unless another weight is indicated or required by structural loads.
  - 1. Provide galvanized finish for exterior installations where indicated.
- E. Slotted Steel Channel Framing: Cold-formed metal box channels (struts) complying with MFMA-4.
  - 1. Basis of Design: Unistrut Corporation; P1000 Channel Framing System.
  - 2. Size of Channels: 1-5/8 by 1-5/8 inches.
  - 3. Channel Material: Galvanized steel, ASTM A 653/A 653M, structural steel, Grade 33, with G90 coating; 0.108-inch (12 gage) nominal thickness.
  - 4. Material for Fittings: Steel conforming to ASTM A 575, A 576, A 36, or A635; with finish matching channels.
- F. Galvanized Steel Sheet: ASTM A 653/A 653M, G90 coating, structural steel, Grade 33, unless another grade is required by design loads.

## 2.3 FASTENERS

- A. General: Unless otherwise indicated, provide Type 304 stainless-steel fasteners for exterior use and zinc-plated fasteners with coating complying with ASTM B 633, Class Fe/Zn 5, at exterior walls. Select fasteners for type, grade, and class required.
- B. Steel Bolts and Nuts: Regular hexagon-head bolts, ASTM A 307, Grade A; with hex nuts, ASTM A 563; and, where indicated, flat washers.
- C. Stainless-Steel Bolts and Nuts: Regular hexagon-head annealed stainless-steel bolts, ASTM F 593; with hex nuts, ASTM F 594; and, where indicated, flat washers; Alloy Group 1.
- D. Anchor Bolts and Unheaded Rods: ASTM F 1554, Grade 36, of dimensions indicated; with nuts, ASTM A 563; and, where indicated, flat washers.
  - 1. Hot-dip galvanize or provide mechanically deposited, zinc coating where item being fastened is indicated to be galvanized.

## 2.4 MISCELLANEOUS MATERIALS

- A. Welding Rods and Bare Electrodes: Select according to AWS specifications for metal alloy welded.
- B. Shop Primers: Provide primers that comply with Division 09 Section "Painting."
- C. Galvanizing Repair Paint: High-zinc-dust-content paint complying with SSPC-Paint 20 and compatible with paints specified to be used over it.
- D. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D 1187.
- E. Shrinkage-Resistant Grout: Factory-packaged, nonmetallic, nonstaining, noncorrosive, nongaseous grout complying with ASTM C1107/C1107M. Provide grout specifically recommended by manufacturer for interior and exterior applications.
- F. Concrete: Comply with requirements in Division 03 Section "Miscellaneous Cast-in-Place Concrete" for normal-weight, air-entrained, ready-mix concrete with a minimum 28-day compressive strength of 3000 psi, unless otherwise indicated.

## 2.5 FABRICATION, GENERAL

- A. Shop Assembly: Preassemble items in the shop to greatest extent possible. Disassemble units only as necessary for shipping and handling limitations. Use connections that maintain structural value of joined pieces. Clearly mark units for reassembly and coordinated installation.
- B. Cut, drill, and punch metals cleanly and accurately. Remove burrs and ease edges to a radius of approximately 1/32 inch, unless otherwise indicated. Remove sharp or rough areas on exposed surfaces.
- C. Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing work.
- D. Form exposed work true to line and level with accurate angles and surfaces and straight edges.
- E. Weld connections, corners, and seams continuously, unless otherwise indicated, to comply with the following:
  - 1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
  - 2. Obtain fusion without undercut or overlap.
  - 3. Remove welding flux immediately.
  - 4. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface.
  - 5. Cope ends of pipe or round tubing at connections to provide close fit.

- F. Form exposed connections with hairline joints, flush and smooth, using concealed fasteners where possible. Where exposed fasteners are required, use Phillips flat-head (countersunk) screws or bolts, unless otherwise indicated. Locate joints where least conspicuous.
- G. Fabricate seams and connections that will be exposed to weather in a manner that excludes water. Provide weep holes for drainage where water may accumulate.
- H. Cut, reinforce, drill, and tap metal fabrications as indicated to receive finish hardware, screws, and similar items.
- I. Provide for anchorage of type indicated on Drawings; coordinate with supporting structure. Space anchoring devices to secure metal fabrications rigidly in place and to support indicated loads.

## 2.6 MISCELLANEOUS FRAMING AND SUPPORTS

- A. General: Provide steel framing and supports not specified in other Sections as indicated on the Drawings and as needed to complete the Work.
- B. Fabricate miscellaneous framing and supports from steel shapes, plates, and bars of welded construction to sizes, shapes, and profiles indicated and as necessary to receive adjacent construction retained by miscellaneous framing and supports.
  - 1. Drill, cut, and tap miscellaneous framing and supports to field bolted connections and to receive hardware, hangers, and similar items.
- C. Prime miscellaneous framing and supports used at interior applications.
- D. Galvanize miscellaneous framing and supports used for exterior applications or where indicated.

## 2.7 STEEL WELD PLATES AND ANGLES

- A. Provide steel weld plates and angles not specified in other Sections, for items supported from concrete construction as needed to complete the Work. Provide each unit with not less than two integrally welded steel strap anchors for embedding in concrete.

## 2.9 STEEL FINISHES

- A. Finish metal fabrications after assembly.
- B. Finish exposed surfaces to remove tool and die marks and stretch lines, and to blend into surrounding surface.

- C. Galvanizing: Hot-dip galvanize exterior items and items indicated to be galvanized after fabrication to comply with ASTM A153/A153M for steel and iron hardware and with ASTM A123/A123M for other steel and iron products.
1. Do not quench or apply post galvanizing treatments that might interfere with paint adhesion.
  2. Fill vent and drain holes that are exposed in the finished Work, unless indicated to remain as weep holes, by plugging with zinc solder and filing off smooth.
- D. Shop Priming: Shop prime items not to be galvanized unless they are to remain unfinished or are embedded in concrete, or masonry, or unless otherwise indicated; shop prime galvanized items that are to receive field applied top coats.
1. Preparation of Surfaces:
    - a. Cleaning of Galvanized Items for Shop Priming: Where galvanized items are to receive field applied top coats, prepare for priming after galvanizing by thoroughly cleaning galvanized surfaces of grease, dirt, oil, flux, and other foreign matter, and treat with metallic phosphate process.
    - b. Surface Preparation: Prepare surfaces to comply with the following:
      - 1) Non-Galvanized Items:
        - a) Exterior Items: SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."
        - b) Other Steel Items: SSPC-SP 3, "Power Tool Cleaning."
      - 2) Galvanized-Steel Items: SSPC-SP 16, "Brush-off Blast Cleaning of Coated and Uncoated Galvanized Steel, Stainless Steels, and Non-Ferrous Metals."
  2. Shop Priming: Apply shop primer to comply with SSPC-PA 1, "Paint Application Specification No. 1: Shop, Field, and Maintenance Painting of Steel," for shop painting.
    - a. Stripe paint corners, crevices, bolts, welds, and sharp edges.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine framing and conditions by other Specification Sections where reinforced to receive anchors, to verify that locations of concealed reinforcements are clearly marked for Installer. Locate reinforcements and mark locations if not already done.

### 3.2 INSTALLATION, GENERAL

- A. Cutting, Fitting, and Placement: Perform cutting, drilling, and fitting required for installing metal fabrications. Set metal fabrications accurately in location, alignment, and elevation; with edges and surfaces level, plumb, true, and free of rack; and measured from established lines and levels.
- B. Fit exposed connections accurately together to form hairline joints. Weld connections that are not to be left as exposed joints but cannot be shop welded because of shipping size limitations. Do not weld, cut, or abrade surfaces of exterior units that have been hot-dip galvanized after fabrication and are for bolted or screwed field connections.
- C. Field Welding: Comply with the following requirements:
  - 1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
  - 2. Obtain fusion without undercut or overlap.
  - 3. Remove welding flux immediately.
  - 4. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface.
- D. Fastening to In-Place Construction: Provide anchorage devices and fasteners where metal fabrications are required to be fastened to in-place construction. Provide threaded fasteners for use with concrete and masonry inserts, toggle bolts, through bolts, lag bolts, wood screws, and other connectors.
- E. Provide temporary bracing or anchors in formwork for items that are to be built into concrete, masonry, or similar construction.

### 3.3 INSTALLING MISCELLANEOUS FRAMING AND SUPPORTS

- A. General: Install framing and supports as indicated on Drawings and to comply with requirements of items being supported, including manufacturers' written instructions and requirements indicated on Shop Drawings.
- B. Anchor support framing securely to, and rigidly brace from, building structure.

### 3.4 REPAIRS

- A. Touchup Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas. Paint uncoated and abraded areas with the same material as used for shop painting to comply with SSPC-PA 1 for touching up shop-painted surfaces.
  - 1. Apply by brush or spray to provide a minimum 2.0-mil dry film thickness.

- B. Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas and repair galvanizing to comply with ASTM A 780.

END OF SECTION



SECTION 061000  
ROUGH CARPENTRY

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:

- 1. Framing with dimension lumber.
- 2. Framing with timber.
- 3. Wood blocking and nailers.
- 4. Wood furring

- B. Related Sections:

- 1. Division 06 Section "Plywood Panel Sheathing" for structural use panel sheathing.

1.3 DEFINITIONS

- A. Boards or Strips: Lumber of less than 2 inches nominal size in least dimension.
- B. Dimension Lumber: Lumber of 2 inches nominal or greater but less than 5 inches nominal in least dimension.
- C. Exposed Framing: Framing not concealed by other construction.
- D. Timber: Lumber of 5 inches nominal or greater in least dimension.

1.4 SUBMITTALS

- A. Product Data: For each type of process and factory-fabricated product. Indicate component materials and dimensions and include construction and application details.
  - 1. Include data for wood-preservative treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements. Indicate type of preservative used and net amount of preservative retained.
  - 2. For products receiving a waterborne treatment, include statement that moisture content of treated materials was reduced to levels specified before shipment to Project site.

- B. Research/Evaluation Reports: From ICC-ES or IAPMO ES, for the following,:
  - 1. Wood-preservative-treated wood.
  - 2. Power-driven fasteners.
  - 3. Powder-actuated fasteners.
  - 4. Post installed concrete anchors.
  - 5. Metal framing anchors.

## 1.5 REFERENCED CODES AND STANDARDS

- A. California Code of Regulations, Title 24, Part 2, California Building Code, 2019 Edition.
- B. American Wood Council (AWC):
  - 1. National Design Specification for Wood Construction with commentary, (ANSI/AWC NDS-2018).
  - 2. Special Design Provisions for Wind and Seismic with commentary, September 8, 2014 (ANSI/AWC SDPWS-2015).
- C. Lumber grading agencies and abbreviations:
  - 1. NLGA: National Lumber Grades Authority.
  - 2. WCLIB: West Coast Lumber Inspection Bureau.
  - 3. WWPA: Western Wood Products Association.

## 1.6 DELIVERY, STORAGE, AND HANDLING

- A. Stockpile materials sufficiently in advance of need to assure their availability in a timely manner for Work.
- B. Use extreme care in off-loading of lumber to prevent damage, splitting, and breaking of materials.
- C. Stack wood products flat with spacers beneath and between each bundle to provide air circulation. Protect wood products from weather by covering with waterproof sheeting, securely anchored. Provide for air circulation around stacks and under coverings.
- D. Identify framing lumber by grade, and store each grade separately from other grades.

## PART 2 - PRODUCTS

### 2.1 WOOD PRODUCTS, GENERAL

- A. Lumber: DOC PS 20 and applicable rules of grading agencies indicated. If no grading agency is indicated, provide lumber that complies with the applicable rules of any rules-writing agency certified by the ALSC Board of Review. Provide lumber graded by an agency certified by the ALSC Board of Review to inspect and grade lumber under the rules indicated.
  - 1. Factory mark each piece of lumber with grade stamp of grading agency.
  - 2. Provide dressed lumber, S4S, unless otherwise indicated.
- B. Moisture Content of Lumber: 19 percent maximum unless otherwise indicated.

### 2.2 WOOD-PRESERVATIVE-TREATED LUMBER

- A. Preservative Treatment by Pressure Process: AWPA U1, Use Category UC2, for interior construction not in contact with ground.
  - 1. Preservative Chemicals: Acceptable to authorities having jurisdiction and containing no arsenic or chromium.
- B. Kiln-dry lumber after treatment to a maximum moisture content of 19 percent. Do not use material that is warped or does not comply with requirements for untreated material.
- C. Mark lumber with treatment quality mark of an inspection agency approved by the ALSC Board of Review.
- D. Application: Treat items indicated on Drawings, and the following:
  - 1. Wood cants, nailers, curbs, equipment support bases, blocking, stripping, and similar members in connection with roofing, flashing, vapor barriers, and waterproofing.
  - 2. Wood sills, sleepers, blocking, furring, stripping, and similar members in contact with masonry or concrete.
  - 3. Wood framing members that are less than 18 inches above the ground in crawlspaces or unexcavated areas.
  - 4. Wood plates that are installed over concrete slabs-on-grade.

### 2.3 DIMENSION LUMBER FRAMING

- A. Framing Lumber; Studs, Joists, and Rafters: Douglas Fir, WCLIB or WWPA, No. 1 or better, unless otherwise indicated on Drawings.

## 2.4 TIMBER FRAMING

- A. Timber Framing: Douglas Fir, WCLIB or WWPA, No. 1 or better, unless otherwise indicated on Drawings.

## 2.5 MISCELLANEOUS LUMBER

- A. General: Provide miscellaneous lumber as indicated on Drawings, as required for project conditions, and as required for support or attachment of other construction, including but not limited to blocking, nailers, support curbs, and furring.
- B. Dimension Lumber Items: Provide lumber of species and grade matching framing lumber.
  - 1. For blocking not used for attachment of other construction, Utility or Stud grade lumber may be used provided that it is cut and selected to eliminate defects that will interfere with its attachment and purpose.
  - 2. For blocking and nailers used for attachment of other construction, select and cut lumber to eliminate knots and other defects that will interfere with attachment of other work.
- C. Boards: Provide lumber of 19 percent maximum moisture content (S-DRY).
  - 1. Exposed Boards: Where boards will not be concealed by other work or where painted finish is indicated, provide Select Merchantable Boards per WCLIP rules.
  - 2. Concealed Boards: Where boards will be concealed by other work, provide any species graded construction boards or WCLIP No. 1 or better.

## 2.6 FASTENERS

- A. General: Provide fasteners of size and type indicated that comply with requirements specified in this Article for material and manufacture.
  - 1. Fasteners in contact with preservative treated wood, including nuts and washers, shall be of hot dipped galvanized steel, stainless steel, or silicon bronze; the coating weights for zinc-coated fasteners shall be in accordance with ASTM A 153. Fasteners other than nails, timber rivets, wood screws, and lag screws shall be permitted to be of mechanically deposited zinc-coated steel with coating weights in accordance with ASTM B 695, Class 55 minimum; comply with requirements of 2019 CBC 2304.10.5.
- B. Nails, Brads, and Staples: ASTM F 1667.
- C. Power-Driven Fasteners: Fastener systems with an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC70.
- D. Wood Screws: ASME B18.6.1.
- E. Lag Bolts: ASME B18.2.1 (ASME B18.2.3.8M).

- F. Bolts: Steel bolts complying with ASTM A 307, Grade A (ASTM F 568M, Property Class 4.6); with ASTM A 563 (ASTM A 563M) hex nuts and, where indicated, flat washers.
- G. Post Installed Concrete Anchors: Fabricated from corrosion-resistant materials; manufacturer, size, and type as indicated on Drawings. Materials to comply with the following:
  - 1. Carbon-steel components, zinc plated to comply with ASTM B 633, Class Fe/Zn 5.
  - 2. Stainless steel with bolts and nuts complying with ASTM F 593 and ASTM F 594, Alloy Group 1 or 2 (ASTM F 738M and ASTM F 836M, Grade A1 or A4).

## 2.7 METAL FRAMING ANCHORS AND HARDWARE

- A. General: Connectors in contact with preservative treated or fire retardant treated wood shall be of hot dipped galvanized steel or stainless steel; the coating weights for zinc-coated connectors shall be in accordance with ASTM A 153; comply with requirements of 2019 CBC 2304.10.5.
- B. Basis of Design Manufacturer: Provide products as indicated on Drawings manufactured by the following:
  - 1. Simpson Strong-Tie Co., Inc.
- C. Material: Galvanized steel sheet, hot-dip, zinc-coated steel sheet complying with ASTM A 653/A 653M, G60 (Z180) coating designation.
  - 1. Use for interior locations unless otherwise indicated.

## 2.8 MISCELLANEOUS MATERIALS

- A. Sill-Sealer Gaskets: Closed-cell neoprene foam, 1/4 inch thick, selected from manufacturer's standard widths to suit width of sill members indicated.
- B. Adhesives for Gluing Furring and Sleepers to Concrete or Masonry: Formulation complying with ASTM D 3498 that is approved for use indicated by adhesive manufacturer.
  - 1. Use adhesives that have a VOC content of 70 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
- C. Water-Repellent Preservative: NWWDA-tested and -accepted formulation containing 3-iodo-2-propynyl butyl carbamate, combined with an insecticide containing chloropyrifos as its active ingredient.

## PART 3 - EXECUTION

### 3.1 INSTALLATION, GENERAL

- A. General: Install framing as indicated on drawings, as herein specified, and as required to comply with regulatory agencies and American Forest and Paper Association (AF&PA) document WCD 1 "Details for Conventional Wood Frame Construction". Notes and details on Drawings shall take precedence over these specifications.
- B. Set rough carpentry to required levels and lines, with members plumb, true to line, cut, and fitted. Fit rough carpentry to other construction; scribe and cope as needed for accurate fit. Locate furring, nailers, blocking, grounds, and similar supports to comply with requirements for attaching other construction.
- C. Install metal framing anchors to comply with manufacturer's written instructions. Install fasteners through each fastener hole.
- D. Install sill sealer gasket to form continuous seal between sill plates and foundation walls.
- E. Do not splice structural members between supports, unless otherwise indicated.
- F. Provide blocking and framing as indicated and as required to support facing materials, fixtures, specialty items, and trim.
  - 1. Provide metal clips for fastening gypsum board or lath at corners and intersections where framing or blocking does not provide a surface for fastening edges of panels. Space clips not more than 16 inches on center.
- G. Provide fire blocking in furred spaces, stud spaces, and other concealed cavities in accordance with 2019 CBC Section 718 "Concealed Spaces" and as follows:
  - 1. Fire block furred spaces of walls, at each floor level, at ceiling, and at not more than 96 inches on center with solid wood blocking or noncombustible materials accurately fitted to close furred spaces.
  - 2. Fire block concealed spaces of wood-framed walls and partitions at each floor level, at ceiling line of top story, and at not more than 96 inches on center. Where fire blocking is not inherent in framing system used, provide closely fitted solid wood blocks of same width as framing members and 2-inch nominal thickness.
- H. Sort and select lumber so that natural characteristics will not interfere with installation or with fastening other materials to lumber. Do not use materials with defects that interfere with function of member or pieces that are too small to use with minimum number of joints or optimum joint arrangement.
- I. Comply with AWPA M4 for applying field treatment to cut surfaces of preservative-treated lumber.
  - 1. Use inorganic boron for items that are continuously protected from liquid water.
  - 2. Use copper naphthenate for items not continuously protected from liquid water.

- J. Securely attach rough carpentry work to substrate by anchoring and fastening as indicated on Drawings and complying with the following:
  - 1. ICC ESR-1539 for power-driven staples and nails.
  - 2. 2019 CBC Table 2304.10.1 "Fastening Schedule."
- K. Use common wire nails, unless otherwise indicated. Select fasteners of size that will not fully penetrate members where opposite side will be exposed to view or will receive finish materials. Make tight connections between members. Install fasteners without splitting wood; do not countersink nail heads, unless otherwise indicated.
- L. Fasteners and connectors in contact with preservative treated or fire retardant treated wood shall be corrosion resistant as specified under Part 2 product requirements.

### 3.2 WOOD FURRING INSTALLATION

- A. Install level and plumb with closure strips at edges and openings. Shim with wood as required for tolerance of finish work.

### 3.3 WALL AND PARTITION FRAMING INSTALLATION

- A. General: Provide studs, top and bottom plates of sizes indicated on Drawings, 2 inch minimum nominal thickness.
  - 1. Studs: Members of size and spacing indicated on Drawings.
  - 2. Top Plates: Double top plate of width equal that of studs.
  - 3. Bottom Plates: Single bottom plate of width equal that of studs; fasten plates to supporting construction as indicated on Drawings.
  - 4. Mid-Height Blocking: Provide continuous horizontal blocking at mid-height of partitions more than 96 inches high, using members of 2-inch nominal thickness and of same width as studs.
- B. Construct corners and intersections with three or more studs.
- C. Frame openings as indicated on Drawings with multiple studs and headers. Provide nailed header members of thickness equal to width of studs. Support headers on double-jamb studs for openings 60 inches and less in width, and triple-jamb studs for wider openings. Provide headers of depth indicated.

### 3.4 CEILING JOIST FRAMING INSTALLATION

- A. Ceiling Joist Framing: Install ceiling joists as indicated on Drawings with crown edge up and complying with requirements specified above for floor joists. Face nail to ends of parallel rafters.
  - 1. Where ceiling joists are at right angles to rafters, provide additional short joists parallel to rafters from wall plate to first joist; nail short joist to ends of rafters and to top plate, and nail to first joist or anchor with framing anchors or metal straps. Provide 2-by-4-inch nominal size stringers spaced 48 inches on center crosswise over main ceiling joists.

### 3.5 PROTECTION

- A. Use all necessary means to protect the installed work and materials of all other trades. In the event of damage, immediately make all repairs and replacements necessary to, the approval of the Architect and at no additional cost to the Owner.
- B. Protect rough carpentry from weather. If, despite protection, rough carpentry becomes wet, apply EPA-registered borate treatment. Apply borate solution by spraying to comply with EPA-registered label.

END OF SECTION



SECTION 061600  
PLYWOOD PANEL SHEATHING

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:
  - 1. Wall sheathing.
  - 2. Roof sheathing.
- B. Related Sections include the following:
  - 1. Division 06 Section "Rough Carpentry" for plywood equipment backing panels.
  - 2. Division 07 Section "Weather Resistive Barriers" for weather resistive barriers applied over wall sheathing.

1.3 DELIVERY, STORAGE, AND HANDLING

- A. Stack panels flat with spacers beneath and between each bundle to provide air circulation. Protect sheathing from weather by covering with waterproof sheeting, securely anchored. Provide for air circulation around stacks and under coverings.

PART 2 - PRODUCTS

2.1 PLYWOOD SHEATHING, ROOF AND/OR WALLS

- A. Plywood Sheathing: Either DOC PS 1 or DOC PS 2, Exposure 1, structural sheathing unless otherwise indicated.
  - 1. Span Rating: As indicated on Drawings.
  - 2. Nominal Thickness: As indicated on Drawings.
- B. Factory mark panels to indicate compliance with applicable standard.

## 2.2 FASTENERS

- A. General: Provide fasteners of size and type indicated that comply with requirements specified in this Article for material and manufacture.
  - 1. Fasteners used for the attachment of exterior roof and/or wall sheathing, and fasteners in contact with preservative treated or fire retardant treated wood, including nuts and washers, shall be of hot dipped galvanized steel, stainless steel, or silicon bronze; the coating weights for zinc-coated fasteners shall be in accordance with ASTM A 153. The coating weights for mechanically deposited zinc-coated steel fasteners shall be in accordance with ASTM B 695, Class 55 minimum. Comply with requirements of 2019 CBC 2304.10.1 and 2304.10.5.
- B. Nails, Brads, and Staples: ASTM F 1667.
- C. Power-Driven Fasteners: Fastener systems with an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC70.

## PART 3 - EXECUTION

### 3.1 INSTALLATION

- A. General: Comply with applicable recommendations in APA Form No. E30, "Engineered Wood Construction Guide," for types of structural-use panels and applications indicated.
- B. Do not use materials with defects that impair quality of sheathing or pieces that are too small to use with minimum number of joints or optimum joint arrangement. Arrange joints so that pieces do not span between fewer than three support members.
- C. Cut panels at penetrations, edges, and other obstructions of work; fit tightly against abutting construction, unless otherwise indicated.
- D. Coordinate wall and roof sheathing installation with flashing and joint-sealant installation so these materials are installed in sequence and manner that prevent exterior moisture from passing through completed assembly.
- E. Coordinate sheathing installation with installation of materials installed over sheathing so sheathing is not exposed to precipitation or left exposed at end of the workday when rain is forecast.
- F. Space panels 1/8 inch apart at edges and ends.
- G. Fastening: Securely fasten panels to framing by fastening as indicated on Drawings complying with the following:
  - 1. Wood Framing: Comply with the following:
    - a. NES NER-272 for power-driven fasteners.
    - b. 2019 California Building Code, Table 2304.10.1 "Fastening Schedule."

- c. Use common wire nails, unless otherwise indicated. Select fasteners of size that will not fully penetrate members where opposite side will be exposed to view or will receive finish materials. Make tight connections. Install fasteners without splitting wood.

END OF SECTION



SECTION 064116  
PLASTIC LAMINATE CASEWORK

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:

- 1. Plastic-laminate faced architectural cabinets.
- 2. Plastic-laminate countertops.

- B. Related Sections:

- 1. Division 06 Section "Rough Carpentry" for blocking required for installing cabinets and concealed within other construction before cabinet installation.

1.3 SUBMITTALS

- A. Product Data: For each type of product, including cabinet hardware and accessories.

- 1. Provide documentation VOC content for adhesives.
- 2. Provide documentation that wood panel products and bonding adhesives contain no urea formaldehyde.

- B. Shop Drawings: Show location of each item, dimensioned plans and elevations, large-scale details, attachment devices, and other components.

- 1. Show locations and sizes of furring, blocking, and hanging strips, including concealed blocking and reinforcement specified in other Sections.
- 2. Show locations and sizes of cutouts and holes for plumbing fixtures and other items installed in architectural woodwork.
- 3. Apply WI-certified compliance label to first page of Shop Drawings.

- C. Samples for Initial Selection:

- 1. Plastic laminates.
- 2. PVC edge material.

D. Samples for Verification:

1. Plastic Laminate and Edge Banding: One sample, 8 by 10 inches, for each type, color, pattern, and surface finish with sample applied to core material and specified edge material applied to 1 edge.
2. Cabinet hardware, one unit for each type and finish of the following:
  - a. Pulls.
  - b. Hinges.
  - c. Catches.
  - d. Locks.
  - e. Shelf supports.

E. Woodwork Quality Standard Compliance Certificates: WI-certified compliance certificates.

1.4 QUALITY ASSURANCE

- A. Fabricator Qualifications: Shop that employs skilled workers who custom fabricate products similar to those required for this Project, who are familiar with Woodwork Institute fabrication requirements, and whose products have a record of successful in-service performance.
- B. Installer Qualifications: Installer shall be fabricator of plastic laminate casework or fabricator shall be responsible for the Work of the installer. Installers shall be skilled workers who are experienced installing products similar to those required for this Project, who are familiar with Woodwork Institute fabrication requirements, and have a record of successful in-service performance.
- C. Woodwork Institute (WI) Quality Assurance Program: Plastic Laminate Casework shall be subject to the following WI quality assurance program:
  1. Certified Compliance Program (CCP):
    - a. A WI Certified Compliance Label shall be affixed to the first page of the original shop drawing set.
    - b. A WI Certified Compliance Certificate shall be issued for plastic laminate cabinets, counter tops and installation.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Do not deliver casework until painting and similar operations that could damage casework have been completed in installation areas. If casework must be stored in other than installation areas, store only in areas where environmental conditions comply with requirements specified in "Field Conditions" Article.

## 1.6 FIELD CONDITIONS

- A. Environmental Limitations: Do not deliver or install woodwork until building is enclosed, wet work is complete, and HVAC system is operating and maintaining temperature and relative humidity at occupancy levels during the remainder of the construction period.
- B. Field Measurements: Where woodwork is indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication, and indicate measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.
  - 1. Locate concealed framing, blocking, and reinforcements that support woodwork by field measurements before being enclosed, and indicate measurements on Shop Drawings.
  - 2. Established Dimensions: Where field measurements cannot be made without delaying the Work, establish dimensions and proceed with fabricating woodwork without field measurements. Provide allowance for trimming at site, and coordinate construction to ensure that actual dimensions correspond to established dimensions.

## 1.7 COORDINATION

- A. Coordinate sizes and locations of framing, blocking, furring, reinforcements, and other related units of Work specified in other Sections to ensure that interior architectural woodwork can be supported and installed as indicated.

## PART 2 - PRODUCTS

### 2.1 PERFORMANCE REQUIREMENTS

- A. Regulatory Requirements, Seismic Design: Comply with requirements of the California Building Code, Part 2, Volume 2, Chapter 16A (State Chapter) "Structural Design Requirements," Sections 1613A.1 and 1616A.1, ASCE Section 7-16, Table 13.5-1, and WI construction methods for seismic design for schools and hospitals.

- B. Regulatory Requirements, Accessibility: Casework shall comply with accessibility requirements of the U.S. Architectural & Transportation Barriers Compliance Board's "Americans with Disabilities Act (ADA) 2010 ADA Standards for Accessible Design and with the 2019 California Building Code, Chapter 11B, "Accessibility to Public Buildings, Public Accommodations, Commercial Buildings, and Public Housing." Accessible casework shall comply with the following:
1. Counter Top Heights for Sinks and Lavatories: Where self-rimming sinks or lavatories are installed in counter tops and the fixtures are indicated to be accessible, counter top heights shall be verified and coordinated so that the top rim of sinks and lavatories shall not be more than 34 inches above the finished floor; for self-rimming sinks, counter top heights shall be set at +33-1/2 inches above the finish floor level.
  2. Knee and Toe Space at Sink Counter Tops (Ref. CBC 11B-306):
    - a. Width: 30 inches minimum clear width.
    - b. Vertical Clearance: 27 inches minimum at the front edge of counter tops.
    - c. Depth of Knee and Toe Clearance: Measured from the front edge of counter tops.
      - 1) Depth at Floor Level: 19 inches minimum / 25 inches maximum; and not less than the reach depth over the counter top.
      - 2) Depth at +9 Inches: Depth at floor level less 6 inches maximum (13 inches minimum depth at +9 inches for a clear space depth of 19 inches at floor level; depth increases as depth at floor level increases).
      - 3) Depth at +27 Inches: Depth at floor level less 9 inches maximum (10 inches minimum depth at +27 inches for a clear space depth of 19 inches at floor level; depth increases as depth at floor level increases).
  3. Side Reach Depth Over Counter Tops (Ref. CBC 11B-308.3.2): Where casework is to be accessible, casework shall be fabricated such that the side reach depth does not exceed 24 inches measured from the front edge of the counter top to the finished surface of the wall at the back of the counter top. Counter top heights shall not exceed 34 inches from the finished floor surface.
- C. Quality Standard: Unless otherwise indicated, comply with Woodwork Institute's (WI) "North American Architectural Woodwork Standards" (NAAWS), latest edition, for grades of architectural plastic-laminate cabinets and counter tops indicated for construction, finishes, installation, and other requirements.
- D. Seismic Design: Fabrication shall comply with referenced seismic design requirements.



## 2.2 PLASTIC-LAMINATE CABINETS

- A. Quality Standard: Unless otherwise indicated, comply with WI's "North American Architectural Woodwork Standards," latest edition, Section 10 "Casework" for grades of architectural plastic-laminate cabinets indicated for construction, finishes, installation, and other requirements.
  - 1. Grade: Custom Grade except where Premium Grade requirements indicated.
  - 2. Provide labels and certificates from the Woodwork Institute (WI) certification program indicating that woodwork, including installation, complies with requirements of grades specified.
  - 3. The Contract Documents contain selections chosen from options in the quality standard and additional requirements beyond those of the quality standard. Comply with those selections and requirements in addition to the quality standard indicated.
- B. Fabricate casework as multiple self-supporting units rigidly joined together.
- C. Type of Construction: Type A, Frameless.
- D. Cabinet, Door, and Drawer Front Interface Style: Style 1, flush overlay.
- E. Laminate Cladding for Exposed Exterior and Exposed Interior Surfaces: NEMA LD 3, High-pressure decorative laminate complying with the following requirements:
  - 1. Horizontal Surfaces Other Than Tops: Grade HGL (1.0 mm).
  - 2. Postformed Surfaces: Grade HGP (1.0 mm).
  - 3. Vertical Surfaces: Grade VGS (0.7 mm).
  - 4. Edges: PVC edge banding, 0.12 inch (3 mm) thick, matching laminate in color, pattern, and finish.
- F. Materials for Semi-exposed Surfaces:
  - 1. Surfaces Other Than Drawer Bodies: Thermoset decorative panels.
    - a. Edges of Plastic-Laminate Shelves: PVC edge banding, 0.12 inch (3 mm) thick, matching laminate in color, pattern, and finish.
    - b. For semi-exposed backs of doors and other semi-exposed backs of panels with exposed plastic-laminate surfaces, provide surface of high-pressure decorative laminate, Grade VGS and matching color of exposed surfaces.
  - 2. Drawer Sides and Backs: Thermoset decorative panels with PVC edge banding, 1/2 inch minimum thickness.
  - 3. Drawer Bottoms: Thermoset decorative panels, 1/2 inch minimum thickness.
- G. Concealed Backs of Panels with Exposed Plastic Laminate Surfaces: High-pressure decorative laminate, Grade BKL. Backs shall be 1/2 inch minimum thickness and mechanically fastened to cabinet bodies.
- H. Security Dust Panels: Provide 3/4-inch thick security dust panels above lockable drawers, unless located directly under tops.

- I. Shelves: Shelves shall be adjustable and supported by shelf standards and clips.
  - 1. Design loading: 50 psf.
  - 2. Maximum Width: 48 inches for concealed shelves, 42 inches for exposed shelves.
  - 3. Thickness: 3/4 inch minimum, shelves 30 inches or more in width shall be 1-inch minimum thickness.
- J. Locks, Doors and Drawers: All doors and drawers shall be provided with locks.
- K. Colors, Patterns, and Finishes: Provide materials and products that result in colors and textures of exposed laminate surfaces complying with the following requirements:
  - 1. As selected by Architect from laminate manufacturer's full range in the following categories:
    - a. Solid colors, matte finish.
    - b. Wood grains, matte finish.
    - c. Patterns, matte finish.

### 2.3 PLASTIC-LAMINATE COUNTERTOPS

- A. Quality Standard: Unless otherwise indicated, comply with WI's "North American Architectural Woodwork Standards," latest edition, Section 11 "Countertops" for grades of architectural plastic-laminate cabinets indicated for construction, finishes, installation, and other requirements.
  - 1. Grade: Premium Grade.
  - 2. Provide labels and certificates from the Woodwork Institute (WI) certification program indicating that woodwork, including installation, complies with requirements of grades specified.
  - 3. The Contract Documents contain selections chosen from options in the quality standard and additional requirements beyond those of the quality standard. Comply with those selections and requirements in addition to the quality standard indicated.
- B. High-Pressure Decorative Laminate: NEMA LD 3, Grade HGS or HGP as required for post-formed counter tops.
- C. Colors and Pattern: Provide materials and products that result in colors and textures of exposed laminate surfaces complying with the following requirements:
  - 1. As selected by Architect from manufacturer's full range in the following categories:
    - a. Solid colors, matte finish.

- D. Edge Treatment: Same as laminate cladding on horizontal surfaces.
  - 1. Splash: Integral cove splash with square top, 4 inches high unless otherwise indicated.
  - 2. Front Edge: Full round edge unless otherwise indicated.
    - a. Square self-edge where full round edge cannot be used due to fabrication limitations.
- E. Core Material: Particleboard, 3/4 inch thick; counter tops for sinks to be particleboard made with exterior glue.
- F. Counter Top Edge Thickness: Build up counter top edge thickness to 1-1/2 inches at front, back, and ends with additional layers of core material laminated to top.
- G. Backer Sheet: Provide paper backing on underside of countertop substrate.
- H. Cutouts: Edges of cut outs shall be sealed per WI Custom Grade requirements with a color toned water resistant varnish before sink or rims are installed.

## 2.4 MATERIALS

- A. General: Provide materials that comply with requirements of WI's quality standard for each type of woodwork and quality grade specified, unless otherwise indicated.
- B. Wood Panel Products: Provide materials that comply with requirements of referenced quality standard for each type of woodwork and quality grade specified unless otherwise indicated. Provide products containing no urea formaldehyde complying with the following:
  - 1. Hardboard: AHA A135.4.
  - 2. Medium-Density Fiberboard: ANSI A208.2, Grade 130.
  - 3. Particleboard: ANSI A208.1, Grade M-2-Exterior Glue.
  - 4. Softwood Plywood: DOC PS 1, Medium Density Overlay.
- C. Thermoset Decorative Panels: Particleboard or medium-density fiberboard finished with thermally fused, melamine-impregnated decorative paper and complying with requirements of NEMA LD 3, Grade VGL, for test methods 3.3, 3.4, 3.6, 3.8, and 3.10.
- D. High-Pressure Decorative Laminate: NEMA LD 3, grades as indicated or, if not indicated, as required by woodwork quality standard.
  - 1. Manufacturer: Subject to compliance with requirements, provide high-pressure decorative laminates by one of the following:
    - a. Formica Corporation.
    - b. Nevamar Company, LLC; Decorative Products Div.
    - c. Wilsonart International; Div. of Premark International, Inc.

## 2.5 CABINET HARDWARE AND ACCESSORIES

- A. General: Provide cabinet hardware and accessory materials associated with architectural cabinets.
- B. Overlay Butt Hinges: 2-3/4-inch, 5-knuckle steel hinges made from 0.095-inch thick metal, with hospital tips; ANSI/BHMA 156.9, Grade 1.
  - 1. Rockford Process Control (RCP) RP-376 or equivalent.
- C. Wire Pulls: Back mounted, solid stainless steel or aluminum bent wire pulls, 4 inches long, 5/16 inch in diameter, 1-1/2 inch projection.
  - 1. Doug Mockett and Company, Inc.; DP57B or equivalent.
- D. Catches:
  - 1. Magnetic Catches: Ives, No. 325, aluminum body, 5 lb maximum load.
  - 2. Friction Catch: Bainbridge, FlexaCatch 2120.
  - 3. Slide Bolt: Quality Hardware.
- E. Drawer Suspension:
  - 1. Grass 6610, 100 lb.
  - 2. Blum, Metabox 3/4 extension, 75 lb. dynamic, 100 lb. static.
- F. Shelf Standards:
  - 1. LD 32 mm line boring system with 5 mm steel pins for shelving less than 36 inches wide.
  - 2. KV255 with KV256 supports for shelving 36 inches wide and wider.
  - 3. Provide seismic restraint pins in back row or notch shelf.
- G. Cabinet Door Locks: National C-8173-915KA-26, pin tumbler.
- H. Cabinet Drawer Locks: National C-8178-915KA-26, pin tumbler.
- I. Exposed Hardware Finishes: For exposed hardware, provide finish that complies with BHMA A156.18 for BHMA finish number indicated. Finish of cabinet hardware shall match exposed door hardware of the room in which casework is located; door hardware is specified in Division 8 Section "Door Hardware."
  - 1. Satin Chromium Plated: BHMA 626 for brass or bronze base; BHMA 652 for steel base.
  - 2. Satin Stainless Steel: BHMA 630.
- J. For concealed hardware, provide manufacturer's standard finish that complies with product class requirements in BHMA A156.9.

## 2.6 MISCELLANEOUS MATERIALS

- A. Furring, Blocking, Shims, and Hanging Strips: Softwood or hardwood lumber, kiln dried to less than 15 percent moisture content.
- B. Anchors: Select material, type, size, and finish required for each substrate for secure anchorage. Provide metal expansion sleeves or expansion bolts for post-installed anchors. Use nonferrous-metal or hot-dip galvanized anchors and inserts at inside face of exterior walls and at floors.
- C. Adhesives: Adhesives containing no urea formaldehyde and as recommended by fabricator or manufacturer. Use clear types where glue lines will be exposed.
- D. VOC Limits for Installation Adhesives and Sealants: Use products that comply with the following limits for VOC content when calculated according to 40 CFR 59, Subpart D (EPA Method 24):
  - 1. Wood Glues: 30 g/L.
  - 2. Multipurpose Construction Adhesives: 70 g/L.
  - 3. Structural Wood Member Adhesive: 140 g/L.
  - 4. Architectural Sealants: 250 g/L.

## 2.7 FABRICATION

- A. Interior Woodwork Grade: Comply with Woodwork Institute's (WI) "North American Architectural Woodwork Standards" (NAAWS), latest edition, quality standards indicated.
- B. Fabricate architectural cabinets to dimensions, profiles, and details indicated.
  - 1. Accessible Casework: Comply with accessible regulatory requirements indicated in Part 2 Article "Performance Requirements."
- C. Complete fabrication, including assembly and hardware application, to maximum extent possible before shipment to Project site. Disassemble components only as necessary for shipment and installation. Where necessary for fitting at site, provide ample allowance for scribing, trimming, and fitting.
- D. Shop-cut openings to maximum extent possible to receive hardware, appliances, electrical work, and similar items. Locate openings accurately and use templates or roughing-in diagrams to produce accurately sized and shaped openings. Sand edges of cutouts to remove splinters and burrs.

## PART 3 - EXECUTION

### 3.1 PREPARATION

- A. Before installation, condition woodwork to average prevailing humidity conditions in installation areas.

- B. Before installing architectural woodwork, examine shop-fabricated work for completion and complete work as required, including removal of packing and backpriming.

### 3.2 INSTALLATION OF CABINETS

- A. Grade: Install cabinets to comply with same grade as item to be installed.
- B. Assemble cabinets and complete fabrication at Project site to the extent that it was not completed in the shop.
- C. Install cabinets level, plumb, true, and straight. Shim as required with concealed shims. Install level and plumb to a tolerance of 1/8 inch in 96 inches.
- D. Scribe and cut cabinets to fit adjoining work, refinish cut surfaces, and repair damaged finish at cuts.
- E. Anchor cabinets to walls as indicated on Drawings and in compliance with referenced seismic requirements.
- F. Install without distortion so doors and drawers fit openings properly and are accurately aligned. Adjust hardware to center doors and drawers in openings and to provide unencumbered operation. Complete installation of hardware and accessory items as indicated.
  - 1. Install cabinets with no more than 1/8 inch in 96-inch sag, bow, or other variation from a straight line.

### 3.3 INSTALLATION OF COUNTER TOPS

- A. Grade: Install countertops to comply with same grade as item to be installed.
- B. Assemble countertops and complete fabrication at Project site to the extent that it was not completed in the shop.
  - 1. Provide cutouts for appliances, plumbing fixtures, electrical work, and similar items.
  - 2. Seal edges of cutouts by saturating with varnish.
- C. Field Jointing: Where possible, make in the same manner as shop jointing, using dowels, splines, adhesives, and fasteners recommended by manufacturer. Prepare edges to be joined in shop so Project-site processing of top and edge surfaces is not required. Locate field joints where shown on Shop Drawings.
  - 1. Secure field joints in plastic-laminate countertops with concealed clamping devices located within 6 inches of front and back edges and at intervals not exceeding 24 inches. Tighten according to manufacturer's written instructions to exert a constant, heavy-clamping pressure at joints.
- D. Install countertops level, plumb, true, and straight. Shim as required with concealed shims. Install level and plumb to a tolerance of 1/8 inch in 96 inches.

- E. Scribe and cut countertops to fit adjoining work, refinish cut surfaces, and repair damaged finish at cuts.
- F. Anchor securely by screwing through corner blocks of base cabinets or other supports into underside of countertop.
  - 1. Install countertops with no more than 1/8 inch in 96-inch sag, bow, or other variation from a straight line.
  - 2. Where applied back splashes are used, secure backsplashes to tops with concealed metal brackets at 16 inches on center and to walls with adhesive.
  - 3. Seal junctures of tops, splashes, and walls with mildew-resistant silicone sealant or another permanently elastic sealing compound recommended by countertop material manufacturer.

#### 3.4 ADJUSTING AND CLEANING

- A. Repair damaged and defective woodwork, where possible, to eliminate functional and visual defects; where not possible to repair, replace woodwork. Adjust joinery for uniform appearance.
- B. Clean, lubricate, and adjust hardware.
- C. Clean woodwork on exposed and semi-exposed surfaces.

END OF SECTION





SECTION 072116  
BLANKET INSULATION

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. This Section includes:

- 1. Glass fiber batt/blanket insulation for thermal and acoustical insulation installed in framing cavities.

- B. Related Sections:

- 1. Division 23 Sections as applicable to air distribution duct systems for insulation for ducts.

1.3 SUBMITTALS

- A. Product Data: For each type of insulation and accessory.

- B. Installer's Certification: Listing type, manufacturer, and R-value of insulation installed in each element of the building thermal envelope.

- 1. Sign, date, and post the certification in a conspicuous location on Project site.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Protect insulation materials from physical damage and from deterioration by moisture, soiling, and other sources. Store inside and in a dry location. Comply with manufacturer's written instructions for handling, storing, and protecting during installation.

## PART 2 - PRODUCTS

### 2.1 GLASS-FIBER BLANKET INSULATION

- A. Sustainability Requirements: Provide glass-fiber blanket insulation as follows:
  - 1. Low Emitting: Insulation tested according to ASTM D 5116 and shown to emit less than 0.05-ppm formaldehyde.
- B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. CertainTeed Corporation.
  - 2. Guardian Fiberglass, Inc.
  - 3. Johns Manville.
  - 4. Knauf Fiber Glass.
  - 5. Owens-Corning.
- C. Glass-Fiber Blanket Insulation, Unfaced: ASTM C 665, Type I (blankets without membrane facing); consisting of fibers; with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively; passing ASTM E 136 for combustion characteristics.
- D. Glass-Fiber Blanket Insulation, Reinforced-Foil-Faced: ASTM C 665, Type III (reflective faced), Class A (faced surface with a flame-spread index of 25 or less); Category 1 (membrane is a vapor barrier), faced with foil-scrim-kraft, or foil-scrim polyethylene vapor-retarder membrane on 1 face.
- E. Thermal Resistance Values and Thicknesses: Where Drawings indicate thermal resistance values, provide units of the following nominal equivalent thicknesses:
  - 1. R-19; 6 inch thickness.
  - 2. R-30; 10 inch thickness.

### 2.2 ACCESSORY MATERIALS

- A. Accessory materials shall be as recommended in writing by insulation manufacturer.
- B. Insulation for Miscellaneous Voids:
  - 1. Glass-Fiber Insulation: ASTM C764, Type II, loose fill; with maximum flame-spread and smoke-developed indexes of 5, per ASTM E84.
  - 2. Spray Polyurethane Foam Insulation: ASTM C1029, Type II, closed cell, with maximum flame-spread and smoke-developed indexes of 75 and 450, respectively, per ASTM E84.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine conditions, with Installer present, for conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 PREPARATION

- A. Clean substrates of substances that are harmful to insulation, including removing projections capable of puncturing insulation or vapor retarders, or that interfere with insulation attachment.

### 3.3 INSTALLATION

- A. Install insulation in cavities formed by framing members in compliance with insulation manufacturer's written instructions applicable to products and applications.
- B. Install insulation to provide a complete thermal envelope between the interior and exterior of the building and between conditioned and unconditioned interior spaces.
  - 1. Provide insulation having thermal resistance values indicated on drawings, but not less than the following:
    - a. Walls: R-19.
    - b. Rafter Spaces and Ceilings: R-30.
  - 2. Seal joints and fill gaps and voids in insulation using the following materials:
    - a. Spray Polyurethane Insulation: Seal joints and fill gaps, voids, and spaces around door and window frames with spray polyurethane insulation; apply according to manufacturer's written instructions.
    - b. Glass-Fiber Insulation: Stuff glass-fiber loose-fill insulation into miscellaneous voids and cavity spaces where it is not feasible to use spray polyurethane insulation; compact to approximately 40 percent of normal maximum volume equaling a density of approximately 2.5 lb/cu. ft.
- C. Install insulation types according to the following:
  - 1. Vapor-Retarder-Faced Blankets: Install vapor-retarder faced insulation at locations indicated below; install with vapor-retarder membrane to the climate conditioned side of framing.
    - a. Exterior Walls: Install vapor retarder faced insulation in stud wall cavities of exterior walls.
    - b. Interior Walls: Install vapor retarder faced insulation in stud wall cavities of interior walls between conditioned and unconditioned spaces.

- c. Rafters: Install vapor retarder faced insulation in framing cavities between rafters.
- 2. Unfaced Blankets: Install in the following locations:
  - a. Interior Walls: Stud wall cavities of interior walls between conditioned interior spaces for acoustical insulation at locations indicated on the Drawings, thickness of insulation to match stud width.
  - b. Ceilings:
    - 1) Thermal Applications: Install unfaced insulation over gypsum board ceilings having an unconditioned vented attic space above.
    - 2) Acoustical Applications: Install unfaced insulation over ceilings at locations indicated on Drawings.
- D. Install insulation that is undamaged, dry, and unsoiled and that has not been left exposed to ice, rain, or snow at any time.
- E. Install vapor barrier faced thermal insulation with manufacturer's R-value label exposed after insulation is installed.
- F. Extend insulation to envelop entire area to be insulated. Cut and fit tightly around obstructions and fill voids with insulation. Remove projections that interfere with placement.
- G. Provide sizes to fit applications indicated and selected from manufacturer's standard thicknesses, widths, and lengths. Apply single layer of insulation units to produce thickness indicated unless multiple layers are otherwise shown or required to make up total thickness.
- H. Use insulation widths and lengths that fill the cavities formed by framing members. If more than one length is required to fill the cavities, provide lengths that will produce a snug fit between ends.
- I. Place insulation in cavities formed by framing members to produce a friction fit between edges of insulation and adjoining framing members.
- J. Maintain 3-inch clearance of insulation around recessed lighting fixtures not rated for or protected from contact with insulation.
- K. For wood-framed construction, install blankets according to ASTM C 1320 using faced blankets having stapling flanges; lap blanket flange over flange of adjacent blanket to maintain continuity of vapor retarder once finish material is installed over it.
- L. Vapor Retarder Faced Blankets: Tape joints and ruptures in vapor-retarder facings, and seal each continuous area of insulation to ensure airtight installation.
- M. Water-Piping in Walls: If water piping is located within insulated exterior walls, coordinate location of piping to ensure that it is placed on warm side of insulation and insulation encapsulates piping.

- N. Use mechanical anchorage to provide permanent placement and support of units.

#### 3.4 PROTECTION

- A. Protect installed insulation and vapor retarders from damage due to harmful weather exposures, moisture, physical abuse, and other causes. Provide temporary coverings or enclosures where insulation is subject to abuse and cannot be concealed and protected by permanent construction immediately after installation.

END OF SECTION



SECTION 072500  
WEATHER RESISTIVE BARRIERS

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. This Section includes the following:
  - 1. Building wrap.
  - 2. Flexible flashing.
- B. Related Sections include but are not limited to the following:
  - 1. Division 06 Section "Plywood Panel Sheathing" for exterior wood panel sheathing.
  - 2. Division 07 Section "Sheet Metal Flashing and Trim."
  - 3. Division 08 Sections as applicable to doors, windows, and similar wall openings.
  - 4. Division 09 Section "Portland Cement Plastering."

1.3 SUBMITTALS

- A. Product Data: For each type of product indicated, include data on air and moisture infiltration protection based on testing according to referenced standards.
- B. Research/Evaluation Reports: For the following, showing compliance with building code in effect for Project:
  - 1. Building wrap membrane.
- C. Qualification Data: For Installer.

1.4 QUALITY ASSURANCE

- A. Installer Qualifications: A firm experienced in installing weather resistive barrier materials similar in material, design, and extent to those indicated for this Project, whose work has resulted in applications with a record of successful in-service performance.
- B. Source Limitations: Obtain each type of product through one source from a single manufacturer.

- C. Mockups: Before beginning installation, build mockup of weather resistive barrier assembly as directed by Architect, incorporate surface preparation, crack and joint treatment, sealing of gaps and terminations, and penetration flashing for window and door frames.
  - 1. Approved mockups may become part of the completed Work if undisturbed and undamaged.

## 1.5 DELIVERY, STORAGE, AND HANDLING

- A. Store materials in their original undamaged packages in a clean, dry, protected location and in accordance with manufacturer's written recommendations.

## 1.6 PROJECT CONDITIONS

- A. Environmental Limitations: Install weather resistive barrier materials within the range of ambient and substrate temperatures recommended by manufacturer. Protect substrates from environmental conditions that affect performance of weather resistive barrier system. Do not apply weather resistive barrier materials to damp or wet substrates or during snow, rain, fog, or mist.

## 1.7 COORDINATION

- A. Coordinate the sequence of installation of weather resistive barrier materials with the installation of exterior wall sheathing and wall finish materials in order to minimize the exposure of sheathing and weather resistive barrier materials to moisture, wind, and sunlight.

# PART 2 - PRODUCTS

## 2.1 BUILDING WRAP

- A. Building Wrap: ASTM E1677, Type I air barrier; with flame-spread and smoke-developed indexes of less than 25 and 450, respectively, when tested according to ASTM E 84; UV stabilized.
  - 1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:
    - a. DuPont (E. I. du Pont de Nemours and Company); Tyvek CommercialWrap.
  - 2. Performance Characteristics:
    - a. Air Penetration: 0.001 cfm/ft<sup>2</sup> at 75 Pa, when tested in accordance with ASTM E2178. Type I per ASTM E1677. ≤0.04 cfm/ft<sup>2</sup> at 75 Pa, when tested in accordance with ASTM E2357.



- b. Water Vapor Transmission: 28 perms, when tested in accordance with ASTM E96, Method B.
- c. Water Penetration Resistance: Minimum 280 cm when tested in accordance with AATCC Test Method 127.
- d. Basis Weight: Minimum 2.7 oz/yd<sup>2</sup>, when tested in accordance with TAPPI Test Method T-410.
- e. Air Resistance: Air infiltration at >1500 seconds, when tested in accordance with TAPPI Test Method T-460.
- f. Tensile Strength: Minimum 38/35 lbs/in., when tested in accordance with ASTM D882, Method A.
- g. Tear Resistance: 12/10 lbs., when tested in accordance with ASTM D1117.
- h. Surface Burning Characteristics: Class A, when tested in accordance with ASTM E84. Flame Spread: 10, Smoke Developed: 10.
- i. Allowable UV Exposure Time: Not less than three months.

## 2.2 FLEXIBLE FLASHING

- A. Flexible Flashing: Composite, self-adhesive, flashing product consisting of a pliable, butyl rubber or rubberized-asphalt compound, bonded to a high-density polyethylene film.
  - 1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:
    - a. DuPont (E. I. du Pont de Nemours and Company).
      - 1) DuPont Flex-Wrap (70 mil), use at door and window heads and sills.
      - 2) DuPont Straight-Flash (30 mil), use at door and window jambs.

## 2.3 SEALING TAPE AND FASTENERS

- A. Sealing Tape: Pressure-sensitive plastic tape recommended by building wrap manufacturer for sealing joints and penetrations in building wrap, 4 inch minimum width tape.
- B. Screws for Fastening Membrane to Steel Framing: Manufacturer's standard corrosion resistant screws with 2-inch diameter plastic washers and of length required to penetrate not less than 1-inch into framing.

## 2.4 MISCELLANEOUS MATERIALS

- A. Primers: Primers as recommended in writing by weather resistive barrier material manufacturer.
- B. Sealants: Sealants as recommended in writing by weather resistive barrier material manufacturer.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements and other conditions affecting performance.
  - 1. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 SURFACE PREPARATION

- A. Clean, prepare, and treat substrate according to manufacturer's written instructions. Provide clean, dust-free, and dry substrate for weather resistive barrier material application.
- B. Treat fins, ridges, other projections, and changes in substrate plane to provide a smooth transition and eliminate sharp projections or edges between surfaces.

### 3.3 INSTALLATION, GENERAL

- A. Do not bridge building expansion joints; cut and space edges of panels to match spacing of structural support elements.
- B. Coordinate installation of building wrap with installation of flexible flashing.
- C. Coordinate installation of weather resistive barrier materials with installation of wall sheathing and subsequent application/installation of exterior wall finish materials.

### 3.4 FLEXIBLE FLASHING INSTALLATION

- A. Apply flexible flashing at exterior door, window, and similar openings to comply with manufacturers written instructions.
  - 1. Prime substrates as recommended by flashing manufacturer.
  - 2. Lap seams and junctures with other materials at least 4 inches, except that at flashing flanges of other construction, laps need not exceed flange width.
  - 3. After flashing has been applied, roll surfaces with a hard rubber or metal roller to ensure that flashing is completely adhered to substrates.
- B. Begin installation of flexible flashing at sills of openings, lap jamb flashing over sill flashing, lap head flashing over jamb flashing.
  - 1. Fasten sill flashing at top edge only to allow for subsequent installation of building wrap membrane behind sill flashing.

### 3.5 BUILDING WRAP MEMBRANE INSTALLATION

- A. General: Install building wrap over exterior side of wall sheathing in accordance with manufacturer's written instructions and as follows.
1. Begin installation of the building wrap at the bottom of the wall, run building wrap horizontally and set level. Install subsequent layers over previous layers lapping horizontal joints not less than 2 inches in shingle fashion for drainage.
  2. Overlap building wrap at corners of building by a minimum of 12 inches.
  3. Overlap building wrap at vertical seams by a minimum of 6 inches.
  4. Seal seams, edges, fasteners, tears, and penetrations with tape.
  5. Install building wrap behind flexible sill flashing lapped in shingle fashion to shed water.
  6. Extend over jambs of openings and seal corners with tape.
  7. Cut back barrier 1/2 inch on each side of the break in supporting members at expansion or control-joint locations.
  8. Apply barrier to cover vertical flashing with a minimum 4-inch overlap, unless otherwise indicated.
  9. Secure building wrap with screws with washers screwed through exterior sheathing and into stud framing. Space fasteners as recommended in writing by building wrap manufacturer.

### 3.6 PROTECTION

- A. Protect weather resistive barrier system from damage during application and remainder of construction period, according to manufacturer's written instructions, until subsequent finishes are applied.
1. Protect weather resistive barrier materials from exposure to UV light and harmful weather exposure as required by manufacturer. Remove and replace weather resistive barrier materials exposed to these conditions for more than 30 days.

END OF SECTION



SECTION 072616  
UNDERSLAB VAPOR RETARDER

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. This Section includes the following:
  - 1. Under slab vapor retarder for concrete slabs on grade.
- B. Related Sections include but are not limited to the following:
  - 1. Division 01 Section "Photographic Documentation."
  - 2. Division 03 Section "Cast-in-Place Concrete."
  - 3. Division 31 Section "Earthwork."

1.3 SUBMITTALS

- A. Product Data: For each type of product indicated, include manufacturer's specifications and installation instructions.
- B. Testing Documentation: Third party documentation that all testing was performed on a single production roll per ASTM E1745 Section 8.1.
- C. Samples: For vapor retarder membrane.
- D. Digital Photography: Digital photographs of completed installation including seam and penetration sealing, terminations at foundations, and repairs.

1.4 QUALITY ASSURANCE

- A. Installer Qualifications: Use an experienced installer and adequate number of skilled personnel who are thoroughly trained and experienced in the application of the vapor retarder.
- B. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 01 Section "Project Management and Coordination."
  - 1. Review procedures for field quality control, vapor-barrier installation, steel reinforcement installation, repair procedures, and protection.

## 1.5 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials in manufacturer's original, unopened packaging, with labels identifying manufacturer and product.
- B. Store materials in accordance with manufacturer's written instructions and to prevent damage.
- C. Protect stored materials from direct sunlight.

## 1.6 PROJECT CONDITIONS

- A. Do not apply material during rain or during windy conditions.
- B. Do not apply on frozen ground.

## 1.7 COORDINATION

- A. Coordinate installation of vapor retarder, reinforcing steel, and placement of concrete to minimize tears and punctures, and to minimize exposure of vapor retarder to sunlight.

## PART 2 - PRODUCTS

### 2.1 VAPOR RETARDERS

- A. Plastic Vapor Retarder: Single ply membrane extruded from virgin grade high-impact polyolefin complying with ASTM E 1745, Class A.
  - 1. Available Products: Subject to compliance with requirements, provide one of the following products:
    - a. Raven Industries Inc.; Vapor Block 15.
    - b. Stego Industries, LLC; Stego Wrap 15 mil.
    - c. W.R. Meadows, Inc., Perminator 15.
  - 2. Thickness: 15 mils.
  - 3. Roll Width: 12 feet minimum.
  - 4. Maximum Permeance: One of the following: ASTM E1745 Section 7.1 (7.1.1-7.1.5), permeance of less than 0.01 Perms (grains/(ft<sup>2</sup> · hr · inHg)) after conditioning.
  - 5. Puncture Resistance: ASTM D1709, Method B, not less than 2,266 Grams.

## 2.2 AUXILIARY MATERIALS

- A. General: Furnish auxiliary materials recommended by manufacturer for intended use and compatible with vapor retarder.
- B. Seam Tape: High Density Polyethylene Tape with pressure sensitive adhesive as manufactured or recommended by vapor retarder manufacturer, minimum width 4 inches.
- C. Pipe Boots: Construct pipe boots from vapor retarder material and pressure sensitive tape per manufacturer's written installation instructions.
- D. Sand: ASTM C 33; fine aggregate, natural, or manufactured sand.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine conditions with Installer present for compliance with requirements for conditions affecting performance of the Work.
- B. Proceed with installation of vapor retarder only after unsatisfactory conditions have been corrected.

### 3.2 PREPARATION

- A. Level and tamp or roll granular base as specified in Division 31 Section "Earthwork."

### 3.3 INSTALLATION OF VAPOR RETARDER

- A. Vapor Retarders: Place, protect, and repair vapor retarder according to ASTM E 1643 and manufacturer's written instructions.
  - 1. Vapor retarder to be installed over prepared, finely graded subgrade.
- B. Unroll vapor retarder and install with the longest dimension parallel with the direction of the pour. Open all folds to the full width.
- C. Lap joints 6 inches and seal with manufacturer's recommended tape.
- D. Seal holes, openings, and pipe and conduit penetrations in vapor retarder. Fabricate boots around pipes and conduits in accordance with manufacturer's written installation instructions and seal with tape.
- E. Areas of adhesion for taped seams, penetrations, and repairs shall be free of dust, dirt, moisture, or other conditions affecting the performance of the tape seal.

- F. Terminate vapor retarder at vertical foundation walls by turning up 4 inches against the wall and sealing with tape or fastening with concrete nails spaced 4 feet on center. Where vertical foundation walls do not occur, extend vapor retarder not less than 12 inches into footing trench prior to pouring footings.
- G. Place 2 inches of dry sand over properly installed and inspected vapor retarder. Protect from rain and moisture; remove sand that is saturated or dampened prior to concrete placement.
- H. Coordinate installation of vapor retarder with Work Division 3 Section "Cast-in-Place Concrete."
  - 1. Use only brick type reinforcing bar supports for reinforcing steel.
  - 2. Avoid driving stakes through vapor retarder membrane, repair all holes.
  - 3. Provide for protection of vapor retarder membrane in high traffic areas.

### 3.4 FIELD QUALITY CONTROL

- A. Immediately after the installation of the vapor retarder, the Contractor, in the presence of the Owner's Inspector or representative, shall review the completed installation and document the installation using digital photography. Documentation shall include the completed installation, seams, penetrations, terminations, and repairs.
- B. After installation of reinforcing steel and just prior to pouring of concrete, the Contractor, in the presence of the Owner's Inspector or representative, shall review the installed vapor retarder for tears or damage.
- C. Inspection reports shall be submitted to the Architect and the Contractor.

### 3.5 REPAIRS

- A. Repair tears and punctures with a vapor retarder patch that overlaps the damaged area by 6 inches in all directions, seal perimeter of the patch with tape.

### 3.6 PROTECTION

- A. Protect installed vapor retarders from damage due to UV light, harmful weather exposures, physical abuse, and other causes until concealed by permanent construction.
- B. Remove rain or water from retarder prior to concrete placement by air blowers.

END OF SECTION



SECTION 075100  
MEMBRANE ROOFING PATCHING AND REPAIR

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:

1. Roof membrane cutting and patching, including roof insulation, for cutting and patching roof systems to accommodate work of the project.
2. Verification of composition of materials and systems of existing roof systems.

B. Related Requirements:

1. Division 01 Section "Execution" for cutting and patching procedures.
2. Division 02 Section "Selective Demolition" for demolition and removal of selected portions of a building or structure.
3. Section 076200 "Sheet Metal Flashing and Trim" for metal roof flashings and counter flashings.
4. Section 079200 "Joint Sealants" for joint sealants, joint fillers, and joint preparation.

1.3 DEFINITIONS

- A. Roofing Terminology: Definitions in ASTM D1079 and glossary of NRCA's "The NRCA Roofing and Waterproofing Manual" apply to Work of this Section.

1.4 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1. Meet with Owner, Owner's Inspector if applicable, roofing Installer, roofing manufacturer's representative if applicable, and installers whose work interfaces with or affects roofing, including installers of roof accessories and roof-mounted equipment.
2. Review methods and procedures related to roofing Work, including manufacturer's written instructions.
3. Review base flashings, special roofing details, roof drainage, roof penetrations, equipment curbs, and condition of other construction that affects roofing.

4. Review temporary protection requirements for roofing during and after installation.
5. Review roof observation and repair procedures after roofing installation.

#### 1.5 SUBMITTALS

- A. Product and Materials List: Submit list of products and materials to be incorporated into the Work.
- B. Product Data: For each type of product.
- C. Verification of Existing Roof Systems: List of products and materials of each existing roof system affected by the Work; include manufacturer and product names, material thicknesses, material compositions, original installer, and warranty information.
- D. Patching and Repair Methods: Patching and repair methods for each type of existing roof system affected by the Work. Include description of existing roof system, patching materials, installation methods, and detail drawings.
- E. Qualification Data: For Installer.
- F. Warranties: Documentation indicating that existing warranties are still in effect after completion of patching and repair.

#### 1.6 QUALITY ASSURANCE

- A. Installer Qualifications: A qualified firm that is approved, authorized, or licensed by roof system manufacturer to install manufacturer's product and that is eligible to receive manufacturer's special warranty.

#### 1.7 DELIVERY, STORAGE, AND HANDLING

- A. Deliver roofing materials to Project site in original containers with seals unbroken and labeled with manufacturer's name, product brand name and type, date of manufacture, approval or listing agency markings, and directions for storing and mixing with other components.
- B. Store liquid materials in their original undamaged containers in a clean, dry, protected location and within the temperature range required by roofing manufacturer. Protect stored liquid material from direct sunlight.
  1. Discard and legally dispose of liquid material that cannot be applied within its stated shelf life.
- C. Protect roof insulation materials from physical damage and from deterioration by sunlight, moisture, soiling, and other sources. Store in a dry location. Comply with insulation manufacturer's written instructions for handling, storing, and protecting during installation.

- D. Handle and store roofing materials, and place equipment in a manner to avoid permanent deflection of deck.

## 1.8 FIELD CONDITIONS

- A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit roofing to be installed according to manufacturer's written instructions and warranty requirements.
- B. Hazardous Materials: It is expected that hazardous materials will not be encountered in the Work.
  - 1. If suspected hazardous materials are encountered, do not disturb; immediately notify Architect and Owner. Hazardous materials will be removed by Owner under a separate contract.

## 1.9 WARRANTY

- A. Existing Warranties: Verify with Owner to ascertain the existence of existing roof warranties.
  - 1. Remove, patch, and repair roof systems using materials and methods so as to not void existing warranties. Notify warrantor before proceeding.
  - 2. Notify warrantor on completion of work and obtain documentation verifying that existing system has been inspected and warranty remains in effect. Submit documentation at Project closeout.
- B. Warranty Limitations: Warranties required by this Section shall be limited to the roofing Work required for this Project and shall not apply to existing roof system where no work is to be performed.
- C. Special Project Warranty: Submit roofing Installer's warranty, signed by Installer, covering the Work of this Section, including all components of roof patching and repair such as roof membrane, base flashing, roof insulation, fasteners, cover boards, and walkway products, for the following warranty period:
  - 1. Warranty Period: Two years from date of Substantial Completion.

## PART 2 - PRODUCTS

### 2.1 PERFORMANCE REQUIREMENTS

- A. Material Compatibility: Materials for patching existing roof system shall be compatible with one another, with existing roof system materials, and under conditions of service and application required, as demonstrated by roofing materials manufacturer(s) based on testing and field experience.

- B. General Performance: Installed roofing and base flashings shall withstand specified uplift pressures, thermally induced movement, and exposure to weather without failure due to defective manufacture, fabrication, installation, or other defects in construction. Built-up roofing and base flashings shall remain watertight.
  - 1. Accelerated Weathering: Roofing system shall withstand 2000 hours of exposure when tested according to ASTM G 152, ASTM G 154, or ASTM G 155.
  - 2. Impact Resistance: Roofing system shall resist impact damage when tested according to ASTM D 3746 or ASTM D4272.
- C. Roofing System Design: Tested by a qualified testing agency to resist uplift pressures according to AISC/SEI 7 for the Project location.
- D. Exterior Fire-Test Exposure: ASTM E 108 or UL 790, Class A; for application and roof slopes indicated; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

## 2.2 ROOFING AND FLASHING MEMBRANE SHEET MATERIALS

- A. General: Verify existing roof system membrane materials and provide roofing and flashing membrane sheet materials that are compatible with existing roof system. Materials shall be designed for cold applied installation to prevent thermal shock to existing roofing system caused by hot mopping.
- B. Source Limitations: Obtain components for patching and repair of roof systems from existing roof system manufacturer or approved by existing roof system manufacturer.

## 2.3 AUXILIARY ROOFING MATERIALS

- A. General: Auxiliary materials recommended by roofing manufacturer for intended use and compatible with built-up roofing.
  - 1. Liquid-type auxiliary materials shall comply with VOC limits of authorities having jurisdiction.
  - 2. Adhesives and sealants that are not on the exterior side of weather barrier shall comply with the following limits for VOC content:
    - a. Plastic Foam Adhesives: 50 g/L.
    - b. Gypsum Board and Panel Adhesives: 50 g/L.
    - c. Multipurpose Construction Adhesives: 70 g/L.
    - d. Fiberglass Adhesives: 80 g/L.
    - e. Contact Adhesives: 80 g/L.
    - f. Other Adhesives: 250 g/L.
    - g. Nonmembrane Roof Sealants: 300 g/L.
    - h. Sealant Primers for Nonporous Substrates: 250 g/L.
    - i. Sealant Primers for Porous Substrates: 775 g/L.
- B. Asphalt Primer: ASTM D 41/D 41M.

- C. Cold-Applied Adhesive: Roofing manufacturer's standard asphalt-based, one or two-part, asbestos-free, cold-applied adhesive specially formulated for compatibility and use with built-up base flashings.
- D. Asphalt Roofing Cement: ASTM D 4586, asbestos free, of consistency required by roofing manufacturer for application.
- E. Mastic Sealant: Polyisobutylene, plain or modified bitumen; nonhardening, nonmigrating, nonskinning, and nondrying.
- F. Fasteners: Factory-coated steel fasteners and metal or plastic plates complying with corrosion-resistance provisions in FM Global 4470, designed for fastening built-up roofing components to substrate; tested by manufacturer for required pullout strength, and acceptable to roofing manufacturer.
- G. Miscellaneous Accessories: Provide those recommended by roofing system manufacturer.

#### 2.4 ROOF INSULATION AND INSULATION ACCESSORIES

- A. Board Insulation, General: Preformed roof insulation boards manufactured or approved by roofing manufacturer, selected from manufacturer's standard sizes suitable for application, of thicknesses indicated. Roof insulation accessories recommended by insulation manufacturer for intended use and compatible with built-up roofing.
  - 1. General: Verify existing insulation materials and provide insulation materials that are compatible with existing insulation and roof system. Materials shall be designed for cold applied installation to prevent thermal shock to existing roofing system caused by hot mopping.
- B. Polyisocyanurate Board Insulation: ASTM C 1289, Type II, Class 1, Grade 2, felt or glass-fiber mat facer on both major surfaces.
- C. Provide preformed saddles, crickets, tapered edge strips, and other insulation shapes where indicated for sloping to drain. Fabricate to slopes required for project conditions, not less than 1/4 inch per 12 inches.
- D. Fasteners: Factory-coated steel fasteners and metal or plastic plates complying with corrosion-resistance provisions in FM Global 4470, designed for fastening roof insulation to substrate and acceptable to roofing manufacturer.
- E. Insulation Adhesive: Insulation manufacturer's recommended adhesive formulated to attach roof insulation to substrate or to another insulation layer as follows:
  - 1. Modified asphaltic, asbestos-free, cold-applied adhesive.
- F. Insulation Cant Strips: ASTM C 728, perlite insulation board or ASTM C 208, Type II, Grade 1, cellulosic-fiber insulation board.

- G. Wood Nailer Strips: Comply with requirements in Division 06 Section "Miscellaneous Rough Carpentry."
- H. Tapered Edge Strips: ASTM C 728, perlite insulation board or ASTM C 208, Type II, Grade 1, cellulosic-fiber insulation board.
- I. Cover Board: ASTM C 208, Type II, Grade 2, cellulosic-fiber insulation board, 1/2 inch thick.
- J. Substrate Joint Tape: 6 or 8-inchwide, coated, glass fiber.

## PART 3 - EXECUTION

### 3.1 ROOFING REMOVAL

- A. General: Remove existing roof system only to the extent required for Work of the Project and as indicated. Use methods required to complete the Work within limitations of governing regulations.
  - 1. Comply with requirements of Division 02 Section "Selective Demolition."
- B. Protect existing roof where no work is to be performed.

### 3.2 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements and other conditions affecting performance of the Work:
  - 1. Verify existing roof system conditions are the same as conditions assumed for proposing patching and repair of the roof.
  - 2. Verify that roof openings and penetrations are in place, curbs are set and braced, and roof-drain bodies are securely clamped in place.
  - 3. Verify that cants, blocking, curbs, and nailers are securely anchored to roof deck at penetrations and terminations and that nailers match thicknesses of insulation.
  - 4. Verify that concrete substrates are visibly dry and free of moisture. Test for capillary moisture by plastic sheet method according to ASTM D 4263.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.3 PREPARATION

- A. Clean substrate of dust, debris, moisture, and other substances detrimental to roof patching and repairing according to roofing manufacturer's written instructions. Remove sharp projections.
- B. Prevent materials from entering and clogging roof drains and conductors and from spilling or migrating onto surfaces of other construction. Remove roof-drain plugs when no work is taking place or when rain is forecast.

- C. Protect existing roof where no work is to be performed.
- D. Prime surface of concrete deck with asphalt primer at a rate of 3/4 gal./100 sq. ft and allow primer to dry.

### 3.4 INSTALLATION

- A. Patch and repair roof systems according to roofing manufacturer's written instructions, recommendations of ARMA/NRCA applicable to patching and repairing, and to be compatible with existing roofing system.
- B. Insulation: Install insulation in thickness to match existing insulation.
- C. Cover Boards: Install cover boards over insulation to match existing conditions.
- D. Cant Strips: Install and secure preformed 45-degree insulation cant strips at junctures of built-up roofing with vertical surfaces or angle changes greater than 45 degrees.
- E. Crickets: Provide crickets of tapered insulation where required for drainage around curbs and similar drainage obstructions.
- F. Membrane Roofing Materials:
  - 1. Apply membrane materials with cold process methods.
  - 2. Install membrane materials matching number of plies of existing roofing system.
  - 3. Ply Sheets: Lap ply sheets and shingle in direction to shed water. Extend ply sheets over and terminate beyond cants.
  - 4. Cap Sheet: Install lapped granulated cap sheet starting at low point of roofing. Offset laps from laps of preceding ply sheets, and align cap sheet without stretching. Lap in direction to shed water. Extend cap sheet over and terminate beyond cants.
  - 5. Install base flashing over cant strips and other sloping and vertical surfaces, at roof edges, and at penetrations through roof; secure to substrates according to built-up roofing manufacturer's written instructions.

### 3.5 FIELD QUALITY CONTROL

- A. Roof Inspection: Where existing warranties are in place, arrange for roofing system Manufacturer's technical personnel to inspect roofing installation on completion and submit report to Architect.

### 3.6 PROTECTING AND CLEANING

- A. Protect roofing from damage and wear during remainder of construction period. When remaining construction does not affect or endanger roofing, inspect roofing for deterioration and damage, describing its nature and extent in a written report, with copies to Architect and Owner.

- B. Correct deficiencies in patching and repair of roof systems that do not comply with requirements. Repair to a condition free of damage and deterioration at time of Substantial Completion and according to warranty requirements.
- C. Clean overspray and spillage from adjacent construction using cleaning agents and procedures recommended by manufacturer of affected construction.

END OF SECTION



SECTION 076200  
SHEET METAL FLASHING AND TRIM

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:

- 1. Formed sheet metal fabrications:
  - a. Flashing and trim.
  - b. Miscellaneous sheet metal fabrications.

- B. Related Sections include the following:

- 1. Division 06 Section "Rough Carpentry" for wood nailers, curbs, and blocking.
- 2. Division 07 Sections as applicable to roofing for sheet metal flashing and trim integral with roofing systems.
- 3. Division 07 Section "Joint Sealants" for field-applied sheet metal flashing and trim sealants.

1.3 COORDINATION

- A. Coordinate sheet metal flashing and trim layout and seams with sizes and locations of penetrations to be flashed, and joints and seams in adjacent materials.
- B. Coordinate sheet metal flashing and trim installation with adjoining roofing and wall materials, joints, and seams to provide leakproof, secure, and noncorrosive installation.

1.4 SUBMITTALS

- A. Product Data: For each type of manufactured product. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for each manufactured product and accessory.

- B. Shop Drawings: For fabricated sheet metal items. Show fabrication and installation layouts including plans, elevations, expansion-joint locations, and keyed details. Distinguish between shop and field-assembled work. Include the following:
1. Identification of material, thickness, weight, and finish for each item and location in Project.
  2. Details for forming sheet metal flashing and trim, including profiles, shapes, seams, and dimensions.
  3. Details for joining, supporting, and securing sheet metal flashing and trim, including layout of fasteners, cleats, clips, and other attachments. Include pattern of seams.
  4. Details of termination points and assemblies, including fixed points.
  5. Details of expansion joints and expansion-joint covers, including showing direction of expansion and contraction.
  6. Details of edge conditions, including eaves, ridges, valleys, rakes, crickets, and counterflashings as applicable.
  7. Details of special conditions.
  8. Details of connections to adjoining work.
  9. Detail formed flashing and trim at a scale of not less than 3 inches per 12 inches.
- C. Qualification Data: For fabricator.

## 1.5 QUALITY ASSURANCE

- A. Fabricator Qualifications: Entity that employs skilled workers who custom fabricate sheet metal flashing and trim similar to that required for this Project and whose products have a record of successful in-service performance.

## 1.6 DELIVERY, STORAGE, AND HANDLING

- A. Do not store sheet metal flashing and trim materials in contact with other materials that might cause staining, denting, or other surface damage. Store sheet metal flashing and trim materials away from uncured concrete and masonry.
- B. Protect strippable protective covering on sheet metal flashing and trim from exposure to sunlight and high humidity, except to the extent necessary for the period of sheet metal flashing and trim installation.

## PART 2 - PRODUCTS

### 2.1 PERFORMANCE REQUIREMENTS

- A. General: Sheet metal flashing and trim assemblies shall withstand wind loads, structural movement, thermally induced movement, and exposure to weather without failure due to defective manufacture, fabrication, installation, or other defects in construction. Completed sheet metal flashing and trim shall not rattle, leak, or loosen, and shall remain watertight.

- B. Sheet Metal Standard for Flashing and Trim: Comply with NRCA's "The Roofing and Waterproofing Manual" and SMACNA's "Architectural Sheet Metal Manual" requirements as applicable for dimensions and profiles shown unless more stringent requirements are indicated.
- C. Thermal Movements: Sheet metal flashing and trim shall allow for thermal movements from ambient and surface temperature changes to prevent buckling, opening of joints, hole elongation, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Provide clips that resist rotation and avoid shear stress as a result of sheet metal and trim thermal movements.
  - 1. Temperature Change (Range): 120 deg F (67 deg C), ambient; 180 deg F (100 deg C), material surfaces.

## 2.2 SHEET METALS

- A. General: Protect mechanical and other finishes on exposed surfaces from damage by applying a strippable, temporary protective film before shipping.
- B. Metallic-Coated Steel Sheet: Provide zinc-coated (galvanized) steel sheet according to ASTM A 653/A 653M, G90 coating designation or aluminum-zinc alloy-coated steel sheet according to ASTM A 792/A 792M, Class AZ50 coating designation, Grade 40.
  - 1. Surface: Smooth, flat and mill phosphatized for field painting.

## 2.3 UNDERLAYMENT MATERIALS

- A. Polyethylene Sheet: 6-mil thick polyethylene sheet complying with ASTM D 4397.
- B. Felt: ASTM D 226, Type II (No. 30), asphalt-saturated organic felt, nonperforated.

## 2.4 MISCELLANEOUS MATERIALS

- A. General: Provide materials and types of fasteners, solder, welding rods, protective coatings, separators, sealants, and other miscellaneous items as required for complete sheet metal flashing and trim installation and recommended by manufacturer of primary sheet metal or manufactured item unless otherwise indicated.
- B. Fasteners: Wood screws, annular threaded nails, self-tapping screws, self-locking rivets and bolts, and other suitable fasteners designed to withstand design loads and recommended by manufacturer of primary sheet metal or manufactured item.
  - 1. Self-drilling screws, gasketed, with hex-washer head.
  - 2. Blind Fasteners: High-strength aluminum or stainless-steel rivets suitable for metal being fastened.
  - 3. Fasteners for Aluminum Sheet: Aluminum or Series 300 stainless steel.
  - 4. Fasteners for Zinc-Coated (Galvanized) or Aluminum-Zinc Alloy-Coated Steel Sheet: Hot-dip galvanized steel according to ASTM A 153/A 153M or ASTM F 2329 or Series 300 stainless steel.

- C. Solder for Zinc-Coated (Galvanized) Steel: ASTM B 32, Grade Sn50, 50 percent tin and 50 percent lead or Grade Sn60, 60 percent tin and 40 percent lead.
- D. Sealant Tape: Pressure-sensitive, 100 percent solids, gray polyisobutylene compound sealant tape with release-paper backing. Provide permanently elastic, nonsag, nontoxic, nonstaining tape 1/2 inch wide and 1/8 inch thick.
- E. Elastomeric Sealant: ASTM C 920, elastomeric polyurethane, polysulfide, or silicone polymer sealant; low modulus; of type, grade, class, and use classifications required to seal joints in sheet metal flashing and trim and remain watertight.
- F. Butyl Sealant: ASTM C 1311, single-component, solvent-release butyl rubber sealant; polyisobutylene plasticized; heavy bodied for hooked-type expansion joints with limited movement.
- G. Bituminous Coating: Cold-applied asphalt emulsion complying with ASTM D 1187.
- H. Asphalt Roofing Cement: ASTM D 4586, asbestos free, of consistency required for application.

## 2.5 FABRICATION, GENERAL

- A. General: Custom fabricate sheet metal flashing and trim as indicated on Drawings and to comply with recommendations in SMACNA's "Architectural Sheet Metal Manual" that apply to design, dimensions, geometry, metal thickness, and other characteristics of item indicated. Fabricate items at the shop to greatest extent possible.
  - 1. Fabricate sheet metal flashing and trim in thickness or weight needed to comply with performance requirements, but not less than that specified for each application and metal.
  - 2. Obtain field measurements for accurate fit before shop fabrication.
  - 3. Form sheet metal flashing and trim without excessive oil canning, buckling, and tool marks and true to line and levels indicated, with exposed edges folded back to form hems.
  - 4. Conceal fasteners and expansion provisions where possible. Exposed fasteners are not allowed on faces exposed to view.
- B. Fabrication Tolerances: Fabricate sheet metal flashing and trim that is capable of installation to a tolerance of 1/4 inch in 20 feet on slope and location lines as indicated and within 1/8-inch offset of adjoining faces and of alignment of matching profiles.
- C. Sealed Joints: Form nonexpansion but movable joints in metal to accommodate elastomeric sealant.
- D. Expansion Provisions: Where lapped expansion provisions cannot be used, form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with butyl sealant concealed within joints.

- E. Fabricate cleats and attachment devices from same material as accessory being anchored and of sizes as recommended by SMACNA's "Architectural Sheet Metal Manual" for application, but not less than thickness of metal being secured.
- F. Seams: Fabricate nonmoving seams with flat-lock seams and as follows:
  - 1. Seams for Pre-Finished Metal: Form seams and seal with elastomeric sealant unless otherwise recommended by sealant manufacturer for intended use. Rivet joints where necessary for strength.
  - 2. Seams for Unfinished Sheet Steel: Tin edges to be seamed, form seams, and solder.
  - 3. Seams for Unfinished Aluminum: Form seams and seal with epoxy seam sealer. Rivet joints where necessary for strength.
- G. Do not use graphite pencils to mark metal surfaces.
- H. Conceal fasteners and expansion provisions where possible on exposed-to-view sheet metal flashing and trim, unless otherwise indicated.

## 2.6 MISCELLANEOUS SHEET METAL FABRICATIONS

- A. Miscellaneous Sheet Metal Fabrications: Fabricate from 0.028 inch (24 gage) thick galvanized steel unless otherwise indicated.

## 2.7 FINISHES

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- B. Protect mechanical and painted finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- C. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in the same piece are not acceptable. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

# PART 3 - EXECUTION

## 3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, to verify actual locations, dimensions and other conditions affecting performance of work.
  - 1. Verify compliance with requirements for installation tolerances of substrates.
  - 2. Verify that substrate is sound, dry, smooth, clean, sloped for drainage, and securely anchored.

- B. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 UNDERLAYMENT INSTALLATION

- A. Polyethylene Sheet: Install polyethylene sheet with adhesive for anchorage to minimize use of mechanical fasteners under sheet metal flashing and trim. Apply in shingle fashion to shed water, with lapped and taped joints of not less than 2 inches.
- B. Felt Underlayment: Install felt underlayment with adhesive for temporary anchorage to minimize use of mechanical fasteners under sheet metal flashing and trim. Apply in shingle fashion to shed water, with lapped joints of not less than 2 inches.

### 3.3 INSTALLATION, GENERAL

- A. General: Anchor sheet metal flashing and trim and other components of the Work securely in place, with provisions for thermal and structural movement. Use fasteners, solder, welding rods, protective coatings, separators, sealants, and other miscellaneous items as required to complete sheet metal flashing and trim system.
  - 1. Install sheet metal flashing and trim true to line and levels indicated. Provide uniform, neat seams with minimum exposure of solder, welds, and sealant.
  - 2. Install sheet metal flashing and trim to fit substrates and to result in watertight performance. Verify shapes and dimensions of surfaces to be covered before fabricating sheet metal.
  - 3. Space cleats not more than 12 inches apart. Anchor each cleat with two fasteners. Bend tabs over fasteners.
  - 4. Install exposed sheet metal flashing and trim without excessive oil canning, buckling, and tool marks.
  - 5. Install sealant tape where indicated.
  - 6. Torch cutting of sheet metal flashing and trim is not permitted.
  - 7. Do not use graphite pencils to mark metal surfaces.
- B. Metal Protection: Where dissimilar metals will contact each other or corrosive substrates, protect against galvanic action by painting contact surfaces with bituminous coating or by other permanent separation as recommended by SMACNA.
  - 1. Coat back side of uncoated aluminum sheet metal flashing and trim with bituminous coating where flashing and trim will contact wood, ferrous metal, or cementitious construction.
  - 2. Underlayment: Where installing metal flashing directly on cementitious or wood substrates, install a course of felt underlayment and cover with a slip sheet or install a course of polyethylene sheet.
- C. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim. Space movement joints at a maximum of 10 feet with no joints allowed within 24 inches of corners or intersections. Where lapped expansion provisions cannot be used or would not be sufficiently watertight, form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with sealant concealed within joints.

D. Fastener Sizes:

1. Wood Framing, Blocking, and Sheathing: Use fasteners of sizes that will penetrate [wood sheathing not less than 1-1/4 inches for nails and not less than 3/4 inch for wood screws.

E. Seal joints as shown and as required for watertight construction.

1. Where sealant-filled joints are used, embed hooked flanges of joint members not less than 1 inch into sealant. Form joints to completely conceal sealant. When ambient temperature at time of installation is moderate, between 40 and 70 deg F, set joint members for 50 percent movement each way. Adjust setting proportionately for installation at higher ambient temperatures. Do not install sealant-type joints at temperatures below 40 deg F.
2. Prepare joints and apply sealants to comply with requirements in Division 07 Section "Joint Sealants."

F. Soldered Joints: Clean surfaces to be soldered, removing oils and foreign matter. Pre-tin edges of sheets to be soldered to a width of 1-1/2 inches, except reduce pre-tinning where pre-tinned surface would show in completed Work.

1. Do not solder coil-coated steel and aluminum sheet.
2. Do not use torches for soldering. Heat surfaces to receive solder and flow solder into joint. Fill joint completely. Completely remove flux and spatter from exposed surfaces.

### 3.4 MISCELLANEOUS FLASHING INSTALLATION

- A. Equipment Support Flashing: Coordinate installation of equipment support flashing with installation of roofing and equipment. Weld or seal flashing with elastomeric sealant to equipment support member.

### 3.5 ERECTION TOLERANCES

- A. Installation Tolerances: Shim and align sheet metal flashing and trim within installed tolerance of 1/4 inch in 20 feet on slope and location lines as indicated and within 1/8-inch offset of adjoining faces and of alignment of matching profiles.

### 3.6 CLEANING AND PROTECTION

- A. Clean exposed metal surfaces of substances that interfere with uniform oxidation and weathering.
- B. Clean and neutralize flux materials. Clean off excess solder and sealants.
- C. Remove temporary protective coverings and strippable films as sheet metal flashing and trim are installed. On completion of installation, clean finished surfaces, including removing unused fasteners, metal filings, pop rivet stems, and pieces of flashing. Maintain in a clean condition during construction.

- D. Replace sheet metal flashing and trim that have been damaged or that have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

END OF SECTION



SECTION 077233  
ROOF HATCH GUARDRAILS

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:
  - 1. Roof hatch guardrails.
- B. Related Sections:
  - 1. Division 07 Sections as applicable to roofing systems.

1.3 SUBMITTALS

- A. Product Data: For roof hatch guardrail system. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.
- B. Shop Drawings: For roof hatch guardrail system; include plans, elevations, keyed details, and attachments to other work. Indicate dimensions, loadings, and special conditions.
- C. Operation and Maintenance Data: For roof hatch guardrail system to include in operation and maintenance manuals.

1.4 COORDINATION

- A. Coordinate installation of roof hatch guardrails with roof framing, roofing system, flashing, and interfacing and adjoining construction to provide a leakproof, weathertight, secure, and noncorrosive installation.
- B. Coordinate dimensions with rough-in information or Shop Drawings of equipment to be supported.

## PART 2 - PRODUCTS

### 2.1 PERFORMANCE REQUIREMENTS, GENERAL

- A. General Performance: Roof hatch guardrail systems shall withstand exposure to weather and resist thermally induced movement without failure, rattling, leaking, or fastener disengagement due to defective manufacture, fabrication, installation, or other defects in construction.

### 2.2 ROOF HATCH SAFETY RAILING SYSTEM

- A. Performance Requirements: Comply with 29 CFR 1910.23 requirements and authorities having jurisdiction including CAL-OSHA.
- B. Safety Railing System: Roof hatch guardrail system including rails, clamps, fasteners, safety barrier at railing opening, and accessories required for a complete installation; and attached to roof hatch.
  - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Babcock-Davis.
    - b. Bilco Company (The).
    - c. Dur-Red Products.
    - d. J. L. Industries, Inc.
    - e. Milcor Inc.; Commercial Products Group of Hart & Cooley, Inc.
    - f. Nystrom.
  - 2. Height: 42 inches minimum above finished roof deck.
  - 3. Posts and Rails: Galvanized-steel pipe, 1-1/4 inches in diameter or galvanized-steel tube, 1-5/8 inches in diameter.
  - 4. Maximum Opening Size between Rails: System constructed to prevent passage of a sphere 21 inches in diameter.
  - 5. Gate: Self-closing and self-latching gate fabricated of same materials and rail spacing as safety railing system. Provide manufacturer's standard hinges and self-latching mechanism.
  - 6. Post and Rail Tops and Ends: Weather resistant, closed or plugged with prefabricated end fittings.
  - 7. Provide weep holes or another means to drain entrapped water in hollow sections of handrail and railing members.
  - 8. Fabricate joints exposed to weather to be watertight.
  - 9. Fasteners: Manufacturer's standard, finished to match railing system.
  - 10. Finish: Manufacturer's standard.

## 2.3 METAL MATERIALS

- A. Zinc-Coated (Galvanized) Steel Sheet: ASTM A 653/A 653M, G90 coating designation.
  - 1. Baked-Enamel or Powder-Coat Finish: After cleaning and pretreating, apply manufacturer's standard two-coat, baked-on finish consisting of prime coat and thermosetting topcoat to a minimum dry film thickness of 2 mils.
  - 2. Concealed Finish: Pretreat with manufacturer's standard white or light-colored acrylic or polyester-backer finish consisting of prime coat and wash coat, with a minimum total dry film thickness of 0.5 mil.
- B. Steel Shapes: ASTM A 36/A 36M, hot-dip galvanized according to ASTM A 123/A 123M unless otherwise indicated.
- C. Steel Tube: ASTM A 500, round tube.
- D. Galvanized-Steel Tube: ASTM A 500, round tube, hot-dip galvanized according to ASTM A 123/A 123M.
- E. Steel Pipe: ASTM A 53/A 53M, galvanized.

## 2.4 MISCELLANEOUS MATERIALS

- A. General: Provide materials and types of fasteners, protective coatings, sealants, and other miscellaneous items required by manufacturer for a complete installation.
- B. Bituminous Coating: Cold-applied asphalt emulsion complying with ASTM D 1187.
- C. Underlayment:
  - 1. Felt: ASTM D 226, Type II (No. 30), asphalt-saturated organic felt, nonperforated.
  - 2. Polyethylene Sheet: 6-mil thick polyethylene sheet complying with ASTM D 4397.
  - 3. Slip Sheet: Building paper, 3-lb/100 sq. ft. minimum, rosin sized.
- D. Fasteners: Roof accessory manufacturer's recommended fasteners suitable for application and metals being fastened. Match finish of exposed fasteners with finish of material being fastened. Provide nonremovable fastener heads to exterior exposed fasteners. Furnish the following unless otherwise indicated:
  - 1. Fasteners for Zinc-Coated or Aluminum-Zinc Alloy-Coated Steel: Series 300 stainless steel or hot-dip zinc-coated steel according to ASTM A 153/A 153M or ASTM F 2329.
- E. Gaskets: Manufacturer's standard tubular or fingered design of neoprene, EPDM, PVC, or silicone or a flat design of foam rubber, sponge neoprene, or cork.

- F. Elastomeric Sealant: ASTM C 920, elastomeric polyurethane or silicone polymer sealant as recommended by roof accessory manufacturer for installation indicated; low modulus; of type, grade, class, and use classifications required to seal joints and remain watertight.
- G. Butyl Sealant: ASTM C 1311, single-component, solvent-release butyl rubber sealant; polyisobutylene plasticized; heavy bodied for expansion joints with limited movement.
- H. Asphalt Roofing Cement: ASTM D 4586, asbestos free, of consistency required for application.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, to verify actual locations, dimensions, and other conditions affecting performance of the Work.
- B. Verify that substrate is sound, dry, smooth, clean, sloped for drainage, and securely anchored.
- C. Verify dimensions of roof openings for roof accessories.
- D. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 INSTALLATION

- A. General: Install roof hatch guardrails according to manufacturer's written instructions.
  - 1. Install roof hatch guardrails level, plumb, true to line and elevation, and without warping, jogs in alignment, excessive oil canning, buckling, or tool marks.
  - 2. Anchor roof hatch guardrails securely in place so they are capable of resisting indicated loads.
  - 3. Use fasteners, separators, sealants, and other miscellaneous items as required to complete installation and fit them to substrates.
  - 4. Install roof hatch guardrails to resist exposure to weather without failing, rattling, leaking, or loosening of fasteners and seals.
- B. Metal Protection: Protect metals against galvanic action by separating dissimilar metals from contact with each other or with corrosive substrates by painting contact surfaces with bituminous coating or by other permanent separation as recommended by manufacturer.
  - 1. Underlayment: Where installing roof accessories directly on cementitious or wood substrates, install a course of felt underlayment and cover with a slip sheet, or install a course of polyethylene sheet.
  - 2. Bed flanges in thick coat of asphalt roofing cement where required by manufacturers of roof accessories for waterproof performance.

- C. Safety Railing Installation: Attach safety railing system to roof-hatch curb.

### 3.3 REPAIR AND CLEANING

- A. Galvanized Surfaces: Clean bolted connections and abraded areas, and repair galvanizing according to ASTM A 780.
- B. Touch up factory-finished surfaces with compatible finish.
- C. Clean exposed surfaces according to manufacturer's written instructions.
- D. Clean off excess sealants.
- E. Replace items that have been damaged or that cannot be successfully repaired by finish touchup or similar minor repair procedures.

END OF SECTION



SECTION 079200  
JOINT SEALANTS

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:

1. Silicone joint sealants including mildew resistant silicone joint sealants
2. Urethane joint sealants.
3. Latex joint sealants.
4. Acoustical joint sealants.
5. Joint sealant Backings

- B. Related Sections:

1. Division 04 Section "Concrete Unit Masonry" for masonry control and expansion joint fillers and gaskets.

1.3 SUBMITTALS

- A. Product Data: For each joint-sealant product, include documentation for VOC content of sealants and sealant primers.
- B. Samples for Initial Selection: Manufacturer's color charts consisting of strips of cured sealants showing the full range of colors available for each product exposed to view.
- C. Joint-Sealant Schedule: Include the following information:
1. Joint-sealant application, joint location, and designation.
  2. Joint-sealant manufacturer and product name.
  3. Joint-sealant formulation.
  4. Joint-sealant color.
- D. Warranties: Sample of special warranties.

## 1.4 QUALITY ASSURANCE

- A. **Installer Qualifications:** An entity employing installers trained and experienced in installing joint sealants similar in material, design, and extent to that indicated for this Project, whose work has resulted in construction with a record of successful performance.

## 1.5 WARRANTY

- A. **Special Installer's Warranty:** Installer agrees to repair or replace joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.
  - 1. **Warranty Period:** Two years from date of Substantial Completion.
- B. **Special Manufacturer's Warranty:** Manufacturer agrees to furnish joint sealants to repair or replace those that do not comply with performance and other requirements specified in this Section within specified warranty period.
  - 1. **Warranty Period:** Five years from date of Substantial Completion.
- C. **Special warranties shall warrant that all exposed sealants will be guaranteed against any crazing developing on the surfaces of the material, any staining of adjacent surfaces by sealant or by primer (yellowing, etc.), chalking, or color changes on surface of cured sealant.**
- D. **Special warranties specified in this article exclude deterioration or failure of joint sealants from the following:**
  - 1. **Movement of the structure caused by structural settlement or errors attributable to design or construction resulting in stresses on the sealant exceeding sealant manufacturer's written specifications for sealant elongation and compression.**
  - 2. **Disintegration of joint substrates from causes exceeding design specifications.**
  - 3. **Mechanical damage caused by individuals, tools, or other outside agents.**
  - 4. **Changes in sealant appearance caused by accumulation of dirt or other atmospheric contaminants.**

## PART 2 - PRODUCTS

### 2.1 JOINT SEALANTS, GENERAL

- A. **Compatibility:** Provide joint sealants, backings, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by joint-sealant manufacturer, based on testing and field experience.



- B. VOC Content: Sealants and primers applied at the Project site shall comply with VOC limits of authorities having jurisdiction; VOC limits, exclusive of colorants added to a tint base, when calculated according to 40 CFR 59, Subpart D (EPA Method 24); and VOC limits of the California Green Building Standards Code (CGBSC), Section 5.504.4.1 and Table 504.4.2 as follows:
  - 1. Architectural Sealants: 250 g/L.
  - 2. Sealant Primers for Nonporous Substrates: 250 g/L.
  - 3. Sealant Primers for Porous Substrates: 775 g/L.
- C. Liquid-Applied Joint Sealants: Comply with ASTM C 920 and other requirements indicated for each liquid-applied joint sealant specified, including those referencing ASTM C 920 classifications for type, grade, class, and uses related to exposure and joint substrates.
- D. Stain-Test-Response Characteristics: Where sealants are indicated to be nonstaining to porous substrates, provide products that have undergone testing according to ASTM C 1248 and have not stained porous joint substrates indicated for Project.
- E. Suitability for Contact with Food: Where sealants are used in areas of food preparation, use products that comply with 21 CFR 177.2600 and are USDA approved.
- F. Colors of Exposed Joint Sealants: As selected by Architect from manufacturer's full range.
- G. Source Limitations: Obtain each kind of joint sealant from a single source from a single manufacturer.

## 2.2 SILICONE JOINT SEALANTS

- A. Silicone, S, NS, 100/50, NT: Single-component, nonsag, plus 100 percent and minus 50 percent movement capability, non-traffic-use, neutral-curing silicone joint sealant; ASTM C920, Type S, Grade NS, Class 100/50, Use NT. neutral-curing silicone joint sealant; ASTM C 920, Type S, Grade NS, Class 100/50, for Use NT.
  - 1. Products: Subject to compliance with requirements, provide one of the following:
    - a. Dow Corning Corporation; 790.
    - b. GE Advanced Materials - Silicones; SilPruf LM SCS2700.
    - c. Tremco Incorporated; Spectrem 1.
  - 2. Joint Sealant Application: Exterior joints where one or both joint faces are masonry, stone, concrete or other porous materials.

- B. Silicone, Acid Curing, S, NS, 25, NT: Single-component, nonsag, plus 25 percent and minus 25 percent movement capability, nontraffic-use, acid-curing silicone joint sealant; ASTM C920, Type S, Grade NS, Class 25, Use NT.
1. Products: Subject to compliance with requirements, provide one of the following:
    - a. Dow Corning Corporation; 999-A.
    - b. GE Advanced Materials - Silicones; Contractors SCS1000.
    - c. Tremco Incorporated; Proglaze.
  2. Joint Sealant Application: Exterior joints where both joint faces are metal, glass, plastic, or other non-porous material.
- C. Silicone, Mildew Resistant, Acid Curing, S, NS, 25, NT: Mildew-resistant, single-component, nonsag, plus 25 percent and minus 25 percent movement capability, nontraffic-use, acid-curing silicone joint sealant; ASTM C920, Type S, Grade NS, Class 25, Use NT; formulated for prolonged exposure to humidity with fungicide to prevent mold and mildew growth.
1. Products: Subject to compliance with requirements, provide one of the following:
    - a. Dow Corning Corporation; 786 Mildew Resistant.
    - b. GE Advanced Materials - Silicones; Sanitary SCS1700.
    - c. Tremco Incorporated; Tremsil 200 Sanitary.
  2. Joint Sealant Application: Interior joints between plumbing fixtures and floor or wall surfaces of non-porous materials.

## 2.3 URETHANE JOINT SEALANTS

- A. Urethane, S, NS, 25, NT: Single-component, nonsag, nontraffic-use, plus 25 percent and minus 25 percent movement capability, urethane joint sealant; ASTM C920, Type S, Grade NS, Class 25, Use NT.
1. Products: Subject to compliance with requirements, provide one of the following:
    - a. BASF Building Systems; Sonolastic NP1.
    - b. Pecora Corporation; Dynatrol I-XL.
    - c. Sika Corporation, Construction Products Division; Sikaflex - 1a.
  2. Joint Sealant Application: Exterior joints of hollow metal frames, exterior joints in concrete and masonry walls, and interior and exterior joints requiring painting.
- B. Urethane, S, P, 25, T, NT: Single-component, pourable, plus 25 percent and minus 25 percent movement capability, traffic- and nontraffic-use, urethane joint sealant; ASTM C920, Type S, Grade P, Class 25, Uses T and NT.
1. Products: Subject to compliance with requirements, provide one of the following:
    - a. BASF Building Systems; Sonolastic SL 1.
    - b. Pecora Corporation; Urexpan NR-201.

- c. Sika Corporation. Construction Products Division; Sikaflex - 1CSL.
- 2. Joint Sealant Application: Interior concrete slab floor joints and exterior paving joints.

## 2.4 LATEX JOINT SEALANTS

- A. Latex Joint Sealant: Acrylic latex or siliconized acrylic latex, ASTM C 834, Type OP, Grade NF.
  - 1. Products: Subject to compliance with requirements, provide one of the following:
    - a. BASF Building Systems; Sonolac.
    - b. Pecora Corporation; AC-20+.
    - c. Tremco Incorporated; Tremflex 834.
  - 2. Joint Sealant Application: Interior non-moving joints between gypsum board and adjacent materials, trim, or similar surfaces.

## 2.5 ACOUSTICAL JOINT SEALANTS

- A. Acoustical Joint Sealant: Manufacturer's standard non-sag, paintable, non-staining latex acoustical sealant complying with ASTM C 834 that effectively reduces airborne sound transmission through perimeter joints and openings in building construction as demonstrated by testing representative assemblies according to ASTM E 90.
  - 1. Products: Subject to compliance with requirements, provide one of the following:
    - a. GE Construction Sealants; RCS20 Acoustical.
    - b. Pecora Corporation; AC-20 FTR or AIS-919.
    - c. Tremco, Incorporated; Tremco Acoustical Sealant.
    - d. USG Corporation; SHEETROCK Acoustical Sealant.
  - 2. Joint Sealant Application: Interior joints of acoustically rated construction and where indicated on Drawings.

## 2.6 JOINT SEALANT BACKING

- A. General: Provide sealant backings of material that are nonstaining; are compatible with joint substrates, sealants, primers, and other joint fillers; and are approved for applications indicated by sealant manufacturer based on field experience and laboratory testing.
- B. Cylindrical Sealant Backings: ASTM C 1330, Type C (closed-cell material with a surface skin) or Type B (bicellular material with a surface skin), as approved in writing by joint-sealant manufacturer for joint application indicated, and of size and density to control sealant depth and otherwise contribute to producing optimum sealant performance.

- C. Bond-Breaker Tape: Polyethylene tape or other plastic tape recommended by sealant manufacturer for preventing sealant from adhering to rigid, inflexible joint-filler materials or joint surfaces at back of joint. Provide self-adhesive tape where applicable.

## 2.7 MISCELLANEOUS MATERIALS

- A. Primer: Material recommended by joint-sealant manufacturer where required for adhesion of sealant to joint substrates.
- B. Cleaners for Nonporous Surfaces: Chemical cleaners acceptable to manufacturers of sealants and sealant backing materials, free of oily residues or other substances capable of staining or harming joint substrates and adjacent nonporous surfaces in any way, and formulated to promote optimum adhesion of sealants to joint substrates.
- C. Masking Tape: Nonstaining, nonabsorbent material compatible with joint sealants and surfaces adjacent to joints.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine joints indicated to receive joint sealants, with Installer present, for compliance with requirements for joint configuration, installation tolerances, and other conditions affecting joint-sealant performance.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 PREPARATION

- A. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealants to comply with joint-sealant manufacturer's written instructions and the following requirements:
  1. Remove all foreign material from joint substrates that could interfere with adhesion of joint sealant, including dust, paints (except for permanent, protective coatings tested and approved for sealant adhesion and compatibility by sealant manufacturer), old joint sealants, oil, grease, waterproofing, water repellents, water, surface dirt, and frost.
  2. Clean porous joint substrate surfaces by brushing, grinding, mechanical abrading, or a combination of these methods to produce a clean, sound substrate capable of developing optimum bond with joint sealants. Remove loose particles remaining after cleaning operations above by vacuuming or blowing out joints with oil-free compressed air. Porous joint substrates include the following:
    - a. Concrete.
    - b. Masonry.
    - c. Unglazed surfaces of ceramic tile.
    - d. Exterior insulation and finish systems.

3. Remove laitance and form-release agents from concrete.
  4. Clean nonporous joint substrate surfaces with chemical cleaners or other means that do not stain, harm substrates, or leave residues capable of interfering with adhesion of joint sealants. Nonporous joint substrates include the following:
    - a. Metal.
    - b. Glass.
    - c. Porcelain enamel.
    - d. Glazed surfaces of ceramic tile.
- B. Etch concrete and masonry joint surfaces as recommended by manufacturer to remove excess alkalinity, unless sealant manufacturer's printed instructions indicate that alkalinity does not interfere with sealant bond and performance. Etch with 5% solution of muriatic acid; neutralize with diluted ammonia solution, rinse thoroughly with water and allow to dry before sealant installation.
- C. Joint Priming: Prime joint substrates where recommended by joint-sealant manufacturer. Apply primer to comply with joint-sealant manufacturer's written instructions. Confine primers to areas of joint-sealant bond; do not allow spillage or migration onto adjoining surfaces.
- D. Masking Tape: Use masking tape where required to prevent contact of sealant or primer with adjoining surfaces that otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears. Remove tape immediately after tooling without disturbing joint seal.

### 3.3 INSTALLATION OF JOINT SEALANTS

- A. General: Comply with joint-sealant manufacturer's written installation instructions for products and applications indicated, unless more stringent requirements apply.
- B. Sealant Installation Standard: Comply with recommendations in ASTM C 1193 for use of joint sealants as applicable to materials, applications, and conditions indicated.
- C. Install sealant backings of kind indicated to support sealants during application and at position required to produce cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.
  1. Do not leave gaps between ends of sealant backings.
  2. Do not stretch, twist, puncture, or tear sealant backings.
  3. Remove absorbent sealant backings that have become wet before sealant application and replace them with dry materials.
- D. Install bond-breaker tape behind sealants where sealant backings are not used between sealants and backs of joints.

- E. Install sealants using proven techniques that comply with the following and at the same time backings are installed:
  - 1. Place sealants so they directly contact and fully wet joint substrates.
  - 2. Completely fill recesses in each joint configuration.
  - 3. Produce uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability.
  
- F. Install sealant to depths as shown or, if not shown, as recommended by sealant manufacturer but within the following general limitations, measured at center (thin) section of bead:
  - 1. For sidewalks, pavements and similar joints sealed with elastomeric sealants and subject to traffic and other abrasion and indentation exposures, fill joints to a depth equal to 75 percent of joint width, but neither more than 5/8 inch deep nor less than 3/8 inch deep.
  - 2. For normal moving joints sealed with elastomeric sealants but not subject to traffic, fill joints to a depth equal to 50 percent of joint width, but neither more than 1/2 inch deep nor less than 1/4 inch deep.
  - 3. For joints sealed with non-elastomeric sealants and caulking compounds, fill joints to a depth in range of 75 to 125 percent of joint width.
  
- G. Do not allow sealants or compounds to overflow or spill onto adjoining surfaces, or to migrate into voids of adjoining surfaces.
  
- H. Tooling of Nonsag Sealants: Immediately after sealant application and before skinning or curing begins, tool sealants according to requirements specified in subparagraphs below to form smooth, uniform beads of configuration indicated; to eliminate air pockets; and to ensure contact and adhesion of sealant with sides of joint.
  - 1. Remove excess sealant from surfaces adjacent to joints.
  - 2. Use tooling agents that are approved in writing by sealant manufacturer and that do not discolor sealants or adjacent surfaces.
  - 3. Provide concave joint profile per Figure 8A in ASTM C 1193, unless otherwise indicated.

### 3.4 INSTALLATION OF ACOUSTICAL JOINT SEALANTS

- A. General: Comply with acoustical joint-sealant manufacturer's written installation instructions unless more stringent requirements apply.
  
- B. Acoustical Ceiling Areas: Apply acoustical joint sealant at perimeter edge moldings of acoustical ceiling areas in a continuous ribbon concealed on back of vertical legs of moldings before they are installed.

### 3.5 CLEANING

- A. Clean off excess sealant or sealant smears adjacent to joints as the Work progresses by methods and with cleaning materials approved in writing by manufacturers of joint sealants and of products in which joints occur.

### 3.6 PROTECTION

- A. Protect joint sealants during and after curing period from contact with contaminating substances and from damage resulting from construction operations or other causes so sealants are without deterioration or damage at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out and remove damaged or deteriorated joint sealants immediately so installations with repaired areas are indistinguishable from original work.

END OF SECTION





SECTION 081053  
DOOR LOUVER AND LITE FRAMES

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:

- 1. Door lite frames for hollow metal doors.
- 2. Door louvers and frames for hollow metal doors.

- B. Related Sections:

- 1. Division 08 Sections "Hollow Metal Doors and Frames" for hollow metal doors.
- 2. Division 08 Section "Glazing" for glass installed in door lite frames.
- 3. Division 09 Sections "Painting" for field painting louvers and door lite frames.

1.3 SUBMITTALS

- A. Product Data: For each type of product indicated. Include construction details, material descriptions, and finishes.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Source Limitations: Obtain door lite frames and door louvers from a single source from a single manufacturer.

- B. Basis of Design Manufacturer: In other Part 2 Articles where products are identified by Basis of Design named manufacturer and product, products are based on items manufactured by:

- a. Anemostat Door Products.

- 1) Subject to compliance with requirements, provide products indicated, or comparable products by one of the following:

- a) Activar Construction Products Group.
- b) Alternate manufacturer subject to request for substitution.

## 2.2 DOOR LITE FRAMES

- A. Metal Frames for Light Openings in Doors: Manufacturer's standard frame formed of steel sheet; factory primed for field finishing.
  - 1. Basis of Design: Anemostat Door Products, LoPro or LoPro-IS Series as required for glass thickness specified.
  - 2. Physical Characteristics:
    - a. Frame Material: 0.033 inch thick (20 gage) steel of material as follows:
      - 1) Interior Door Lite Frames: Cold rolled steel of thickness indicated.
      - 2) Exterior Door Lite Frames: Hot dipped galvanized of thickness indicated.
    - b. Size: As indicated on Drawings.
    - c. Glazing Thickness: As indicated on Drawings.
    - d. Finish: Baked enamel.
    - e. Fasteners: Oval head Phillips wood or sheet metal screws.
      - 1) Provide one-way vandal resistant oval head wood or sheet metal screws at exterior doors.

## 2.3 DOOR LOUVERS

- A. Standard Louvers: Manufacturer's standard louver with frame formed of steel sheet; factory primed for field finishing.
- B. Security Louvers: Manufacturer's standard security louver with frame formed of steel sheet and security grille each side; factory primed for field finishing.
  - 1. Basis of Design: Anemostat Door Products, PLSL Series louver with security grille.
    - 1) Subject to compliance with requirements, provide product indicated or comparable products by one of the following:
      - a) Approved equivalent subject to request for substitution.
  - 2. Physical Characteristics:
    - a. Material:
      - 1) Exterior Door Louvers: Hot dipped galvanized of thickness indicated.
    - b. Security Grille: 0.1046 inch thick (12 gage) steel each side of door with 13/16 inch square holes spaced 1 inch on center each way.
    - c. Louver Blades: 0.032 inch thick (20 gage) steel, non-vision inverted split 'Y'.
    - d. Size: As indicated on Drawings.

- e. Free Ventilating Area: 50%.
- f. Finish: Baked enamel.
- g. Fasteners: One-way vandal resistant oval head through bolt, blank one end.
- h. Insect Screens: Provide galvanized insect screens for exterior door louvers installed between split louvers.

## 2.4 MATERIALS

- A. Cold-Rolled Steel Sheet: ASTM A 1008/A 1008M, Commercial Steel (CS), Type B; suitable for exposed applications.
- B. Hot-Rolled Steel Sheet: ASTM A 1011/A 1011M, Commercial Steel (CS), Type B; free of scale, pitting, or surface defects; pickled and oiled.
- C. Metallic-Coated Steel Sheet: ASTM A 653/A 653M, Commercial Steel (CS), Type B; with minimum A40 zinc-iron-alloy coating designation.
- D. Glazing: Comply with requirements in Division 8 Section "Glazing."

## PART 3 - EXECUTION

### 3.1 INSTALLATION

- A. General: Install door louvers, louver frames, and lite frames in accordance with manufacturer's written instructions.
- B. Glazing: Comply with installation requirements in Division 8 Section "Glazing" and with manufacturer's written instructions.

END OF SECTION



SECTION 081113  
HOLLOW METAL DOORS AND FRAMES

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:

- 1. Hollow-metal frames.
- 2. Hollow-metal doors.

- B. Related Sections:

- 1. Division 08 Section "Door Louver and Light frames for door light frames.
- 2. Division 08 Section "Door Hardware" for door hardware for hollow metal doors.
- 3. Division 08 Section "Glazing" for glass installed in hollow metal doors and frames.
- 4. Division 09 Sections "Painting" for field painting hollow metal doors and frames.
- 5. Division 26 Sections as applicable for electrical connections including conduit and wiring for door controls and operators.

1.3 DEFINITIONS

- A. Minimum Thickness: Minimum thickness of base metal without coatings.

1.4 SUBMITTALS

- A. Product Data: For each type of product indicated. Include construction details, material descriptions, core descriptions, and finishes.

- B. Shop Drawings: Include the following:

- 1. Elevations of each door design.
- 2. Details of doors, including vertical and horizontal edge details and metal thicknesses.
- 3. Frame details for each frame type, including dimensioned profiles and metal thicknesses.
- 4. Locations of reinforcement and preparations for hardware.
- 5. Details of each different wall opening condition.
- 6. Details of anchorages, joints, field splices, and connections.
- 7. Details of accessories.

8. Details of moldings, removable stops, and glazing.
  9. Details of conduit and preparations for power, signal, and control systems.
- C. Schedule: Provide a schedule of hollow metal work prepared by or under the supervision of supplier, using same reference numbers for details and openings as those on Drawings. Coordinate with door hardware schedule.

#### 1.5 DELIVERY, STORAGE, AND HANDLING

- A. Deliver hollow metal work palletized, wrapped, or crated to provide protection during transit and Project-site storage. Do not use non-vented plastic.
- B. Deliver welded frames with two removable spreader bars across bottom of frames, tack welded to jambs and mullions.
- C. Store hollow metal work vertically under cover at Project site with head up. Place on minimum 4 inch high wood blocking. Provide minimum 1/4-inch space between each stacked door to permit air circulation.

#### 1.6 FIELD CONDITIONS

- A. Field Measurements: Verify actual dimensions of openings by field measurements before fabrication and indicate measurements on Shop Drawings.
  1. Established Dimensions: Where field measurements cannot be made without delaying the Work, establish opening dimensions and proceed with fabricating steel frames without field measurements. Coordinate wall construction to ensure that actual opening dimensions correspond to established dimensions.

#### 1.7 COORDINATION

- A. Coordinate installation of anchorages for standard steel frames. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete. Deliver such items to Project site in time for installation.
- B. Coordinate requirements for preparation and installation of electrified door hardware and access control and security systems.

### PART 2 - PRODUCTS

#### 2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  1. Amweld Building Products, LLC.

2. Ceco Door Products; an Assa Abloy Group company.
3. Curries Company; an Assa Abloy Group company.
4. Deansteel Manufacturing Company, Inc.
5. Metal Products Incorporated (MPI).
6. Steelcraft; an Ingersoll-Rand company.
7. Windsor Republic Doors.

- B. Source Limitations: Obtain hollow metal work from a single source from a single manufacturer.

## 2.2 HOLLOW METAL DOORS

- A. General: Construct hollow-metal doors and frames to comply with standards indicated for materials, fabrication, hardware locations, hardware reinforcement, tolerances, and clearances, and as specified.

1. Type/Design: Flush panel unless otherwise indicated on the Drawings.
2. Door Thickness: 1-3/4 inches unless otherwise indicated.
3. Vertical Edges for Single-Acting Doors: Beveled, 1/8 inch in 2 inches.
4. Openings: Factory cut openings in doors.
5. Hardware Reinforcement: Fabricate according to ANSI/SDI A250.6 with reinforcing plates from same material as door face sheets.
6. Fabricate concealed stiffeners and hardware reinforcement from either cold- or hot-rolled steel sheet.
7. Tolerances: Comply with SDI 117, "Manufacturing Tolerances for Standard Steel Doors and Frames."
8. Exposed Finish: Factory prime finish for field painting.

- B. Exterior Doors: Doors complying with requirements indicated below by referencing ANSI/SDI A250.8 for level and model and ANSI/SDI A250.4 for physical performance level.

1. Extra Heavy Duty Doors, Level 3 and Physical Performance Level A.
2. Edge Condition: Model 2, seamless.
3. Face Sheet Material: Fabricated from metallic-coated steel sheet, 0.053-inch minimum thickness (16 gage).
4. Core Construction: Manufacturer's standard polyurethane, or polyisocyanurate core.
5. Top Edge Closures: Close top edges of doors with flush closures of same material as face sheets. Seal joints in top edges of doors against water penetration.
6. Bottom Edge Closures: Close bottom edges of doors with end closures or channels of same material as face sheets. Provide weep-hole openings in bottoms of exterior doors to permit moisture to escape.

- C. Interior Doors: Doors complying with requirements indicated below by referencing ANSI/SDI A250.8 for level and model and ANSI/SDI A250.4 for physical performance level.
1. Heavy Duty Doors, Level 2 and Physical Performance Level B.
  2. Edge Condition: Model 2, seamless.
  3. Face Sheet Material: Fabricated from cold-rolled steel sheet, 0.042-inch minimum thickness (18 gage).
  4. Core Construction: One of the following:
    - a. Manufacturer's standard polyurethane, or polyisocyanurate core.
    - b. Kraft paper honeycomb core; one inch cell, phenolic resin impregnated core, laminated to face sheets, full area.
    - c. Manufacturer's standard as required to comply with fire-protection and temperature-rise ratings indicated.

## 2.3 HOLLOW METAL FRAMES

- A. General: Comply with ANSI A250.8 and with details indicated for type and profile.
1. Fabricate frames with mitered or coped full profile welded corners unless otherwise indicated.
  2. Frames shall be sized to provide full throat width equal to depth of wall including finishes plus 1/2 inch backbend on each side per SDI-100.
- B. Exterior Frames: Metallic-coated steel sheet, minimum thickness of 0.053 inch (16-gage).
- C. Interior Frames: Cold-rolled steel sheet, minimum thickness of 0.053-inch (16 gage).
- D. Exposed Finish: Factory prime finish for field painting.
- E. Hardware Reinforcement: Fabricate with reinforcement plates from same material as frames with minimum reinforcement according to ANSI/SDI A250.6 and the following:
1. Hinges: Minimum 0.123 inch thick by 1-1/2 inches wide by 6 inches longer than hinge, secured by not less than 6 spot welds.
  2. Pivots: Minimum 0.167 inch thick by 1-1/2 inches wide by 6 inches longer than hinge, secured by not less than 6 spot welds.
  3. Lock Face, Closers, and Concealed Holders: Minimum 0.067 inch thick.
  4. All Other Surface-Mounted Hardware: Minimum 0.067 inch thick.
- F. Supports and Anchors: Fabricated from electrolytic zinc-coated or metallic-coated steel sheet.
- G. Fabricate concealed stiffeners and hardware reinforcement from either cold- or hot-rolled steel sheet.
- H. Plaster Guards: Formed from same material as frames, not less than 0.016-inch thick.



## 2.4 FRAME ANCHORS

### A. Jamb Anchors:

1. Type: Anchors of minimum size and type required by applicable door and frame standard, and suitable for performance level indicated.
2. Quantity: Minimum of three anchors per jamb, with one additional anchor for frames with no floor anchor. Provide one additional anchor for each 24 inches of frame height above 7 feet.
3. Postinstalled Expansion Anchor: Minimum 3/8-inch diameter bolts with expansion shields or inserts, with manufacturer's standard pipe spacer.

### B. Floor Anchors: Provide floor anchors for each jamb and mullion that extends to floor; form from same material as frames, not less than 0.042 inch thick, and as follows:

1. Monolithic Concrete Slabs: Clip-type anchors, with two holes to receive fasteners.

### C. Material: ASTM A879/A879M, Commercial Steel (CS), 04Z coating designation; mill phosphatized.

1. For anchors built into exterior walls, steel sheet complying with ASTM A1008/A1008M or ASTM A1011/A1011M; hot-dip galvanized according to ASTM A153/A153M, Class B.

## 2.5 STOPS AND MOLDINGS

### A. Moldings for Glazed Lites in Doors: Minimum 0.032 inch (20 gage) thick, fabricated from same material as door face sheet in which they are installed.

### B. Fixed Frame Moldings: Formed integral with standard steel frames, minimum 5/8 inch high, unless otherwise indicated.

### C. Loose Stops for Glazed Lites in Frames: Minimum 0.032 inch thick, fabricated from same material as frames in which they are installed.

## 2.6 MATERIALS

### A. Cold-Rolled Steel Sheet: ASTM A 1008/A 1008M, Commercial Steel (CS), Type B; suitable for exposed applications.

### B. Hot-Rolled Steel Sheet: ASTM A 1011/A 1011M, Commercial Steel (CS), Type B; free of scale, pitting, or surface defects; pickled and oiled.

### C. Metallic-Coated Steel Sheet: ASTM A 653/A 653M, Commercial Steel (CS), Type B; with minimum A40 zinc-iron-alloy coating designation.

1. Material indicated to be fabricated from metallic coated steel sheet shall be of galvanized steel sheet.

- D. Inserts, Bolts, and Fasteners: Hot-dip galvanized according to ASTM A 153/A 153M.
- E. Mineral-Fiber Insulation: ASTM C 665, Type I (blankets without membrane facing); consisting of fibers manufactured from slag or rock wool with 6- to 12-lb/cu. ft. density; with maximum flame-spread and smoke-development indexes of 25 and 50, respectively; passing ASTM E 136 for combustion characteristics.
- F. Glazing: Comply with requirements in Division 8 Section "Glazing."
- G. Bituminous Coating: Cold-applied asphalt mastic, SSPC-Paint 12, compounded for 15-mil dry film thickness per coat. Provide inert-type non-corrosive compound free of asbestos fibers, sulfur components, and other deleterious impurities.

## 2.7 FABRICATION

- A. General: Fabricate hollow metal work to be rigid and free of defects, warp, or buckle. Accurately form metal to required sizes and profiles, with minimum radius for thickness of metal. Where practical, fit and assemble units in manufacturer's plant. To ensure proper assembly at Project site, clearly identify work that cannot be permanently factory assembled before shipment.
- B. Tolerances: Fabricate hollow metal work to tolerances indicated in SDI 117.
- C. Hollow-Metal Frames: Fabricate in one piece except where handling and shipping limitations require multiple sections. Where frames are fabricated in sections, provide alignment plates or angles at each joint, fabricated of metal of same or greater thickness as frames.
  - 1. Welded Frames: Weld flush face joints continuously; grind, fill, dress, and make smooth, flush, and invisible.
  - 2. Sidelight and/or Transom Bar Frames: Provide closed tubular members with no visible face seams or joints, fabricated from same material as door frame. Fasten members at crossings and to jambs by welding.
  - 3. Provide countersunk, flat or oval-head exposed screws and bolts for exposed fasteners unless otherwise indicated.
  - 4. Grout Guards: Weld guards to frame at back of hardware mortises in frames to be grouted.
  - 5. Floor Anchors: Weld anchors to bottom of jambs and mullions with at least four spot welds per anchor.
    - a. For conditions that do not allow for a floor anchor, provide an additional jamb anchor.

6. Jamb Anchors: Provide number and spacing of anchors as follows unless additional anchors are required for fire rating:
  - a. Masonry Type: Locate anchors not more than 18 inches from top and bottom of frame. Space anchors not more than 32 inches o.c. and as follows:
    - 1) Two anchors per jamb up to 60 inches high.
    - 2) Three anchors per jamb from 60 to 90 inches high.
    - 3) Four anchors per jamb from 90 to 120 inches high.
    - 4) Four anchors per jamb plus 1 additional anchor per jamb for each 24 inches or fraction thereof above 120 inches high.
  - b. Stud-Wall Type: Locate anchors not more than 18 inches from top and bottom of frame. Space anchors not more than 32 inches o.c. and as follows:
    - 1) Three anchors per jamb up to 60 inches high.
    - 2) Four anchors per jamb from 60 to 90 inches high.
    - 3) Five anchors per jamb from 90 to 96 inches high.
    - 4) Five anchors per jamb plus 1 additional anchor per jamb for each 24 inches or fraction thereof above 96 inches high.
    - 5) Two anchors per head for frames 42 inches or more in width and mounted in metal-stud framed partitions.
  - c. Postinstalled Expansion Type: Locate anchors not more than 6 inches from top and bottom of frame. Space anchors not more than 26 inches o.c.
7. Door Silencers: Except on weather-stripped doors, drill stops to receive door silencers as follows. Keep holes clear during construction.
  - a. Single-Door Frames: Drill stop in strike jamb to receive three door silencers.
- D. Fabricate concealed stiffeners, edge channels, and hardware reinforcement from either cold- or hot-rolled steel sheet.
- E. Hardware Preparation: Factory prepare hollow-metal work to receive templated mortised hardware; include cutouts, reinforcement, mortising, drilling, and tapping according to SDI A250.6, the Door Hardware Schedule, and templates.
  1. Locate hardware as indicated, or if not indicated, according to ANSI/SDI A250.8.
  2. Reinforce doors and frames to receive non-templated, mortised and surface-mounted door hardware.
  3. Comply with applicable requirements in ANSI/SDI A250.6 and ANSI/DHI A115 Series specifications for preparation of hollow metal work for hardware.
  4. Coordinate locations of conduit and wiring boxes for electrical connections with Division 26 Sections.

- F. Stops and Moldings: Provide stops and moldings around glazed lites where indicated. Form corners of stops and moldings with butted or mitered hairline joints.
1. Single Glazed Lites: Provide fixed stops and moldings welded on secure side of hollow metal work.
  2. Multiple Glazed Lites: Provide fixed and removable stops and moldings so that each glazed lite is capable of being removed independently.
  3. Provide fixed frame moldings on outside of exterior and on secure side of interior doors and frames.
  4. Coordinate rabbet width between fixed and removable stops with type of glazing and type of installation indicated.
  5. Provide stops for installation with countersunk flat or oval-head machine screws spaced uniformly not more than 9 inches o.c. and not more than 2 inches o.c. from each corner.

## 2.8 STEEL FINISHES

- A. Prime Finish: Clean, pretreat, and apply manufacturer's standard primer.
1. Shop Primer: Manufacturer's standard, fast-curing, lead and chromate-free primer complying with SDI A250.10; recommended by primer manufacturer for substrate; compatible with substrate and field-applied coatings despite prolonged exposure.

## 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 the Work.
1. Examine roughing-in for embedded and built-in anchors to verify actual locations before frame installation.
  2. Prepare written report, endorsed by Installer, listing conditions detrimental to performance of work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 PREPARATION

- A. Remove welded-in shipping spreaders installed at factory. Restore exposed finish by grinding, filling, and dressing, as required to make repaired area smooth, flush, and invisible on exposed faces.
- B. Drill and tap doors and frames to receive non-templated mortised and surface-mounted door hardware.

- C. Prior to installation of frames to be grouted or cast in concrete, provide 1/4 inch thick rigid compressible filler material at templated and surface mounted hardware locations at concealed surfaces of frames to facilitate the installation of hardware fasteners and to allow for field drilling and tapping.

### 3.3 INSTALLATION

- A. General: Install doors and frames plumb, rigid, properly aligned, and securely fastened in place; comply with Drawings and manufacturer's written instructions.
- B. Hollow-Metal Frames: Install hollow-metal frames for doors, transoms, sidelites, borrowed lites, and other openings, of size and profile indicated. Comply with SDI A250.11.
  - 1. Set frames accurately in position; plumbed, aligned, and braced securely until permanent anchors are set. After wall construction is complete, remove temporary braces without damage to completed Work.
    - a. Where frames are fabricated in sections, field splice at approved locations by welding face joint continuously; grind, fill, dress, and make splice smooth, flush, and invisible on exposed faces. Touch-up finishes.
    - b. Install frames with removable stops located on secure side of opening.
  - 2. Floor Anchors: Secure with postinstalled expansion anchors.
  - 3. Insulation: Solidly pack mineral-fiber insulation inside frames that are not to be grouted.
  - 4. In-Place Concrete or Masonry Construction: Secure frames in place with postinstalled expansion anchors. Countersink anchors, fill and make smooth, flush, and invisible on exposed faces.
  - 5. Installation Tolerances: Check plumb, square, and twist of frames as walls are constructed. Shim as necessary to comply with installation tolerances. Adjust hollow-metal door frames for squareness, alignment, twist, and plumb to the following tolerances:
    - a. Squareness: Plus or minus 1/16 inch, measured at door rabbet on a line 90 degrees from jamb perpendicular to frame head.
    - b. Alignment: Plus or minus 1/16 inch, measured at jambs on a horizontal line parallel to plane of wall.
    - c. Twist: Plus or minus 1/16 inch, measured at opposite face corners of jambs on parallel lines, and perpendicular to plane of wall.
    - d. Plumbness: Plus or minus 1/16 inch, measured at jambs at floor.
- C. Hollow Metal Doors: Fit hollow metal doors accurately in frames, within clearances specified below.
  - 1. Non-Fire-Rated Doors: Comply with ANSI/SDI A250.8 as follows:
    - a. Between Door and Frame at Jambs and Head: 1/8 inch plus or minus 1/32 inch.
    - b. Between Edges of Pairs of Doors: 1/8 inch minimum, 1/4 inch maximum.

- c. At Bottom of Door and Top of Threshold: Maximum 3/8 inch.
  - d. Between Bottom of Door and Top of Finish Floor (No Threshold): Maximum 3/4 inch.
  - e. Between Door Face and Stop: 1/16 inch minimum, 1/8 inch maximum.
- D. Glazing: Comply with installation requirements in Division 8 Section "Glazing" and with hollow metal manufacturer's written instructions.
- 1. Secure stops with countersunk flat or oval-head machine screws spaced uniformly not more than 9 inches on center and not more than 2 inches on center from each corner.

#### 3.4 ADJUSTING AND REPAIR

- A. Final Adjustments: Final adjustment as specified in Division 08 Section "Door Hardware."
- B. Prime-Coat Touchup: Immediately after erection, sand smooth rusted or damaged areas of prime coat and apply touchup of compatible air-drying, rust-inhibitive primer.
- C. Metallic-Coated Surfaces: Clean abraded areas and repair with galvanizing repair paint according to manufacturer's written instructions.

END OF SECTION

SECTION 083113  
ACCESS DOORS AND FRAMES

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. This Section includes:
  - 1. Access doors and frames for walls and ceilings.
- B. Related Sections include the following:
  - 1. Division 22 and 23 Sections as applicable for access to Plumbing and Mechanical valves and equipment behind finished surfaces.
  - 2. Division 26 Sections as applicable for access to Electrical equipment behind finished surfaces.

1.3 SUBMITTALS

- A. Product Data: For each type of access door and frame indicated. Include construction details, materials, individual components and profiles, and finishes.
- B. Access Door and Frame Schedule: Provide access door and frame schedule, including types, locations, sizes, latching or locking provisions, and other data pertinent to installation.

1.4 COORDINATION

- A. Coordinate locations and sizes for access doors needed to gain access to concealed plumbing, mechanical, or other concealed work with mechanical and plumbing trades.

## PART 2 - PRODUCTS

### 2.1 ACCESS DOORS AND FRAMES FOR WALLS AND CEILINGS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. Babcock-Davis.
  2. Dur-Red Products.
  3. J. L. Industries, Inc.
  4. Karp Associates, Inc.
  5. Larsen's Manufacturing Company.
  6. Milcor Inc.
  7. Nystrom, Inc.
- B. Source Limitations: Obtain each type of access door and frame from single source from single manufacturer.
- C. Non-Fire Resistance Rated Flush Access Doors and Frames with Exposed Trim: Access doors with face of door flush with frame, with exposed flange and concealed hinge.
1. Material:
    - a. Uncoated or Metallic Coated Steel Sheet:
      - 1) Locations: Non-fire resistance rated wall and ceiling surfaces of painted gypsum board.
      - 2) Doors: Nominal 0.060 inch (uncoated) or 0.064 inch (coated) (16 gage) thickness.
      - 3) Frames: Nominal 0.060 inch (uncoated) or 0.064 inch (coated) (16 gage) thickness.
      - 4) Finish: Factory prime finish, manufacturer's standard baked on rust inhibitive gray primer.
    - b. Stainless Steel Sheet:
      - 1) Locations: Non-fire resistance rated wall and ceiling surfaces with ceramic tile finish or prefinished wall paneling.
      - 2) Doors: Nominal 0.062 inch (16 gage) thickness.
      - 3) Frames: Same material and thickness as doors.
      - 4) Finish: No. 4.
  2. Hinges: Manufacturer's standard concealed spring pin hinge.



3. Latch/Lock:
  - a. Latch: Cam latch operated by screwdriver with interior release.
    - 1) Provide where access doors are located in private or semi-private areas such as office spaces, storage rooms, equipment rooms, and private toilet rooms.
  - b. Lock: Manufacturer's standard key operated cylinder cam lock. Furnish two keys per lock and key all locks alike.
    - 1) Provide where access doors are located in public areas such as exterior walls and ceilings, and public toilet rooms.
4. Size: As indicated on drawings or as required to provide access to valves and equipment concealed behind finished surfaces.

## 2.2 MATERIALS

- A. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.
- B. Steel Sheet: Uncoated or electrolytic zinc coated, ASTM A 879/A 879M, with cold-rolled steel sheet substrate complying with ASTM A 1008/A 1008M, Commercial Steel (CS), exposed.
- C. Stainless-Steel Sheet, Strip, Plate, and Flat Bars: ASTM A 666, Type 304. Remove tool and die marks and stretch lines or blend into finish.
  1. Finish: Directional satin finish, No. 4.

## 2.3 FABRICATION

- A. General: Provide access door and frame assemblies manufactured as integral units ready for installation.
- B. Size: As indicated on Drawings or size as required for access to concealed spaces, valves, or equipment.
  1. Access to attic spaces shall not be less than 22 x 30 inches clear opening.
  2. Size Variations: Obtain Architect's acceptance of manufacturer's standard-size units, which may vary slightly from sizes indicated.
- C. Metal Surfaces: For metal surfaces exposed to view in the completed Work, provide materials with smooth, flat surfaces without blemishes. Do not use materials with exposed pitting, seam marks, roller marks, rolled trade names, or roughness.

- D. Doors and Frames: Grind exposed welds smooth and flush with adjacent surfaces. Furnish attachment devices and fasteners of type required to secure access panels to types of supports indicated.
  - 1. Exposed Flanges: Nominal 1 to 1-1/2 inches wide around perimeter of frame.
  - 2. Provide mounting holes in frames for attachment of units to metal or wood framing, mounting holes shall not be located in exposed surfaces of frames.
- E. Latching Mechanisms: Furnish number required to hold doors in flush, smooth plane when closed.

## 2.4 FINISHES

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- C. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.
- D. Steel and Metallic-Coated-Steel Finishes:
  - 1. Factory Prime: Apply manufacturer's standard, fast-curing, lead- and chromate-free, universal primer immediately after surface preparation and pretreatment.
  - 2. Factory Finish: Immediately after cleaning and pretreating, apply manufacturer's standard two-coat, baked-on finish consisting of prime coat and thermosetting topcoat, with a minimum dry-film thickness of 1 mil for topcoat.
- E. Stainless-Steel Finishes:
  - 1. Surface Preparation: Remove tool and die marks and stretch lines, or blend into finish.
  - 2. Polished Finishes: Grind and polish surfaces to produce uniform finish, free of cross scratches.
    - a. Run grain of directional finishes with long dimension of each piece.
    - b. When polishing is completed, passivate and rinse surfaces. Remove embedded foreign matter and leave surfaces chemically clean.
    - c. Directional Satin Finish: No. 4.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine substrates for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 INSTALLATION

- A. Comply with manufacturer's written instructions for installing access doors and frames.
- B. Install doors flush with adjacent finish surfaces or recessed to receive finish material.

### 3.3 ADJUSTING AND CLEANING

- A. Adjust doors and hardware after installation for proper operation.
- B. Remove and replace doors and frames that are warped, bowed, or otherwise damaged.

END OF SECTION



SECTION 087100  
DOOR HARDWARE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes the following:
  - 1. Commercial door hardware for swinging doors.
- B. Related Sections include but are not limited to the following:
  - 1. Division 08 Section "Hollow Metal Doors and Frames."
  - 2. Division 26 Electrical Sections as applicable for connections to electrical power system.

1.3 REFERENCES AND ABBREVIATIONS

- A. Industry standard references and abbreviations shall be as follows:
  - 1. ADA: Americans with Disabilities Act (ADA), 2010 ADA Standards for Accessible Design.
  - 2. BHMA: Builders' Hardware Manufacturers Association.
  - 3. CCR: California Code of Regulations, Title 24, Part 2, California Building Code.
  - 4. DHI: Door and Hardware Institute.
  - 5. NFPA: National Fire Protection Association.
    - a. NFPA 80: Fire Doors and Windows.
    - b. NFPA 101: Life Safety Code.
    - c. NFPA 105: Smoke and Draft Control Door Assemblies
    - d. NFPA 252: Fire Tests of Door Assemblies.
  - 6. UL - Underwriters Laboratories.
    - a. UL 10C: Positive Pressure Fire Tests of Door Assemblies.
    - b. UL 305: Panic Hardware.
  - 7. WHI: Warnock Hersey Incorporated.
  - 8. SDI: Steel Door Institute.
  - 9. NAAMM: National Association of Architectural Metal Manufacturers.

#### 1.4 SUBSTITUTIONS

- A. Substitutions: Substitutions will only be allowed by substitution requests submitted in accordance with Division 01 Section "Substitution Procedures" prior to the bid date.
  - 1. In Part 2 Articles where manufacturers are listed for various product types and only one manufacturer is listed with no alternate manufacturers indicated, manufacturer listed is an established Owner standard and substitutions will not be allowed.

#### 1.5 SUBMITTALS

- A. Product Data: For each type of product indicated. Include construction and installation details, material descriptions, dimensions of individual components and profiles, and finishes.
- B. Door Hardware Schedule: Prepared by or under the supervision of Installer, detailing fabrication and assembly of door hardware, as well as installation procedures and diagrams. Coordinate final door hardware schedule with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of door hardware. Coordinate submission of door hardware schedule with scheduling requirements of other work to facilitate the fabrication of other work that is critical in Project construction schedule. Organize schedule vertically into "Hardware Sets" with index of doors and headings, indicating complete designations of every item required for each door or opening. Include the following information:
  - 1. Type, style, function, size and finish of each hardware item.
  - 2. Name, part number and manufacturer of each item.
  - 3. Fastenings and other pertinent information.
  - 4. Location of hardware set coordinated with floor plans and door schedule.
  - 5. Explanation of all abbreviations, symbols and codes contained in schedule.
  - 6. Mounting locations for hardware.
  - 7. Door and frame sizes and materials.
  - 8. List of manufacturers used and their nearest representative with address and phone number.
  - 9. Keying information.
  - 10. Manufacturer's catalog cut sheets.
- C. Wiring Diagrams: Power, signal, and control wiring for electrified hardware. Include interface between electrified hardware and control system wiring.
- D. Maintenance Data: For each type of door hardware to include in maintenance manuals. Include "as installed" final hardware and keying schedule.
- E. As-Built Schedule: As-built/as-installed schedule with closeout documents, including keying schedule, wiring diagrams, manufacturers' installation, adjustment and maintenance information, and supplier's final inspection report.
- F. Warranty: Special warranty specified in this Section.

## 1.6 QUALITY ASSURANCE

- A. Installer Qualifications: Company specializing in the installation of commercial door hardware with five years documented experience.
- B. Supplier Qualifications: A recognized architectural door hardware supplier with warehousing facilities in the Project's vicinity that has a record of successful in-service performance for supplying door hardware that is similar in quantity, type, and quality to that specified for this Project, and who employs an experienced architectural hardware consultant (AHC) who is available to Owner, Architect, and Contractor, at reasonable times during the course of the Work, for consultation.
  - 1. Architectural Hardware Consultant Qualifications: A person who is currently certified by DHI as an Architectural Hardware Consultant and who is experienced in providing consulting services for door hardware installations that are comparable in material, design, and extent to that indicated for this Project.
    - a. Architectural Hardware Consultant Responsibilities:
      - 1) Detailing, scheduling and ordering of finish hardware.
      - 2) Meeting with Owner to finalize keying requirements and to obtain final instructions in writing.
      - 3) Stock parts for products supplied and be capable of repairing and replacing hardware items found defective within warranty periods.
- C. Source Limitations: Obtain each type and variety of door hardware from a single manufacturer, unless otherwise indicated.
- D. Exit Doors: Operable from inside with single motion without the use of a key or special knowledge or effort.
- E. Keying Conference: Conduct conference at Project site to comply with requirements in Division 01 Section "Project Management and Coordination." Conference participants shall include Owner's lock system representative, Supplier's Architectural Hardware Consultant Contractor, and Architect. Incorporate keying conference decisions into final keying schedule after reviewing door hardware keying system.
- F. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 01 Section "Project Management and Coordination." Attendees shall include Owner, Contractor, Architect, Project Inspector, Installer, and Supplier's Architectural Hardware Consultant. Review methods and procedures related to door hardware including, but not limited to, the following:
  - 1. Hardware products and schedule.
  - 2. Installation procedures and coordination required with related work.
  - 3. Review Owner's keying standards.

## 1.7 DELIVERY, STORAGE AND HANDLING

- A. Coordinate delivery of packaged hardware items to the appropriate locations (shop or field) for installation.
- B. Hardware items shall be individually packaged in manufacturers' original containers, complete with proper fasteners. Clearly mark packages on outside to indicate contents and locations in hardware schedule and in work.
- C. Provide locked storage area for hardware, protect from moisture, sunlight, paint, and chemicals.
- D. Inventory door hardware jointly with representatives of hardware supplier and hardware installer until each is satisfied that count is correct.
- E. Deliver permanent keys and cores directly from lock manufacturer to Owner's designated representative by secured delivery.

## 1.8 COORDINATION

- A. Templates: Distribute door hardware templates for doors, frames, and other work specified to be factory prepared for installing door hardware. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing door hardware to comply with indicated requirements.
- B. Electrical System Roughing-in: Coordinate layout and installation of electrified door hardware with connections to power supplies, fire alarm systems and similar control systems.
- C. Where exact types of hardware specified are not adaptable to finished shape or size of members requiring hardware, provide suitable types having as nearly as practical the same operation and quality as type specified, subject to Architect's approval.
- D. Review, compare, and coordinate scheduled hardware with doors, frames, and adjacent floor and wall conditions for non-compatible mounting and/or operating conditions; notify Architect in writing of any conflicts.

## 1.9 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of door hardware that fail in materials or workmanship within specified warranty period.
  - 1. Failures include, but are not limited to, the following:
    - a. Structural failures including excessive deflection, cracking, or breakage.
    - b. Faulty operation of operators and door hardware.
    - c. Deterioration of metals, metal finishes, and other materials beyond normal weathering and use.



2. Warranty Period: Established from date of Substantial Completion as follows:
  - a. Closers: Mechanical Thirty (30) years. Electrical (1) year.
  - b. Locksets: Three (3) years
  - c. All other hardware: Two (2) years.

#### 1.10 MAINTENANCE

- A. Maintenance Tools and Instructions: Furnish a complete set of specialized tools and maintenance instructions as needed for Owner's continued adjustment, maintenance, and removal and replacement of door hardware.
- B. Maintenance Service: Beginning at Substantial Completion, provide six months' full maintenance by skilled employees of door hardware Installer. Include quarterly preventive maintenance, repair or replacement of worn or defective components, lubrication, cleaning, and adjusting as required for proper door hardware operation. Provide parts and supplies same as those used in the manufacture and installation of original products.

### PART 2 - PRODUCTS

#### 2.1 PERFORMANCE AND REGULATORY REQUIREMENTS

- A. Regulatory Requirements: Comply with the 2010 ADA Standards for Accessible Design, ANSI A117.1, and the 2019 California Building Code.
  1. Opening Hardware, Mounting Height and Operation: Operable parts of door hardware shall be 34 inches minimum and 44 inches above the floor. Hand activated door opening hardware shall be operable with one hand and shall not require tight grasping, pinching, or twisting of the wrist to operate; the force required to activate operable parts shall not exceed 5 lbs. Egress doors shall be readily openable from the egress side without the use of a key or special knowledge or effort. The unlatching of any door or leaf shall not require more than one operation (2019 CBC 11B-309.4 & 11B-404.2.7, 1008.1.9, 1008.1.9.5).
  2. Closers, Opening Force: The opening force shall be the push/pull effort applied perpendicular to the face of the door at the operating hardware; other than required fire rated doors, the effort to operate doors shall not exceed 5 pounds; required fire rated doors may have the opening force increased to the minimum amount necessary to close and latch the door, but shall not exceed 15 pounds (2019 CBC 11B-404.2.9).
  3. Closers, Closing Sweep Period: The closing sweep period for doors shall be such that from an open position of 90 degrees, the door will take at least 5 seconds to move to a position of 12 degrees from the latch (2019 CBC 11B-404.2.8.1).
  4. Thresholds: The height differential between the tops of thresholds and adjacent floor or landing surfaces shall not be more than 1/2 inch; offsets exceeding 1/4 inch shall be beveled with a 2:1 (horizontal to vertical) maximum slope (2019 CBC 11B-404.2.5).

5. Smooth Door Surface: The bottom 10 inches of doors shall have a smooth, uninterrupted surface to allow the door to be opened by a wheel chair footrest without creating a trap or hazardous condition (2019 CBC 11B-404.2.10CBC).
6. New Buildings on a K-12 Public School campus shall be provided with locks which allow the doors to classrooms and any other room with an occupant load of five or more persons to be locked from the inside. Locks shall conform to the specification and requirements of Section 1010.1.11. Exceptions include doors that are normally locked from the outside, relocatable moved within the same campus, and reconstruction projects.

## 2.2 SCHEDULED DOOR HARDWARE

- A. Basis of Design Products: Provide door hardware for each door to comply with requirements in this Section and door hardware sets indicated in Part 3 "Door Hardware Sets" Article. Manufacturer and product designation are listed for each door hardware type required for the purpose of establishing minimum requirements. Subject to compliance with requirements, provide products indicated or comparable products by manufactures listed below:

<b>HARDWARE TYPE</b>	<b>BASIS OF DESIGN MANUFACTURER</b>	<b>MANUFACTURERS OF COMPARABLE PRODUCTS</b>
Butt Hinges	Ives	Hager
Locksets, Latchsets, Cylinders, and key system	Schlage	
Exit Devices	Von Duprin	
Closers	LCN	
Auto Door Operator	Norton	
Door Trim (Pulls, Plates, Bolts, Coordinators, Stops)	Ives	Trimco
Thresholds and Seals	Zero	NGP

## 2.3 DOOR HARDWARE PRODUCTS

- A. General: Door hardware products shall comply with referenced Accessibility Requirements.
- B. Continuous Hinges: Full mortise, heavy duty stainless steel continuous hinge.
- C. Lock and Latch Sets: Cylindrical or mortise latch/lock sets as scheduled with lever handled trim and as follows:

1. Mortise Locksets:

- a. Chassis: Cold-rolled steel, handing field-changeable without disassembly.
- b. Latchbolts: 3/4 inch throw, stainless steel anti-friction type.
- c. Lever Trim: through-bolted, accessible design, cast lever or solid extruded bar type levers as scheduled. Filled hollow tube design unacceptable.
  - 1) Spindles: Security design with independent breakaway. Breakage of outside lever does not allow access to inside lever's hubworks to gain wrongful entry.
- d. Furnish solid cylinder collars with wave springs. Wall of collar to cover rim of mortise cylinder.
- e. Strikes: 16 gage curved steel, bronze or brass with 1 inch deep box construction and lips of sufficient length to clear trim and protect clothing.
- f. Certifications:
  - 1) ANSI A156.13, 1994, Grade 1 Operational, Grade 1 Security.
  - 2) ANSI/ASTM F476-84 Grade 31 UL listed.

2. Cylindrical Locksets: Extra Heavy Duty and as follows:

- a. Chassis: Cylindrical design; corrosion-resistant plated cold-rolled steel, through-bolted.
- b. Locking Spindle: Stainless steel, integrated spring and spindle design.
- c. Latch Retractors: Forged steel; balance of inner parts corrosion-resistant plated steel or stainless steel.
- d. Latchbolt: Solid steel.
- e. Backset: 2-3/4 inches unless otherwise indicated.
- f. Lever Trim: Accessible design, independent operation, spring-cage supported, minimum 2 inch clearance from lever mid-point to door face.
- g. Strikes: 16 gage curved steel, bronze or brass with 1 inch deep box construction and lips of sufficient length to clear trim and protect clothing.
- h. Certifications:
  - 1) ANSI A156.2, 1994, Series 4000, Grade 1.
  - 2) UL listed for A label and lesser class single doors up to 4ft x 8ft.

D. Exit Devices: Surface mounted rim type exit devices as scheduled.

- 1. Certifiable by independent testing laboratory that device has completed over 1,000,000 cycles and can still meet ANSI/BHMA A156.3 - 1994 standards.
- 2. Handing: Non-handed basic device design with center case interchangeable with all functions.
- 3. Fluid Damper Return: Devices shall have quiet return fluid dampeners.
- 4. Latchbolts: Latchbolts shall be deadlocking with 3/4" throw and have a self-lubricating coating to reduce friction and wear.
- 5. Outside Trim: As scheduled; where operating levers are provided, provide manufacturer's standard "breakaway" feature for lever trim.
- 6. Strikes: All surface strikes shall be roller type and utilize a plate underneath to prevent movement.

7. Fasteners: Exit Devices to be sex-bolted through doors.
  8. Glazing Bead Kits: Furnish glass bead kits where required for doors with glazing.
  9. Removable Mullions: Provide keyed removable mullions where indicated for pairs of doors with rim style exit devices.
- E. Surface Closers: Fully adjustable full rack-and-pinion type cylinder with cast iron body and non-ferrous cover, heat-treated pinion shaft, single piece forged piston, chrome-silicon steel spring, and as follows:
1. ISO 2000 certified; units stamped with date-of-manufacture code.
  2. Certifiable by independent testing laboratory that device has completed over 10,000,000 cycles and can still meet ANSI/BHMA A156.4
  3. Non-sized, non-handed, and fully adjustable with separate adjusting valves for closing speed, latching speed, and backcheck; and with a fourth valve for delayed action where scheduled.
  4. Arms and Mounting: Provide type of arm required for closer to be located on non-public side of door, unless otherwise indicated:
    - a. Regular Arm: Pull side, door mounted, for doors swinging into rooms.
    - b. Parallel Arm: Push side, door mounted, for doors swinging out of rooms.
    - c. Provide extra-duty arms (EDA) at exterior doors scheduled with parallel arm units.
    - d. Supplemental Brackets: Coordinate closer mounting requirements with other hardware items and provide supplemental mounting brackets where required for a complete installation.
  5. Fluid: Closers shall utilize a stable fluid withstanding a temperature range of 120 degrees F to -30 degrees F without requiring seasonal adjustment of closer speed to properly close the door. Fluid shall be non-flaming and shall not fuel door or floor covering fires.
  6. Low-Energy Door Operators: Comply with ANSI/BHMA 156.19 Electric power-open, hydraulically checked spring power closing. Modular construction. Finished metal cover. Field-adjustable opening force, opening speed, time-open, closing and latching speeds. Door reopens and timing cycle restores if system re-actuated during closing cycle. Breakaway clutch protection from forced closing. Door, frame, motor and drive train protected by attenuated initiation of opening cycle.
    1. Self-contained low-voltage power supply, terminal strip and sequencing for incorporation of electric hardware with system operation.
- F. Stops, Holders, and Bumpers: Provide units as scheduled; all doors shall be provided with a stop or bumper; stops and bumpers shall be mounted within 8 inches of the outside (strike) edge of the door and shall be not more than 4 inches from walls.
1. Overhead Stops: Provide surface mounted overhead stops where floor or wall stops, or closers with stops cannot be utilized.
  2. Flip down door mounted stops shall not be allowed.
- G. Protection Plates: Kick, armor, or mop plates, 0.050 inch thick stainless steel with four edges beveled, 2 inches less than door width; kick plates to be 10 inches high, mop and armor plate heights shall be as indicated.

- H. Thresholds: Aluminum and as detailed or scheduled; provide at all exterior doors.
- I. Door Bottoms: Provide sweep seals at out swinging exterior doors unless other types are scheduled.
- J. Rain Drips: Provide rain drips at the heads of all exterior doors where there is not enough overhang to protect the opening.
- K. Seals: Provide continuous weather-strip gasketing on exterior doors and provide smoke, light, or sound gasketing on interior doors where indicated, scheduled, or required for smoke rated openings.
  - 1. Intumescent Seals: Provide intumescent seals at fire rated openings where required by Code; comply with UL 10C.
  - 2. Resilient Seal Material: Polyurethane, polypropylene, nylon brush, silicone rubber or solid high-grade neoprene as scheduled. Vinyl seal material shall not be acceptable.
- L. Silencers: Furnish silencers for interior hollow metal frames, 3 for single doors, 2 for pairs of doors. Omit where sound or light seals occurs, or for fire-resistive-rated door assemblies.

## 2.4 KEYING

- A. Furnish a Grand Master, Master, keyed alike or keyed different system as directed by the Owner or Architect.
- B. Existing System: Schlage Primus keyway. Confirm lock cylinders and keying with Owner and provide system as directed by the Owner.
- C. Key Blanks: Standard "6" pin bow key blank; tag to identify.
- D. Supply keys and blanks as follows:
  - 1. Supply 2 cut change keys for each different change key code.
  - 2. Supply 1 uncut key blank for each change key code.
  - 3. Supply 6 cut master keys for each different master key set.
  - 4. Supply 3 uncut key blanks for each master key set.

## 2.5 FINISHES

- A. Generally to be satin chromium US26D (626) unless otherwise noted.
- B. Furnish push plates, pull plates and kick or armor plates in satin stainless steel US32D (630) unless otherwise noted.
- C. Door closers shall be powder-coated to match other hardware, unless otherwise noted.
- D. Aluminum items to be finished clear anodized aluminum US28 (628), except thresholds which can be furnished as standard mill finish.

## 2.6 FASTENERS

- A. Screws for strikes, face plates and similar items shall be flat head, countersunk type, provide machine screws for metal and standard wood screws for wood.
- B. Screws for butt hinges shall be flathead, countersunk, full-thread type.
- C. Fastening of closer bases or closer shoes to doors shall be by means of sex bolts and spray painted to match closer finish.
- D. Provide stainless steel expansion anchors for attaching hardware items to concrete or masonry.
- E. All exposed fasteners shall have a phillips head.
- F. Finish of exposed screws to match surface finish of hardware or other adjacent work.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine doors and frames, with Installer present, for compliance with requirements for installation tolerances, labeled fire door assembly construction, wall and floor construction, and other conditions affecting performance.
- B. Examine roughing-in for electrical power systems to verify actual locations of wiring connections before electrified door hardware installation.
- C. Verify that doors and frames are square and plumb and ready to receive work and dimensions are as instructed by the manufacturer.
- D. Proceed with installation only after unsatisfactory conditions have been corrected. Beginning of installation means acceptance of existing conditions.

### 3.2 INSTALLATION

- A. Install each door hardware item to comply with manufacturer's written instructions and requirements of the Door Hardware Institute. Where cutting and fitting are required to install door hardware onto or into surfaces that are later to be painted or finished in another way, coordinate removal, storage, and reinstallation of surface protective trim units with finishing work specified in Division 09 Sections. Do not install surface-mounted items until finishes have been completed on substrates involved.
- B. Use the templates provided by hardware item manufacturer.
- C. Mounting heights for hardware shall be as recommended by the Door and Hardware Institute.

1. Operating hardware shall be located between 34 and 44 inches above the floor to comply with requirements of the 2019 California Building Code and the 2010 ADA Standards for Accessible Design.
- D. Set units level, plumb and true to line and location. Adjust and reinforce the attachment substrate as necessary for proper installation and operation.
- E. Drill and countersink units that are not factory-prepared for anchorage fasteners. Space fasteners and anchors in accordance with industry standards.
- F. Thresholds: Set thresholds for exterior doors in a full bed of butyl-rubber sealant, secure to concrete substrates with 1/4 inch diameter stainless steel flat head sleeve anchors equally spaced not more than 12 inches on center and not more than 3 inches from ends.
- G. If hand of door is changed during construction, make necessary changes in hardware at no additional cost to the owner.

### 3.3 FIELD QUALITY CONTROL

- A. Supplier's Architectural Hardware Consultant (AHC), with installer present, shall inspect and test installed door hardware operation with the building's climate control system at rest and in full operation. Architectural Hardware Consultant shall certify that hardware has been furnished and installed in accordance with the Contract Documents, manufacturer's instructions, as specified herein, and that door hardware operates as intended.

### 3.4 ADJUSTING

- A. General: Adjust door latches and closers with heating and ventilating equipment fans in operation in order to compensate for room-to-room or room-to-exterior air pressure differences.
- B. Door Closers: Adjust door closers so that the effort to operate doors shall not exceed 5 pounds for non-fire rated doors and 15 pounds maximum for fire rated doors; the force shall be the push/pull effort applied at right angles to hinged doors. (2019 CBC 11B-404.2.9). Adjust the sweep period for closers so that from an open position of 90 degrees, the door will take at least 5 seconds to move to a position of 12 degrees from the latch (2019 CBC 11B-404.2.8.1).
- C. Initial Adjustment: Approximately 2 weeks prior to completion or occupancy, adjust and check each operating item of door hardware and each door to ensure proper operation and function of every unit. Replace units that cannot be adjusted to operate freely and smoothly as intended for the application installed.

- D. Occupancy Adjustment and Service: Approximately six months after the completion of the project, the Contractor, accompanied by the Architectural Hardware Consultant, shall return to the project and re-adjust every item of hardware to restore proper functions of doors and hardware. Consult with and instruct Owner's personnel in recommended additions to the maintenance procedures. Replace hardware items which have deteriorated or failed due to faulty design, materials or installation of hardware units. Prepare a written report of current and predictable problems (of substantial nature) in the performance of the hardware.

### 3.5 CLEANING AND PROTECTION

- A. Clean adjacent surface soiled by hardware installation.
- B. Clean operating items as necessary to restore proper function and finish.
- C. Provide final protection and maintain conditions that ensure that door hardware is without damage or deterioration at time of Substantial Completion.

### 3.6 DEMONSTRATION AND TRAINING

- A. Instruct Owner's Personnel to adjust, operate, and maintain door hardware and door hardware finishes during the final adjustment of hardware.



### 3.7 DOOR HARDWARE SETS

- A. The items listed in the following Hardware Sets shall conform to the requirements of the foregoing specifications.
- B. The Door Schedule on the Drawings indicates hardware sets for each door.
- C. Abbreviations for Manufacturers:

IVE = Ives	Hinges, Plates, Stops
LCN = LCN	Door Closers
NOR = Norton	Auto Door Operator
ZER = Zero	Thresholds, Gasketing & Weatherstrip
SCH = Schlage Lock Company	Locks, Latches & Cylinders
GLY = Glynn Johnson	Overhead stops
VON = Von Duprin	Exit Devices

- D. Door Hardware Sets:

#### HW SET: 01

1	EA	CONTINUOUS HINGE	700	630	IVE
1	EA	PANIC HARDWARE	AXCD98NL-PA X 990NL	626	VON
1	EA	RIM CYLINDER	20-057-ICX (SPECIFY A, B OR C)	626	SCH
1	EA	MORTISE CYLINDER	20-061 ICX XQ11-948 (DOGGING)	626	SCH
2	EA	PRIMUS CORE ONLY	20-740	626	SCH
1	EA	DOOR PULL	VR910NL	630	IVE
1	EA	AUTO-DOOR OPERATOR	6311	689	NOR
1	EA	OVERHEAD STOP	900S	630	GLY
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	SET	SEALS	188N HEAD AND JAMBS	BLK	ZER
1	EA	DOOR SWEEP	39A	AL	ZER
1	EA	THRESHOLD	102A MSLA-10	AL	ZER
2	EA	FULL LENGTH ACTUATOR	8310-836TW		LCN
1	EA	RECEIVER	8310-865		LCN

#### REMOVE EXISTING FLOOR STOP

#### HW SET: 02

3	EA	HINGE	5BB1 4.5 X 4.5	652	IVE
1	EA	STORE LOCK	ND66TD RHO	626	SCH
2	EA	PRIMUS CORE ONLY	20-740	626	SCH
1	EA	SURFACE CLOSER	4111 HEDA	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	WALL STOP	WS401CCV	626	IVE
1	SET	SEALS	188N HEAD AND JAMBS	BLK	ZER

HW SET: 03

1	EA	STOREROOM LOCK	L9080T 06L X L/OST X L283-150	626	SCH
1	EA	PRIMUS CORE ONLY	20-740	626	SCH
1	EA	DOOR PULL	VR900	630	IVE
2	EA	SECURITY FLOOR STOP	FS18S	BLK	IVE
2	EA	DOOR SWEEP	39A	AL	ZER
1	EA	THRESHOLD	102A MSLA-10	AL	ZER

BALANCE OF EXISTING HARDWARE TO REMAIN  
REMOVE EXISTING FLOOR STOPS

HW SET: 04

3	EA	HINGE	5BB1 4.5 X 4.5	652	IVE
1	EA	OFFICE LOCK	ND50TD RHO	626	SCH
1	EA	PRIMUS CORE ONLY	20-740	626	SCH
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	EA	WALL STOP	WS401CCV	626	IVE
1	SET	SEALS	188N HEAD AND JAMBS	BLK	ZER

HW SET: 05

1	EA	STOREROOM LOCK	L9080T 06L X L/OST X L283-150	626	SCH
1	EA	PRIMUS CORE ONLY	20-740	626	SCH
1	EA	DOOR PULL	VR910NL	630	IVE
1	EA	DOOR SWEEP	39A	AL	ZER
1	EA	THRESHOLD	102A MSLA-10	AL	ZER

BALANCE OF EXISTING HARDWARE TO REMAIN  
REMOVE EXISTING FLOOR STOP

HW SET: 06

1	EA	CONTINUOUS HINGE	700	630	IVE
1	EA	PANIC HARDWARE	AXCD98NL-PA X 990NL	626	VON
1	EA	RIM CYLINDER	20-057-ICX (SPECIFY A, B OR C)	626	SCH
1	EA	MORTISE CYLINDER	20-061 ICX XQ11-948 (DOGGING)	626	SCH
2	EA	PRIMUS CORE ONLY	20-740	626	SCH
1	EA	DOOR PULL	VR910NL	630	IVE
1	EA	AUTO-DOOR OPERATOR	6311	689	NOR
1	EA	OVERHEAD STOP	900S	630	GLY
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS	630	IVE
1	SET	SEALS	188N HEAD AND JAMBS	BLK	ZER
1	EA	DOOR SWEEP	39A	AL	ZER
1	EA	THRESHOLD	102A MSLA-10	AL	ZER
2	EA	FULL LENGTH ACTUATOR	8310-836TW		LCN
1	EA	RECEIVER	8310-865		LCN

REMOVE EXISTING FLOOR STOP

HW SET: 07

1	EA	PANIC HARDWARE	AXCD98NL-PA X 990NL	626	VON
1	EA	RIM CYLINDER	20-057-ICX (SPECIFY A, B OR C)	626	SCH
1	EA	MORTISE CYLINDER	20-061 ICX XQ11-948 (DOGGING)	626	SCH
2	EA	PRIMUS CORE ONLY	20-740	626	SCH
1	EA	DOOR PULL	VR910NL	630	IVE
1	EA	AUTO-DOOR OPERATOR	6311	689	NOR
1	EA	OVERHEAD STOP	900S	630	GLY
1	SET	SEALS	188N HEAD AND JAMBS	BLK	ZER
1	EA	THRESHOLD	102A MSLA-10	AL	ZER
2	EA	FULL LENGTH ACTUATOR	8310-836TW		LCN
1	EA	RECEIVER	8310-865		LCN

BALANCE OF EXISTING HARDWARE TO REMAIN  
REMOVE EXISTING FLOOR STOP

HW SET: 08

1	EA	AUTO-DOOR OPERATOR	6311	689	NOR
1	EA	FULL LENGTH ACTUATOR	8310-836TW		LCN
1	EA	RECEIVER	8310-865		LCN

REMOVE EXISTING SURFACE DOOR CLOSER

END OF SECTION



SECTION 088000  
GLAZING

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:
  - 1. Glass for windows and doors.
    - a. Glass Types are indicated in glass type schedules at the end of this Section.
  - 2. Glazing sealants and accessories.

1.3 DEFINITIONS

- A. Glass Manufacturers: Firms that produce primary glass, fabricated glass, or both, as defined in referenced glazing publications.
- B. Glass Thicknesses: Indicated by thickness designations in millimeters according to ASTM C 1036.

1.4 SUBMITTALS

- A. Product Data: For each type of product; include statement of VOC content for any adhesives or sealants.
- B. Glazing Schedule: List glass types and thicknesses for each size opening and location. Use same designations indicated on Drawings.
- C. Product Certificates: Signed by manufacturers of glass and glazing products certifying that products furnished comply with requirements.

## 1.5 QUALITY ASSURANCE

- A. Installer Qualifications: A qualified installer who has completed glazing similar in material, design, and extent to that indicated for this Project; whose work has resulted in installations with a record of successful in-service performance; and who employs glass installers for this Project who are experienced in installing glazing similar in material, design, and extent to that indicated for this Project.
- B. Glass Testing Agency Qualifications: A qualified independent testing agency accredited according to the NFRC CAP 1 Certification Agency Program.

## 1.6 COORDINATION

- A. Coordinate glazing channel dimensions to provide necessary bite on glass, minimum edge and face clearances, and adequate sealant thicknesses, with reasonable tolerances.

## 1.7 DELIVERY, STORAGE, AND HANDLING

- A. Protect glazing materials according to manufacturer's written instructions and as needed to prevent damage to glass and glazing materials from condensation, temperature changes, direct exposure to sun, or other causes.

### FIELD CONDITIONS

- B. Environmental Limitations: Do not proceed with glazing when ambient and substrate temperature conditions are outside limits permitted by glazing material manufacturers and when glazing channel substrates are wet from rain, frost, condensation, or other causes.
  - 1. Do not install liquid glazing sealants when ambient and substrate temperature conditions are outside limits permitted by glazing sealant manufacturer or below 40 deg F.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

- A. Basis-of-Design Products: Where products are identified by manufacturer and product names, Design, Drawings, and Specifications are based on the product indicated; subject to compliance with requirements, provide the named product or a comparable product by one of the following:
  - 1. Guardian Industries.
  - 2. Oldcastle Building Envelope.
  - 3. Pilkington Building Products North America.
  - 4. Vitro Architectural Glass (Formerly PPG Industries, Inc.)

5. Viracon, Inc.

- B. Source Limitations for Glass: Obtain glass from a single source from a single manufacturer for each glass type.
- C. Source Limitations for Glazing Accessories: Obtain accessories from a single source from a single manufacturer for each product and installation method.

## 2.2 PERFORMANCE REQUIREMENTS

- A. General: Installed glazing systems shall withstand normal thermal movement and wind and impact loads (where applicable) without failure, including loss or glass breakage attributable to the following: defective manufacture, fabrication, or installation; failure of sealants or gaskets to remain watertight and airtight; deterioration of glazing materials; or other defects in construction.
- B. Structural Performance: Glazing shall withstand the following design loads within limits and under conditions indicated determined according to the California Building Code and ASTM E 1300.
  - 1. Maximum Lateral Deflection: For glass supported on all four edges, limit center-of-glass deflection at design wind pressure to not more than 1/50 times the short-side length or 1 inch, whichever is less.
- C. Safety Glazing: Where safety glazing is indicated, provide glazing that complies with 16 CFR 1201, Category II.
- D. Thermal and Optical Performance Properties: Provide glass with performance properties specified, as indicated in manufacturer's published test data, based on procedures indicated below:
  - 1. For monolithic-glass lites, properties are based on units with lites 6 mm thick.
  - 2. Visible Reflectance: Center-of-glazing values, according to NFRC 300.

## 2.3 GLASS PRODUCTS, GENERAL

- 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 Publication: "Glazing Manual."
- B. Safety Glazing Labeling: Where safety glazing is indicated, permanently mark glazing with certification label of the SGCC or another certification agency acceptable to authorities having jurisdiction; label shall indicate manufacturer's name, type of glass, thickness, and safety glazing standard with which glass complies.
- C. Thickness: Where glass thickness is indicated, it is a minimum. Provide glass that complies with performance requirements and is not less than the thickness indicated.

- D. Strength: Where annealed float glass is indicated, provide annealed float glass, heat-strengthened float glass, or fully tempered float glass as needed to comply with "Performance Requirements" Article. Where heat-strengthened float glass is indicated, provide heat-strengthened float glass or fully tempered float glass. Where fully tempered float glass is indicated, provide fully tempered float glass.

## 2.4 GLASS PRODUCTS

- A. Fully Tempered Float Glass: ASTM C 1048, Kind FT (fully tempered), Condition A (uncoated) unless otherwise indicated, Type I, Class 1 (clear), Quality-Q3.
1. Fabrication Process: By horizontal (roller-hearth) process with roll-wave distortion parallel to bottom edge of glass as installed unless otherwise indicated.

## 2.5 GLAZING SEALANTS

- A. General: Provide products of type indicated, complying with the following requirements:
1. Compatibility: Compatible with one another and with other materials they contact, including glass products, seals of insulating-glass units, and glazing channel substrates, under conditions of service and application, as demonstrated by sealant manufacturer based on testing and field experience.
  2. Suitability: Comply with sealant and glass manufacturers' written instructions for selecting glazing sealants suitable for applications indicated and for conditions existing at time of installation.
  3. VOC Content: Field applied sealants shall have a VOC content of not more than 250 g/L.
  4. Colors of Exposed Glazing Sealants: As selected by Architect from manufacturer's full range.
- B. Glazing Sealant: Neutral-curing silicone glazing sealant complying with ASTM C 920, Type S, Grade NS, Class 100/50, Use NT.
1. Products: Subject to compliance with requirements, provide one of the following:
    - a. Dow Corning Corporation; 790.
    - b. GE Advanced Materials - Silicones; SilPruf LM SCS2700.
    - c. Tremco Incorporated; Spectrem 1.



## 2.6 GLAZING TAPES

- A. Back-Bedding Mastic Glazing Tapes: Preformed, butyl-based, 100 percent solids elastomeric tape; nonstaining and nonmigrating in contact with nonporous surfaces; with or without spacer rod as recommended in writing by tape and glass manufacturers for application indicated; and complying with ASTM C 1281 and AAMA 800 for products indicated below:
  - 1. AAMA 806.3 tape, for glazing applications in which tape is subject to continuous pressure.
  - 2. AAMA 807.3 tape, for glazing applications in which tape is not subject to continuous pressure.
- B. Expanded Cellular Glazing Tapes: Closed-cell, PVC foam tapes; factory coated with adhesive on both surfaces; and complying with AAMA 800 for the following types:
  - 1. AAMA 810.1, Type 1, for glazing applications in which tape acts as the primary sealant.
  - 2. AAMA 810.1, Type 2, for glazing applications in which tape is used in combination with a full bead of liquid sealant.

## 2.7 MISCELLANEOUS GLAZING MATERIALS

- A. General: Provide products of material, size, and shape complying with referenced glazing standard, requirements of manufacturers of glass and other glazing materials for application indicated, and with a proven record of compatibility with surfaces contacted in installation.
- B. Cleaners, Primers, and Sealers: Types recommended by sealant or gasket manufacturer.
- C. Setting Blocks: Type recommended by sealant or glass manufacturer; EPDM, Silicone, Neoprene, or Santoprene; with a Shore A durometer hardness of 85, plus or minus 5.
- D. Spacers: Type recommended by sealant or glass manufacturer; neoprene blocks or continuous extrusions of hardness required by glass manufacturer to maintain glass lites in place for installation indicated.
- E. Edge Blocks: Type recommended by sealant or glass manufacturer; EPDM, Silicone, Neoprene, or Santoprene; with a Shore A durometer hardness per manufacturer's written instructions.
- F. Cylindrical Glazing Sealant Backing: ASTM C1330, Type O (open-cell material), of size and density to control glazing sealant depth and otherwise produce optimum glazing sealant performance.

## 2.8 FABRICATION OF GLAZING UNITS

- A. Fabricate glazing units in sizes required to fit openings indicated for Project, with edge and face clearances, edge and surface conditions, and bite complying with written instructions of product manufacturer and referenced glazing publications, to comply with system performance requirements.
  - 1. Allow for thermal movements from ambient and surface temperature changes acting on glass framing members and glazing components.
    - a. Temperature Change: 120 deg F ambient; 180 deg F material surfaces.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine framing, glazing channels, and stops, with Installer present, for compliance with the following:
  - 1. Manufacturing and installation tolerances, including those for size, squareness, and offsets at corners.
  - 2. Presence and functioning of weep system.
  - 3. Minimum required face or edge clearances.
  - 4. Effective sealing between joints of glass-framing members.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 PREPARATION

- A. Clean glazing channels and other framing members receiving glass immediately before glazing. Remove coatings not firmly bonded to substrates.

### 3.3 GLAZING, GENERAL

- A. Comply with combined written instructions of manufacturers of glass, sealants, gaskets, and other glazing materials, unless more stringent requirements are indicated, including those in referenced glazing publications.
- B. Protect glass edges from damage during handling and installation. Remove damaged glass from Project site and legally dispose of off Project site. Damaged glass is glass with edge damage or other imperfections that, when installed, could weaken glass and impair performance and appearance.
- C. Apply primers to joint surfaces where required for adhesion of sealants.
- D. Install setting blocks in sill rabbets, sized and located to comply with referenced glazing publications, unless otherwise required by glass manufacturer. Set blocks in thin course of compatible sealant suitable for heel bead.

- E. Do not exceed edge pressures stipulated by glass manufacturers for installing glass lights.
- F. Provide spacers for glass lights where length plus width is larger than 50 inches.
  - 1. Locate spacers directly opposite each other on both inside and outside faces of glass. Install correct size and spacing to preserve required face clearances, unless gaskets and glazing tapes are used that have demonstrated ability to maintain required face clearances and to comply with system performance requirements.
  - 2. Provide 1/8-inch minimum bite of spacers on glass and use thickness equal to sealant width. With glazing tape, use thickness slightly less than final compressed thickness of tape.
- G. Provide edge blocking where indicated or needed to prevent glass lites from moving sideways in glazing channel, as recommended in writing by glass manufacturer and according to requirements in referenced glazing publications.
- H. Set glass lites in each series with uniform pattern, draw, bow, and similar characteristics.
- I. Where wedge-shaped gaskets are driven into one side of channel to pressurize sealant or gasket on opposite side, provide adequate anchorage so gasket cannot walk out when installation is subjected to movement.
- J. Square cut wedge-shaped gaskets at corners and install gaskets in a manner recommended by gasket manufacturer to prevent corners from pulling away; seal corner joints and butt joints with sealant recommended by gasket manufacturer.

### 3.4 TAPE GLAZING

- A. Position tapes on fixed stops so that, when compressed by glass, their exposed edges are flush with or protrude slightly above sightline of stops.
- B. Install tapes continuously, but not necessarily in one continuous length. Do not stretch tapes to make them fit opening.
- C. Cover vertical framing joints by applying tapes to heads and sills first and then to jambs. Cover horizontal framing joints by applying tapes to jambs and then to heads and sills.
- D. Place joints in tapes at corners of opening with adjoining lengths butted together, not lapped. Seal joints in tapes with compatible sealant approved by tape manufacturer.
- E. Do not remove release paper from tape until immediately before each glazing unit is installed.

- F. Center glass lites in openings on setting blocks and press firmly against tape by inserting dense compression gaskets formed and installed to lock in place against faces of removable stops. Start gasket applications at corners and work toward centers of openings.
- G. Apply cap bead of elastomeric sealant over exposed edge of tape.

### 3.5 GASKET GLAZING (DRY)

- A. Cut compression gaskets to lengths recommended by gasket manufacturer to fit openings exactly, with allowance for stretch during installation.
- B. Insert soft compression gasket between glass and frame or fixed stop so it is securely in place with joints miter cut and bonded together at corners.
- C. Installation with Drive-in Wedge Gaskets: Center glass lites in openings on setting blocks and press firmly against soft compression gasket by inserting dense compression gaskets formed and installed to lock in place against faces of removable stops. Start gasket applications at corners and work toward centers of openings. Compress gaskets to produce a weathertight seal without developing bending stresses in glass. Seal gasket joints with sealant recommended by gasket manufacturer.
- D. Installation with Pressure-Glazing Stops: Center glass lites in openings on setting blocks and press firmly against soft compression gasket. Install dense compression gaskets and pressure-glazing stops, applying pressure uniformly to compression gaskets. Compress gaskets to produce a weathertight seal without developing bending stresses in glass. Seal gasket joints with sealant recommended by gasket manufacturer.
- E. Install gaskets so they protrude past face of glazing stops.

### 3.6 SEALANT GLAZING (WET)

- A. Install continuous spacers, or spacers combined with cylindrical sealant backing, between glass lights and glazing stops to maintain glass face clearances and to prevent sealant from extruding into glass channel and blocking weep systems until sealants cure. Secure spacers or spacers and backings in place and in position to control depth of installed sealant relative to edge clearance for optimum sealant performance.
- B. Force sealants into glazing channels to eliminate voids and to ensure complete wetting or bond of sealant to glass and channel surfaces.
- C. Tool exposed surfaces of sealants to provide a substantial wash away from glass.

### 3.7 CLEANING AND PROTECTION

- A. Immediately after installation remove nonpermanent labels and clean surfaces.
- B. Protect glass from contact with contaminating substances resulting from construction operations.
  - 1. If, despite such protection, contaminating substances do come into contact with glass, remove substances immediately as recommended in writing by glass manufacturer. Remove and replace glass that cannot be cleaned without damage to coatings.
- C. Remove and replace glass that is damaged during construction period.

### 3.8 MONOLITHIC GLASS SCHEDULE

- A. Glass Type TG: Clear fully tempered float glass.
  - 1. Thickness: 6.0 mm.
  - 2. Safety glazing required.

END OF SECTION



SECTION 092400  
PORTLAND CEMENT PLASTERING

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:

- 1. Exterior portland cement plasterwork (stucco) including lath and accessories installed over the following substrates:
  - a. Exterior wood or gypsum sheathing.
  - b. Open wood framing.

B. Related Sections:

- 1. Division 06 Section "Rough Carpentry" for wood framing and furring included in portland cement plaster assemblies.
- 2. Division 06 Section "Plywood Panel Sheathing" for sheathing and water-resistant barriers included in portland cement plaster assemblies.
- 3. Division 07 Section "Blanket Insulation" for thermal insulations and vapor retarders included in portland cement plaster assemblies.
- 4. Division 07 Section "Weather Resistive Barriers" for building wrap and flexible flashing included in portland cement plaster assemblies.
- 5. Division 07 Section "Sheet Metal Flashing and Trim" for sheet metal items installed in conjunction with cement plaster assemblies.

1.3 SUBMITTALS

- A. Product Data: For each type of product indicated or included in the Work.
- B. Samples for Verification: For each texture and color of finish coat indicated; 36 by 36 inches, and prepared on rigid backing.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Store materials inside under cover and keep them dry and protected against damage from weather, direct sunlight, surface contamination, corrosion, construction traffic, and other causes.

## 1.5 FIELD CONDITIONS

- A. Comply with ASTM C 926 requirements.
- B. Exterior Plasterwork:
  - 1. Apply and cure plaster to prevent plaster drying out during curing period. Use procedures required by climatic conditions, including moist curing, providing coverings, and providing barriers to deflect sunlight and wind.
  - 2. Apply plaster when ambient temperature is greater than 40 deg F.
  - 3. Protect plaster coats from freezing for not less than 48 hours after set of plaster coat has occurred.

## PART 2 - PRODUCTS

### 2.1 PERFORMANCE REQUIREMENTS

- A. Regulatory Requirements: Comply with requirements of the 2019 California Building Code, Chapter 25, as applicable to lath and cement plaster.
  - 1. Comply with Division of the State Architect (DSA) Interpretive Regulation IR 25-4 for self furring lath.

### 2.2 METAL LATH

- A. Expanded-Metal Lath: ASTM C 847 with ASTM A 653/A 653M, G60, hot-dip galvanized zinc coating.
  - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Alabama Metal Industries Corporation; a Gibraltar Industries company.
    - b. CEMCO.
    - c. Clark Western Building Systems.
    - d. Dietrich Metal Framing; a Worthington Industries company.
    - e. MarinoWARE.
  - 2. Diamond-Mesh Lath: 3.4 lb/sq. yd. and as follows:
    - a. Flat: For use over open vertical framing.
    - b. Self Furred, Dimpled, or V-Grooved: For use over solidly sheathed vertical surfaces.
    - c. Ribbed: 3/8 inch ribbed lath for use over open horizontal framing.
- B. Welded Wire-Fabric Lath:
  - 1. Basis of Design: Design and details are based on the following:
    - a. Structa Wire Corporation; Megalath (ICC # ESR 2017).



2. Self-furred welded wire fabric lath without paper backing and as follows for use over solid sheathed vertical surfaces.
  - a. Wire Spacing: 1.5 inch by 0.7 inch rectangular grid.
  - b. Wire Size: 17 gage (0.054 inch) Hot-dipped galvanized, low-carbon, cold-drawn steel wire complying with ASTM A641-2, Class 1.
    - 1) Longitudinal (Horizontal) Wires: Wire flattened to dimensions of 0.034 inches by 0.072 inches by cold rolling.
    - 2) Cross (Vertical) Wires: Wire having 1/4 inch high by 3/8 inch long furring crimps spaced 3 inches on center.
  - c. Welding: Each intersection of longitudinal and cross wires shall be electrical resistance welded.
  - d. Nominal weight of Lath: 1.8 lb/sq. yd.

### 2.3 ACCESSORIES

- A. General: Comply with ASTM C 1063 and coordinate depth of trim and accessories with thicknesses and number of plaster coats required.
- B. Metal Accessories:
  1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Alabama Metal Industries Corporation; a Gibraltar Industries company.
    - b. CEMCO.
    - c. Clark Dietrich Building Systems.
    - d. MarinoWARE.
    - e. Stockton Products.
  2. Foundation Weep Screed: Fabricated from hot-dip galvanized-steel sheet, ASTM A 653/A 653M, G60 zinc coating.
  3. Cornerite: Fabricated from metal lath with ASTM A 653/A 653M, G60, hot-dip galvanized zinc coating; use at inside corners.
  4. Cornerbeads: Small nose cornerbead with expanded flanges fabricated from zinc-coated (galvanized) steel; use at external corners unless otherwise indicated.
  5. Casing Beads: Fabricated from zinc-coated (galvanized) steel; square-edged style; with expanded flanges.
  6. Control Joints: Fabricated from zinc-coated (galvanized) steel; one-piece-type, folded pair of unperforated screeds in M-shaped configuration; with perforated flanges and removable protective tape on plaster face of control joint.
  7. Expansion Joints: Fabricated from zinc-coated (galvanized) steel; folded pair of unperforated screeds in M-shaped configuration; with expanded flanges.
  8. Two-Piece Expansion Joints: Fabricated from zinc-coated (galvanized) steel; formed to produce slip-joint and square-edged reveal that is adjustable from 1/4 to 5/8 inch wide; with perforated flanges.

9. Reveals: Fabricated from zinc-coated (galvanized) steel of configuration indicated on Drawings.

## 2.4 MISCELLANEOUS MATERIALS

- A. Water for Mixing: Potable and free of substances capable of affecting plaster set or of damaging plaster, lath, or accessories.
- B. Fasteners for Attaching Metal Lath to Substrates: Complying with ASTM C 1063.
  1. Fasten Seal Products, LLC; Self-Sealing screws, ESR 1675.
    - a. Self-sealing screws with high density polyethylene sealing washers filled with butyl rubber sealing compound; 1-5/8 inch long sharp point screws for wood; 1-1/2 inch long self-drilling screws for metal framing.
- C. Wire: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, not less than 0.0475-inch diameter, unless otherwise indicated.
- D. Building Wrap: As specified in Division 07 Section "Weather Resistive Barriers."
- E. Paper Backing: FS UU-B-790, Type I, 60 minute Grade D, Style 2 vapor-permeable paper.
  1. Paper backing may be attached to lath or separate from lath.

## 2.5 PLASTER MATERIALS

- A. Portland Cement: ASTM C 150, Type I.
  1. Color for Job Mixed Finish Coats: Gray.
- B. Lime: ASTM C 206, Type S; or ASTM C 207, Type S.
- C. Sand Aggregate: ASTM C 897.
- D. Ready-Mixed Finish-Coat Plaster: Mill-mixed portland cement, aggregates, and proprietary ingredients without integral color.
  1. Products: Subject to compliance with requirements, provide one of the following:
    - a. Bonsal American, an Oldcastle Company; Marblesil Stucco Mix.
    - b. California Stucco Products Corp.; Conventional Portland Cement Stucco.
    - c. El Rey Stucco Company, Inc., a brand of ParexLaHabra, Inc.; Premium Stucco Finish.
    - d. LaHabra, a brand of ParexLaHabra, Inc.; Exterior Stucco Color Coat.
    - e. Omega Products International, Inc.; ColorTek Exterior Stucco.
    - f. SonoWall, BASF Wall Systems, Inc.; Thoro Stucco.

## 2.6 PLASTER MIXES

- A. General: Comply with ASTM C 926 for applications indicated.
  - 1. Fiber Content: Add fiber to base-coat mixes after ingredients have mixed at least two minutes. Comply with fiber manufacturer's written instructions for fiber quantities in mixes, but do not exceed 1 lb of fiber/cu. yd. of cementitious materials.
- B. Base Coat Mixes:
  - 1. Scratch and brown coats for three-coat plasterwork for use over metal lath:
    - a. Scratch Coat: For cementitious material, mix 1 part portland cement and 0 to 3/4 parts lime; use 2-1/2 to 4 parts sand per part of cementitious material.
    - b. Brown Coat: For cementitious material, mix 1 part portland cement and 0 to 3/4 parts lime; use 3 to 5 parts sand per part of cementitious material, but not less than the volume of sand used in the scratch coat.
- C. Factory-Prepared Cement Based Finish-Coat Mixes: Comply with manufacturer's written instructions.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine areas and substrates, with Installer present, and including welded hollow-metal frames, cast-in anchors, and structural framing, for compliance with requirements and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 COORDINATION

- A. General: Coordinate installation of lath, plaster, and accessories with the following:
  - 1. Building wrap and flexible flashing as specified in Division 07 Section "Weather Resistive Barriers."
  - 2. Sheet metal flashing and trim as specified in Division 07 Section "Sheet Metal Flashing and Trim."
  - 3. Batt and blanket insulation as specified in Division 07 Section "Thermal and Acoustical Batt Insulation." Insulation in exterior walls is to be installed prior to installing lath unless insulation is readily installed after lath has been installed on one side.
  - 4. Gypsum board as specified in Division 09 Section "Gypsum Board." Where practical, install gypsum board at the interior side of exterior walls prior applying plaster materials in order to prevent cracking or damage to plaster surfaces.

### 3.3 PREPARATION

- A. Protect adjacent work from soiling, spattering, moisture deterioration, and other harmful effects caused by plastering.
- B. Prepare solid substrates for plaster that are smooth or that do not have the suction capability required to bond with plaster according to ASTM C 926.

### 3.4 PAPER BACKING

- A. Install one layer of paper backing over building wrap specified in Division 07 Section "Weather Resistive Barriers."
- B. Apply horizontally with a 3-inch overlap and a 6-inch end lap; fasten to sheathing with galvanized staples or roofing nails.
- C. Apply barrier to cover vertical flashing with a minimum 4-inch overlap, unless otherwise indicated.

### 3.5 INSTALLING METAL LATH

- A. General: Installation of lath shall be subject to inspection by the enforcing agency.
  - 1. The use of self-furred lath is subject to a satisfactory jobsite demonstration with approval by the Architect and the DSA Field Engineer.
- B. Metal Lath: Install according to ASTM C 1063 and as follows:
  - 1. Install types of lath at locations indicated as follows:
    - a. Open Vertical Framing and Furring (Studs with no sheathing): Install flat diamond-mesh lath.
    - b. Solidly Sheathed Vertical Surfaces: Install one of the following:
      - 1) Self-furred diamond mesh lath.
      - 2) Self-furred welded wire lath.
    - c. Flat-Ceiling and Horizontal Framing: Install 3/8-inch ribbed lath.
  - 2. Lath Installed over Solid Sheathing:
    - a. Lath shall be held out at least 1/4 inch from the sheathing by self furred lath or furring nails.
    - b. Lath shall be fastened to framing members through the sheathing, fasteners shall have not less than required minimum penetration into framing members.
  - 3. Lath shall be installed with the long dimension perpendicular to supports.

4. Lath shall be fastened to each framing member with screws spaced not more than 7 inches on center for flat lath and at each rib for ribbed lath.
  - a. Screws shall be self-sealing as specified in "Part 2 – Products," "Miscellaneous Materials" Article of this specification.

### 3.6 INSTALLING TRIM ACCESSORIES

A. Install according to ASTM C 1063, at locations indicated on Drawings, and as follows:

1. Cornerbead: Use at outside corners.
2. Cornerite: Use at interior corners.
3. Casing Bead: Use at exposed edges, perimeters of doors, windows, and similar openings, and where indicated on drawings.
4. Foundation Weep Screed: Use at base of walls at grade; weep screeds shall be not less than 2 inches above paved surfaces and 4 inches above earth.
5. Drip Screed: Use at soffit edges.
6. Expansion Joints, Reveals, and Aluminum Trim: Use at locations indicated on Drawings.
7. Control Joints: Unless otherwise indicated on Drawings, provide control joints at locations approved by Architect for visual effect as follows:
  - a. Where control joints occur in surface of construction directly behind plaster.
  - b. At corners of openings and where plasterwork areas change dimensions, to delineate rectangular-shaped areas (panels) and to relieve the stress that occurs at the corner formed by the dimension change.
  - c. As required to delineate plasterwork into areas (panels) complying with the following:
    - 1) Maximum length-to-width ratio: 2-1/2:1.
    - 2) Maximum Joint Spacing: 18 feet o.c.
    - 3) Maximum Area of Vertical Surfaces: 144 sq. ft.
    - 4) Maximum area of Horizontal Surfaces: 100 sq. ft.

### 3.7 PLASTER APPLICATION

A. General: Comply with ASTM C 926.

1. Do not deviate more than plus or minus 1/4 inch in 10 feet from a true plane in finished plaster surfaces, as measured by a 10-foot straightedge placed on surface.
2. Finish plaster flush with metal frames and other built-in metal items or accessories that act as a plaster ground unless otherwise indicated. Where casing bead does not terminate plaster at metal frame, cut base coat free from metal frame before plaster sets and groove finish coat at junctures with metal.
3. Provide plaster surfaces that are ready to receive field-applied finishes indicated.

B. Walls; Base-Coat Mixes for Use over Metal Lath: Scratch and brown coats for three-coat plasterwork; 3/4-inch thickness.

- C. Ceilings; Base-Coat Mixes for Use over Metal Lath: Scratch and brown coats for three-coat plasterwork; 5/8 inch thick.
- D. Walls; Base-Coat Mix for Use over Concrete or Masonry Walls: Brown coat for two-coat plasterwork over concrete or masonry, 3/8 inch thick.
- E. Plaster Finish Coats: Apply to provide finish surface texture to match existing adjacent plaster surfaces where applicable.
- F. Concealed Exterior Plasterwork: Omit finish coat where plaster will be used as a base for adhered finishes.

### 3.8 PLASTER REPAIRS

- A. Repair or replace work to eliminate cracks, dents, blisters, buckles, crazing and check cracking, dry outs, efflorescence, sweat outs, and similar defects and where bond to substrate has failed.

### 3.9 CLEANING AND PROTECTION

- A. Remove temporary protection and enclosure of other work. Promptly remove plaster from door frames, windows, and other surfaces not indicated to be plastered. Repair floors, walls, and other surfaces stained, marred, or otherwise damaged during plastering.

END OF SECTION

SECTION 092900  
GYPSUM BOARD

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:

- 1. Interior gypsum board.
- 2. Tile backing panels.

B. Related Sections:

- 1. Division 06 Section "Rough Carpentry" for wood framing and furring that supports gypsum board.
- 2. Division 07 Section "Blanket Insulation" for batt and blanket insulation installed in assemblies that incorporate gypsum board.
- 3. Division 09 Section "Tiling" for cementitious backer units installed as substrates for ceramic tile.
- 4. Division 09 Section "Painting" for primers applied to gypsum board surfaces.

1.3 ACTION SUBMITTALS

- A. Product Data: Manufacturer's product data for each type of product indicated or incorporated into the Work.
  - 1. Include statement of VOC content for any adhesives or sealants.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Store materials inside under cover and keep them dry and protected against weather, condensation, direct sunlight, construction traffic, and other potential causes of damage. Stack panels flat and supported on risers on a flat platform to prevent sagging.

## 1.5 FIELD CONDITIONS

- A. Environmental Limitations: Comply with ASTM C 840 requirements or gypsum board manufacturer's written recommendations, whichever are more stringent.
- B. Do not install paper faced gypsum panels until installation areas are enclosed and conditioned.
- C. Do not install panels that are wet, those that are moisture damaged, and those that are mold damaged.
  - 1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
  - 2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

## PART 2 - PRODUCTS

### 2.1 GYPSUM BOARD PANELS, GENERAL

- A. Size: Provide in maximum lengths and widths available that will minimize joints in each area and that correspond with support system indicated.
  - 1. Width: 4 feet.
  - 2. Length: 8, 10, or 12 feet.

### 2.2 INTERIOR GYPSUM BOARD

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. American Gypsum Co.
  - 2. Georgia-Pacific Gypsum, LLC.
  - 3. Lafarge North America Inc.
  - 4. National Gypsum Company.
  - 5. PABCO Gypsum.
  - 6. USG Corporation.
- B. Interior Gypsum Wallboard: ASTM C 1396/C 1396M of the following types:
  - 1. Type X:
    - a. Thickness: 5/8 inch.
    - b. Long Edges: Tapered.



2. Moisture and Mold-Resistant Type: With moisture and mold-resistant core and surfaces.
  - a. Core: 5/8 inch, Type X.
  - b. Long Edges: Tapered.
  - c. Mold Resistance: ASTM D 3273, score of 10 as rated according to ASTM D 3274.

### 2.3 TILE BACKING PANELS

- A. Cementitious Backer Units: ANSI A118.9 and ASTM C 1288 or ASTM C 1325, with manufacturer's standard edges.
  1. Products: Subject to compliance with requirements, provide products by one of the following:
    - a. CertainTeed Corp.; FiberCement BackerBoard.
    - b. Custom Building Products; Wonderboard.
    - c. FinPan, Inc.; Util-A-Crete Concrete Backer Board.
    - d. James Hardie Building Products, Inc.; Hardiebacker.
    - e. National Gypsum Company, Permabase Cement Board.
    - f. USG Corporation; DUROCK Cement Board.
  2. Thickness: 5/8 inch.
  3. Mold Resistance: ASTM D 3273, score of 10 as rated according to ASTM D 3274.

### 2.4 TRIM ACCESSORIES

- A. Interior Trim: ASTM C 1047.
  1. Material: Galvanized or aluminum-coated steel sheet or rolled zinc.
  2. Shapes: As required for project conditions, including but not limited to the following:
    - a. Cornerbead.
    - b. LC-Bead: J-shaped; exposed long flange receives joint compound.
    - c. L-Bead: L-shaped; exposed long flange receives joint compound.
    - d. U-Bead: J-shaped; exposed short flange does not receive joint compound.

### 2.5 JOINT TREATMENT MATERIALS

- A. General: Comply with ASTM C 475/C 475M.
- B. Joint Tape:
  1. Interior Gypsum Board: Paper.
  2. Tile Backing Panels: As recommended by panel manufacturer.

- C. Joint Compound for Interior Gypsum Board: For each coat use formulation that is compatible with other compounds applied on previous or for successive coats.
  - 1. Prefilling: At open joints and damaged surface areas, use setting-type taping compound.
  - 2. Embedding and First Coat: For embedding tape and first coat on joints, fasteners, and trim flanges, use drying-type, all-purpose compound.
  - 3. Fill Coat: For second coat, use drying-type, all-purpose compound.
  - 4. Finish Coat: For third coat, use drying-type, all-purpose compound.
- D. Joint Compound for Tile Backing Panels: As recommended by backing panel manufacturer.

## 2.6 AUXILIARY MATERIALS

- A. General: Provide auxiliary materials that comply with referenced installation standards and manufacturer's written recommendations.
- B. Steel Drill Screws: ASTM C 1002, unless otherwise indicated.
  - 1. For fastening cementitious backer units, use screws of type and size recommended by panel manufacturer.
- C. Insulation: As specified in Division 07 Section "Blanket Insulation."

## 2.7 TEXTURE FINISHES

- A. Primer: As recommended by textured finish manufacturer.
  - 1. Coordinate primers with Division 09 Section "Painting."
- B. Aggregate Finish: Water-based, job-mixed, aggregated, drying-type texture finish for spray application.
  - 1. Texture: Match existing.
- C. Non-Aggregate Finish: Pre-mixed, vinyl texture finish for spray application.
  - 1. Texture: Match existing.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine areas and substrates including welded hollow-metal frames and support framing, with Installer present, for compliance with requirements and other conditions affecting performance of the Work.

- B. Examine panels before installation. Reject panels that are wet, moisture damaged, and mold damaged.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 APPLYING AND FINISHING GYPSUM PANELS, GENERAL

- A. Comply with ASTM C 840 and manufacturer's written installation instructions.
- B. Install ceiling panels across framing to minimize the number of abutting end joints and to avoid abutting end joints in central area of each ceiling. Stagger abutting end joints of adjacent panels not less than one framing member.
- C. Install panels with face side out. Butt panels together for a light contact at edges and ends with not more than 1/16 inch of open space between panels. Do not force into place.
- D. Locate edge and end joints over supports, except in ceiling applications where intermediate supports or gypsum board back-blocking is provided behind end joints. Do not place tapered edges against cut edges or ends. Stagger vertical joints on opposite sides of partitions. Do not make joints other than control joints at corners of framed openings.
- E. Form control and expansion joints with space between edges of adjoining gypsum panels.
- F. Cover both faces of support framing with gypsum panels in concealed spaces (above ceilings, etc.), except in chases braced internally.
  - 1. Unless concealed application is indicated or required for sound, fire, air, or smoke ratings, coverage may be accomplished with scraps of not less than 8 sq. ft. in area.
  - 2. Fit gypsum panels around ducts, pipes, and conduits.
  - 3. Where partitions intersect structural members projecting below underside of floor/roof slabs and decks, cut gypsum panels to fit profile formed by structural members; allow 1/4 to 3/8-inch wide joints to install sealant.
- G. Isolate perimeter of gypsum board applied to non-load-bearing partitions at structural abutments, except floors. Provide 1/4 to 1/2-inch wide spaces at these locations, and trim edges with edge trim where edges of panels are exposed. Seal joints between edges and abutting structural surfaces with acoustical sealant.
- H. Fastening Gypsum Board Panels: Comply with fastening requirements of ASTM C 840 unless more stringent fastening requirements are required for fire resistance rated gypsum board assemblies as indicated on Drawings. Fasten gypsum panels to supports with steel drill screws as follows:
  - 1. Fastener Spacing, Single Layer Gypsum Board Application:
    - a. Ceilings: Space fasteners 12 inches on center maximum.

- b. Walls: Space fasteners 12 inches on center maximum where studs are spaced 24 inches on center; fastener spacing may be increased to 16 inches on center where studs are spaced 16 inches on center.
    - c. Edge Distance: Space fasteners 3/8 inches minimum from panel edges.
  - 2. Attachment to Wood Framing: Install gypsum panels over wood framing, with floating internal corner construction. Do not attach gypsum panels across the flat grain of wide-dimension lumber, including floor joists and headers. Float gypsum panels over these members, or provide control joints to counteract wood shrinkage.
  - 3. Where gypsum panels are installed over structural sheathing or acoustical board panels, increase the length of fasteners an amount equal to not less than the thickness of the sheathing or panels.
- I. Coordinate gypsum panel installation with insulation work specified in Division 07 Section "Blanket Insulation."
  - 1. Thermal and sound attenuation batt/blanket insulation shall be installed before installing gypsum panels, unless blankets are readily installed after panels have been installed on one side of framing members.

### 3.3 APPLYING INTERIOR GYPSUM BOARD

- A. Install interior gypsum board in the following locations:
  - 1. Type X: Unless otherwise indicated.
  - 2. Moisture and Mold-Resistant Type: At walls of toilet and janitor rooms, walls within 2 feet (horizontally) of plumbing fixtures, and other locations as indicated on Drawings.
- B. Single-Layer Application:
  - 1. On ceilings, apply gypsum panels before wall/partition board application to greatest extent possible and at right angles to framing, unless otherwise indicated.
  - 2. On partitions/walls, apply gypsum panels vertically (parallel to framing) using continuous panels without abutting end joints unless otherwise indicated or required by fire-resistance-rated design.
    - a. Stagger abutting end joints not less than one framing member in alternate courses of panels.
    - b. At stairwells and other high walls where the vertical dimension of the wall without horizontal offsets exceeds the maximum available panel length, install panels horizontally, unless otherwise indicated or required by fire-resistance-rated design.
  - 3. Fastening Methods: Apply gypsum panels to supports with steel drill screws.

### 3.4 APPLYING TILE BACKING PANELS

- A. Cementitious Backer Units: ANSI A108.11, at locations indicated to receive tile.
- B. Where tile backing panels abut other types of panels in same plane, provide panels of matching thickness or shim surfaces to produce a uniform plane across panel surfaces.

### 3.5 INSTALLING TRIM ACCESSORIES

- A. General: For trim with back flanges intended for fasteners, attach to framing with same fasteners used for panels. Otherwise, attach trim according to manufacturer's written instructions.
- B. Control Joints: Install control joints at locations indicated on Drawings and according to ASTM C 840 and in specific locations approved by Architect for visual effect.
- C. Interior Trim: Install in the following locations:
  - 1. Cornerbead: Use at outside corners, unless otherwise indicated.
  - 2. LC-Bead: Use at exposed panel edges.
  - 3. L-Bead: Use at exposed panel edges where LC-Bead cannot be used.
  - 4. U-Bead: Use where indicated.

### 3.6 FINISHING GYPSUM BOARD

- A. General: Treat gypsum board joints, interior angles, edge trim, control joints, penetrations, fastener heads, surface defects, and elsewhere as required to prepare gypsum board surfaces for decoration. Promptly remove residual joint compound from adjacent surfaces.
- B. Prefill open joints and damaged surface areas.
- C. Apply joint tape over gypsum board joints, except for trim products specifically indicated as not intended to receive tape.
- D. Gypsum Board Finish Levels: Finish panels to levels indicated below and according to ASTM C 840 and the Gypsum Association:
  - 1. Level 1: All joints and interior angles shall have tape embedded in joint compound; surface shall be free of excess joint compound; tool marks and ridges are acceptable.
    - a. Locations: Concealed areas and areas above ceilings.

2. Level 2: All joints and interior angles shall have tape embedded in joint compound and one separate coat of joint compound applied over all joints, angles, fastener heads, and accessories; surface shall be free of excess joint compound; tool marks and ridges are acceptable.
  - a. Locations: Panels that are substrate for applied rigid panels having a thickness not less than 3/8 inches.
3. Level 3: All joints and interior angles shall have tape embedded in joint compound and two (2) separate coats of joint compound applied over all joints, angles, fastener heads, and accessories; all joint compound shall be smooth and free of tool marks and ridges.
  - a. Locations: Not used unless otherwise indicated on Drawings.
4. Level 4: All joints and interior angles shall have tape embedded in joint compound and Three (3) separate coats of joint compound applied over all joints, angles, fastener heads, and accessories; all joint compound shall be smooth and free of tool marks and ridges.
  - a. Locations: At panel surfaces that will be exposed to view and painted or will be substrates for wall coverings.
  - b. Primer and its application to surfaces are specified in Division 09 Section "Painting."
  - c. Where suspended ceilings are to be installed, wall finish shall extend not less than 6 inches above the ceiling height.
5. Level 5: All joints and interior angles shall have tape embedded in joint compound and Three (3) separate coats of joint compound applied over all joints, angles, fastener heads, and accessories; a thin skim coat of joint compound or similar material specific for this purpose shall be applied to the entire surface; the surface shall be smooth and free of tool marks and ridges.
  - a. Locations: Not used unless otherwise indicated on Drawings
  - b. Primer and its application to surfaces are specified in Division 09 Section "Painting."

E. Cementitious Backer Units: Finish according to manufacturer's written instructions.

### 3.7 APPLYING TEXTURE FINISHES

- A. Surface Preparation and Primer: Prepare and apply primer to gypsum panels and other surfaces receiving texture finishes prior to application of finishes. Apply primer to surfaces that are clean, dry, and smooth.
- B. Texture Finish Application: Mix and apply finish using powered spray equipment, to produce a uniform texture free of starved spots or other evidence of thin application or of application patterns.

- C. Prevent texture finishes from coming into contact with surfaces not indicated to receive texture finish by covering them with masking agents, polyethylene film, or other means. If, despite these precautions, texture finishes contact these surfaces, immediately remove droppings and overspray to prevent damage according to texture-finish manufacturer's written recommendations.

### 3.8 PROTECTION

- A. Protect adjacent surfaces from drywall compound and promptly remove from floors and other non-drywall surfaces. Repair surfaces stained, marred, or otherwise damaged during drywall application.
- B. Protect installed products from damage from weather, condensation, direct sunlight, construction, and other causes during remainder of the construction period.
- C. Remove and replace panels that are wet, moisture damaged, and mold damaged.
  - 1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
  - 2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

END OF SECTION





SECTION 093000  
TILING

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. This Section includes the following:
  - 1. Ceramic tile.
  - 2. Waterproof membrane.
- B. Related Sections include the following:
  - 1. Division 03 Section "Miscellaneous Cast-in-Place Concrete" for monolithic slab finishes specified for tile substrates.
  - 2. Division 07 Section "Joint Sealants" for sealing of expansion, contraction, and isolation joints in tile surfaces.
  - 3. Division 09 Section "Gypsum Board" for tile backing panels.

1.3 DEFINITIONS

- A. General: Definitions in the ANSI A108 series of tile installation standards and in ANSI A137.1 apply to Work of this Section unless otherwise specified.
- B. ANSI A108 Series: ANSI A108.01, ANSI A108.02, ANSI A108.1A, ANSI A108.1B, ANSI A108.1C, ANSI A108.4, ANSI A108.5, ANSI A108.6, ANSI A108.8, ANSI A108.9, ANSI A108.10, ANSI A108.11, ANSI A108.12, ANSI A108.13, ANSI A108.14, ANSI A108.15, ANSI A108.16, and ANSI A108.17, which are contained in "American National Standard Specifications for Installation of Ceramic Tile."
- C. Face Size: Actual tile size, excluding spacer lugs.
- D. Module Size: Actual tile size plus joint width indicated.

1.4 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Samples for Initial Selection: For each type of tile and grout indicated. Include Samples of accessories involving color selection.

## 1.5 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials that match and are from same production runs as products installed and that are packaged with protective covering for storage and identified with labels describing contents.
  - 1. Tile and Trim Units: Furnish quantity of full-size units equal to 3 percent of amount installed for each type, composition, color, pattern, and size indicated.

## 1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver and store packaged materials in original containers with seals unbroken and labels intact until time of use. Comply with requirements in ANSI A137.1 for labeling tile packages.
- B. Store tile and cementitious materials on elevated platforms, under cover, and in a dry location.
- C. Store aggregates where grading and other required characteristics can be maintained and contamination can be avoided.
- D. Store liquid materials in unopened containers and protected from freezing.

## 1.7 FIELD CONDITIONS

- A. Environmental Limitations: Do not install tile until construction in spaces is complete and ambient temperature and humidity conditions are maintained at the levels indicated in referenced standards and manufacturer's written instructions.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

- A. Source Limitations for Tile: Obtain all tile of same type from one source or producer.
  - 1. Obtain tile from same production run and of consistent quality in appearance and physical properties for each contiguous area.
- B. Source Limitations for Setting and Grouting Materials: Obtain ingredients of a uniform quality for each mortar, adhesive, and grout component from a single manufacturer and each aggregate from one source or producer.
- C. Source Limitations for Other Products: Obtain each of the following products specified in this Section through one source from a single manufacturer for each product:
  - 1. Waterproofing.
  - 2. Joint sealants.

## 2.2 PRODUCTS, GENERAL

- A. ANSI Ceramic Tile Standard: Provide tile that complies with ANSI A137.1, "Specifications for Ceramic Tile," for types, compositions, and other characteristics indicated.
  - 1. Provide tile complying with Standard grade requirements, unless otherwise indicated.
- B. ANSI Standards for Tile Installation Materials: Provide materials complying with ANSI A108.02, ANSI standards referenced in other Part 2 articles, ANSI standards referenced by TCNA installation methods specified in tile installation schedules, and other requirements specified.
- C. Factory Blending: For tile exhibiting color variations within ranges, blend tile in factory and package so tile units taken from one package show same range in colors as those taken from other packages and match approved Samples.
- D. Mounting: For factory-mounted tile, provide back- or edge-mounted tile assemblies as standard with manufacturer unless otherwise indicated.
  - 1. Where tile is indicated for installation in wet areas, do not use back or edge-mounted tile assemblies unless tile manufacturer specifies in writing that this type of mounting is suitable for installation indicated and has a record of successful in-service performance.
- E. Colors, Textures, and Patterns: Where selection of colors, surface textures, patterns, and other appearance characteristics are required, selections shall be made by Architect from manufacturer's full range unless otherwise indicated.

## 2.3 TILE PRODUCTS

- A. Basis-of-Design Manufacturer: Provide products indicated as manufactured by the following:
  - 1. Dal-Tile International Corporation.
    - a. Subject to compliance with requirements, provide products indicated or equal products by one of the following:
      - 1) Crossville Ceramics Company, L.P.
      - 2) Florida Tile Industries, Inc.
      - 3) Interceramic Tile.
      - 4) Summitville Tiles, Inc.
      - 5) United States Ceramic Tile Company.
- B. Factory mounted unglazed ceramic mosaic floor tile:
  - 1. Style Name: Daltile, Keystones Porcelain, Price Group 2.
  - 2. Composition: Porcelain.

3. Certification: Porcelain tile certified by the Porcelain Tile Certification Agency.
4. Module Size: 2 by 2 inches.
5. Thickness: 1/4 inch.
6. Face: Plain with cushion edges.
7. Surface: Smooth, without abrasive admixture.
8. Dynamic Coefficient of Friction: Not less than 0.42.
9. Finish: Mat, opaque.
10. Tile Color and Pattern: As indicated on Drawings or if not indicated, as selected by Architect.
11. Grout Color: As indicated on Drawings or if not indicated, as selected by Architect.

C. Glazed Wall Tile:

1. Style Name: Daltile, Semi-Gloss or Matte.
2. Module Size: 4-1/4 by 4-1/4 inches.
3. Thickness: 5/16 inch.
4. Face: Plain with cushion edges.
5. Finish: Bright, opaque; Mat, opaque; or Semimat, opaque glaze per tile as indicated on Drawings, or if not indicated, as selected by Architect from manufacturer's full range.
  - a. Accent Tile Finish: Bright, opaque; Mat, opaque; or Semimat, opaque glaze per tile as indicated on Drawings, or if not indicated, as selected by Architect from manufacturer's full range.
6. Tile Color and Pattern: As indicated on Drawings or if not indicated, as selected by Architect.
7. Grout Color: As indicated on Drawings or if not indicated, as selected by Architect.

D. Trim Units: Coordinated with sizes and coursing of adjoining tile where applicable and matching characteristics of adjoining tile indicated. Provide shapes as follows, selected from manufacturer's standard shapes:

1. Base for Thin-Set Mortar Floor Installations: Cove base with square top, module size and tile matching adjoining wall tile.
2. Wainscot Cap for Thin-Set Mortar Installations: Surface bullnose, module size matching adjoining wall tile.
3. External Corners for Thin-Set Mortar Installations: Surface bullnose, same size as adjoining wall tile.
4. Internal Corners: Field-buttet square corners. For coved base and cap use angle pieces designed to fit with stretcher shapes.

## 2.4 WATERPROOF MEMBRANE

- A. General: Manufacturer's standard product, selected from the following that complies with ANSI A118.10 and is recommended by the manufacturer for the application indicated. Include reinforcement and accessories recommended by manufacturer.
1. Chlorinated-Polyethylene-Sheet Product: Nonplasticized, chlorinated polyethylene faced on both sides with nonwoven polyester fabric, 0.030-inch nominal thickness.
    - a. Available Product: Noble Company (The); Nobleseal TS.
  2. PVC Sheet: PVC sheet heat-fused on both sides to facings of nonwoven polyester; 0.040-inch nominal thickness.
    - a. Available Product: Compositite Corporation; Composeal Gold.
  3. Polyethylene Sheet: Polyethylene faced on both sides with fleece webbing; 0.008-inch nominal thickness.
    - a. Available Product: Schluter Systems L.P.; KERDI.
  4. Fabric-Reinforced, Fluid-Applied Membrane: System consisting of liquid-latex rubber or elastomeric polymer and continuous fabric reinforcement.
    - a. Subject to compliance with requirements, provide one of the following:
      - 1) Custom Building Products; 9240 Waterproofing and Anti-Fracture Membrane.
      - 2) Laticrete International, Inc.; Laticrete 9235 Waterproof Membrane.
      - 3) MAPEI Corporation; Mapelastc L (PRP M19).
      - 4) Mer-Kote Products, Inc.; Hydro-Guard 2000.
      - 5) Summitville Tiles, Inc.; S-9000.

## 2.5 SETTING MATERIALS

- A. Modified Dry-Set Mortar (Thin Set): ANSI A118.4.
1. Prepackaged dry-mortar mix containing dry, redispersible, vinyl acetate or acrylic additive to which only water must be added at Project site.
    - a. For wall applications, provide mortar that complies with requirements for nonsagging mortar in addition to the other requirements in ANSI A118.4.
  2. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Boiardi Products Corporation.
    - b. Bonsal, W. R., Company.
    - c. Custom Building Products.
    - d. LATICRETE International Inc.

- e. MAPEI Corporation.
- f. Summitville Tiles, Inc.

## 2.6 GROUT MATERIALS

- A. Sand-Portland Cement Grout: ANSI A108.10, composed of white or gray cement and white or colored aggregate as required to produce color indicated.
- B. Standard Prepackaged Cement Grout: ANSI A118.6, color as indicated.
- C. Polymer-Modified Prepackaged Tile Grout: ANSI A118.7.

## 2.7 ELASTOMERIC SEALANTS

- A. General: Provide sealants, primers, backer rods, and other sealant accessories that comply with the applicable requirements in Division 07 Section "Joint Sealants."

## 2.8 MISCELLANEOUS MATERIALS

- A. Trowelable Underlayments and Patching Compounds: Latex-modified, portland cement-based formulation provided or approved by manufacturer of tile-setting materials for installations indicated.
- B. Vapor-Retarder Membrane: Polyethylene sheeting, ASTM D 4397, 4.0 mils thick.
- C. Tile Cleaner: A neutral cleaner capable of removing soil and residue without harming tile and grout surfaces, specifically approved for materials and installations indicated by tile and grout manufacturers.
- D. Grout Sealer: Product recommended by manufacturer for sealing grout joints that does not change color or appearance of grout.
  - 1. Grout sealers shall comply with requirements of FloorScore certification.

## 2.9 MIXING MORTARS AND GROUT

- A. Mix mortars and grouts to comply with referenced standards and mortar and grout manufacturers' written instructions.
- B. Add materials, water, and additives in accurate proportions.
- C. Obtain and use type of mixing equipment, mixer speeds, mixing containers, mixing time, and other procedures to produce mortars and grouts of uniform quality with optimum performance characteristics for installations indicated.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine substrates, areas, and conditions where tile will be installed, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
  - 1. Verify that substrates for setting tile are firm, dry, clean, and free of coatings that are incompatible with tile-setting materials including curing compounds and other substances that contain soap, wax, oil, or silicone; and comply with flatness tolerances required by ANSI A108.01 for installations indicated.
  - 2. Verify that concrete substrates for tile floors installed with bonded mortar bed or thin-set mortar comply with surface finish requirements in ANSI A108.01 for installations indicated.
    - a. Verify that surfaces that received a steel trowel finish have been mechanically scarified.
    - b. Verify that protrusions, bumps, and ridges have been removed by sanding or grinding.
  - 3. Verify that installation of grounds, anchors, recessed frames, electrical and mechanical units of work, and similar items located in or behind tile has been completed.
  - 4. Verify that joints and cracks in tile substrates are coordinated with tile joint locations; if not coordinated, adjust joint locations in consultation with Architect.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 PREPARATION

- A. Remove coatings, including curing compounds and other substances that contain soap, wax, oil, or silicone, that are incompatible with tile-setting materials.
- B. Fill cracks, holes, and depressions in concrete substrates for tile floors installed with thinset mortar with trowelable leveling and patching compound specifically recommended by tile-setting material manufacturer.
- C. Where mortar bed installed tile floors are indicated, prepare substrates by applying a reinforced mortar bed that complies with ANSI A108.1A for use with or without a waterproof membrane, or A108B without a waterproof membrane.
  - 1. Where tile floors are indicated to be sloped, slope 1/4 inch per foot maximum (2%) toward drains.

- D. Blending: For tile exhibiting color variations within ranges selected during Sample submittals, verify that tile has been factory blended and packaged so tile units taken from one package show same range of colors as those taken from other packages and match approved Samples. If not factory blended, either return to manufacturer or blend tiles at Project site before installing.

### 3.3 TILE INSTALLATION

- A. Comply with TCNA's "Handbook for Ceramic, Glass, and Stone Tile Installation" for TCNA installation methods specified in tile installation schedules. Comply with parts of the ANSI A108 Series "Specifications for Installation of Ceramic Tile" that are referenced in TCNA installation methods, specified in tile installation schedules, and apply to types of setting and grouting materials used.
  - 1. For the following installations, follow procedures in the ANSI A108 series of tile installation standards for providing 95 percent mortar coverage:
    - a. Tile floors in wet areas.
- B. Extend tile work into recesses and under or behind equipment and fixtures to form complete covering without interruptions, unless otherwise indicated. Terminate work neatly at obstructions, edges, and corners without disrupting pattern or joint alignments.
- C. Accurately form intersections and returns. Perform cutting and drilling of tile without marring visible surfaces. Carefully grind cut edges of tile abutting trim, finish, or built-in items for straight aligned joints. Fit tile closely to electrical outlets, piping, fixtures, and other penetrations so plates, collars, or covers overlap tile.
- D. Provide manufacturer's standard trim shapes where necessary to eliminate exposed tile edges.
- E. Where accent tile differs in thickness from field tile, vary setting-bed thickness so that tiles are flush.
- F. Jointing Pattern: Lay tile in grid pattern unless otherwise indicated. Lay out tile work and center tile fields in both directions in each space or on each wall area. Lay out tile work to minimize the use of pieces that are less than half of a tile. Provide uniform joint widths unless otherwise indicated.
  - 1. For tile mounted in sheets, make joints between tile sheets same width as joints within tile sheets so joints between sheets are not apparent in finished work.
  - 2. Where adjoining tiles on floor, base, walls, or trim are specified or indicated to be same size, align joints.
  - 3. Where tiles are specified or indicated to be whole integer multiples of adjoining tiles on floor, base, walls, or trim, align joints unless otherwise indicated.



- G. Joint Widths: Unless otherwise indicated, install tile with the following joint widths:
  - 1. Ceramic Mosaic Tile: 1/16 inch.
  - 2. Glazed Wall Tile: 1/16 inch.
- H. Lay out tile wainscots to next full tile beyond dimensions indicated.
- I. Expansion Joints: Locate expansion joints and other sealant-filled joints, including control, contraction, and isolation joints, where indicated during installation of setting materials, mortar beds, and tile. Do not saw-cut joints after installing tiles.
  - 1. Where joints occur in concrete substrates, locate joints in tile surfaces directly above them.
  - 2. Prepare joints and apply sealants to comply with requirements in Division 07 Section "Joint Sealants."
- J. Grout Sealer: Apply grout sealer to grout joints in tile floors according to grout-sealer manufacturer's written instructions. As soon as grout sealer has penetrated grout joints, remove excess sealer and sealer from tile faces by wiping with soft cloth.

### 3.4 WATERPROOF MEMBRANE INSTALLATION

- A. Install waterproofing to comply with ANSI A108.13 and manufacturer's written instructions to produce waterproof membrane of uniform thickness bonded securely to substrate.
- B. Allow waterproofing to cure and verify by testing that it is watertight before installing tile or setting materials over it.

### 3.5 ADJUSTING AND CLEANING

- A. Remove and replace tile that is damaged or that does not match adjoining tile. Provide new matching units, installed as specified and in a manner to eliminate evidence of replacement.
- B. Cleaning: On completion of placement and grouting, clean all ceramic tile surfaces so they are free of foreign matter.
  - 1. Remove grout residue from tile as soon as possible.
  - 2. Clean grout smears and haze from tile according to tile and grout manufacturer's written instructions, but no sooner than 10 days after installation. Use only cleaners recommended by tile and grout manufacturers and only after determining that cleaners are safe to use by testing on samples of tile and other surfaces to be cleaned. Protect metal surfaces and plumbing fixtures from effects of cleaning. Flush surfaces with clean water before and after cleaning.

### 3.6 PROTECTION

- A. Protect installed tile work with kraft paper or other heavy covering during construction period to prevent staining, damage, and wear. If recommended by tile manufacturer, apply coat of neutral protective cleaner to completed tile walls and floors.
- B. Prohibit foot and wheel traffic from tiled floors for at least seven days after grouting is completed.
- C. Before final inspection, remove protective coverings and rinse neutral protective cleaner from tile surfaces.

### 3.7 FLOOR TILE INSTALLATION SCHEDULE

- A. Floor Tile Installation FT-1: Ceramic tile thinset over concrete subfloor.
  - 1. Installation Method: TCNA F113 and ANSI A108.5, Unglazed ceramic mosaic tile thinset over concrete slab.
  - 2. Thin-Set Mortar: Latex-portland cement mortar.
  - 3. Grout: Polymer-modified unsanded grout.
- B. Floor Tile Installation FT-2 (Shower Floors): Ceramic tile thinset over waterproof membrane over concrete subfloor.
  - 1. Installation Method: TCNA F113 and ANSI A108.5, Unglazed ceramic mosaic tile thinset over concrete slab.
    - a. Extend waterproof membrane 24 inches beyond shower threshold.
  - 2. Thin-Set Mortar: Latex-portland cement mortar.
  - 3. Grout: Polymer-modified unsanded grout.

### 3.8 WALL TILE INSTALLATION SCHEDULE

- A. Wall Tile Installation WT-1: Ceramic tile thinset over cementitious backer board.
  - 1. Installation Method: TCNA W244C and ANSI A108.5, Glazed wall tile thinset over cementitious backer units.
  - 2. Thin-Set Mortar: Latex-portland cement mortar.
  - 3. Grout: Polymer-modified unsanded grout.

- B. Wall Tile Installation WT-2 (Shower Walls): Ceramic tile thinset over cementitious backer board.
1. Installation Method: TCNA W244C and ANSI A108.5, Glazed wall tile thinset over cementitious backer units.
    - a. Extend waterproof membrane 24 inches beyond shower threshold.
  2. Thin-Set Mortar: Latex-portland cement mortar.
  3. Grout: Polymer-modified unsanded grout.

END OF SECTION



SECTION 095113  
ACOUSTICAL PANEL CEILINGS

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 acoustical panels and exposed suspension systems for ceilings.
- B. Related Requirements:
  - 1. Division 07 Section "Joint Sealants" for acoustical joint sealant.

1.3 SUBMITTALS

- A. Product Data: For each type of product.
  - 1. Include statement of VOC content for any adhesives or sealants.
- B. Samples for Initial Selection: For components with factory-applied finishes.

1.4 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
  - 1. Acoustical Ceiling Units: Full-size panels equal to not less than 2 percent of quantity installed.
  - 2. Suspension-System Components: Quantity of each exposed component equal to not less than 2 percent of quantity installed.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Deliver acoustical panels, suspension-system components, and accessories to Project site in original, unopened packages and store them in a fully enclosed, conditioned space where they will be protected against damage from moisture, humidity, temperature extremes, direct sunlight, surface contamination, and other causes.
- B. Before installing acoustical panels, permit them to reach room temperature and a stabilized moisture content.

- C. Handle acoustical panels carefully to avoid chipping edges or damaging units in any way.

## 1.6 FIELD CONDITIONS

- A. Environmental Limitations: Do not install acoustical panel ceilings until spaces are enclosed and weatherproof, wet work in spaces is complete and dry, work above ceilings is complete, and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.

## 1.7 COORDINATION

- A. Coordinate layout and installation of acoustical panels and suspension system with other construction that penetrates ceilings or is supported by them, including light fixtures, HVAC equipment, fire-suppression system, and partition assemblies.

## PART 2 - PRODUCTS

### 2.1 PERFORMANCE REQUIREMENTS

- A. Ceiling System Components: Ceiling system components shall comply with ASTM C 635 and Section 5.1 of ASTM E 580.
- B. Seismic Performance: Suspended ceiling systems shall withstand the effects of earthquake motions determined according to ASCE/SEI 7 and the California Building Code.
- C. System components and installation shall comply with Division of the State Architect (DSA) Interpretive Regulation IR 25-2.13, latest edition.
  - 1. Ceiling System General Notes (DSA IR 25-2.13, Notes 1.01 - 1.06):
    - a. IR 25-2.13, Note 1.01: Ceiling system components shall comply with ASTM C 635-07 and Section 5.1 of ASTM E 580-10a.
    - b. IR 25-2.13, Note 1.02: The ceiling grid system must be rated heavy duty as defined by ASTM C 635-08.
    - c. IR 25-2.13, Note 1.03 and 1.04: Suspension component manufacturer, product number, and Evaluation Report information provided in Part 2 Article "Metal Suspension Systems."
    - d. IR 25-2.13, Note 1.05: Ceiling panels shall not support any light fixtures, air terminals, or devices.
    - e. IR 25-2.13, Note 1.06: For Ceiling installations utilizing acoustic panels of mineral or glass fiber, it is not mandatory to provide 3/4 inch clearance between the acoustical panel and the wall on the sides of the ceiling which are free to slip. For all other ceiling panel types, provide 3/4 inch clearance between the ceiling panel and the wall on the sides of the ceiling free to slip.

2. Materials (DSA IR 25-2.13, Notes 2.01 - 2.03):
  - a. IR 25-2.13, Note 2.01: Ceiling wire shall be Class 1 zinc coated (galvanized) carbon steel conforming to ASTM A 641-09a. Wire shall be 12 gauge (0.106 inch diameter) with soft temper and minimum tensile strength of 70 ksi.
  - b. IR 25-2.13, Note 2.02: Galvanized sheet steel (including that used for metal stud and track compression struts/posts) shall conform to ASTM A 653-11, or other equivalent sheet steel listed in Section A2.1 of the North American Specification for the Design of Cold-Formed Steel Structural Members 2007, including Supplement 2 dated 2010 (AISI S100-07/S2-10). Material 43 mil (18 gauge) and lighter shall have a minimum yield strength of 33 ksi. Material 54 mil (16 gauge) and heavier shall have a minimum yield strength of 50 ksi.
  - c. IR 25-2.13, Note 2.03: Electrical metallic tubing (EMT) shall be ANSI C80.3/UL 797 carbon steel with G90 galvanizing. EMT shall have a minimum yield strength (F<sub>y</sub>) of 30 ksi and minimum ultimate strength (F<sub>u</sub>) of 48 ksi.
3. Attachment of Hanger and Bracing Wires (DSA IR 25-2.13, Notes 3.01 - 3.05):
  - a. IR 25-2.13, Note 3.01: Separate all ceiling hanger and bracing wires at least 6 inches from all unbraced ducts, pipes, conduits, and similar items.
  - b. IR 25-2.13, Note 3.02: Hanger and bracing wires shall not attach to or bend around obstructions including but not limited to piping, ductwork, conduit, and equipment.
  - c. IR 25-2.13, Note 3.03: Hanger wires that are more than one horizontal in 6 vertical out of plumb shall have counter sloping wires.
  - d. IR 25-2.13, Note 3.04: Slack Safety wires shall be considered hanger wires for installation and testing requirements.
  - e. IR 25-2.13, Note 3.05: Hanger and brace wire anchorage to the structure shall be installed in such a manner that the direction of the anchor aligns closely with the direction of the wire. (e.g. bracing wire ceiling clips must be bent as shown in the details and rotated as required to align closely with the direction of the wire, eye screws in wood must be installed so they align closely with the direction of the wire, etc.).
4. Fasteners and Welding (DSA IR 25-2.13, Notes 4.01 - 4.07):
  - a. IR 25-2.13, Note 4.01: Sheet metal screws shall comply with ASTM C 1513-10, ASME B 18.6.4-89 (R 2005). Penetration of screws through joined material shall not be less than three exposed threads.
  - b. IR 25-2.13, Note 4.02: Expansion anchors shall be (None required for project conditions). [mfr/product/evaluation report number]
  - c. IR 25-2.13, Notes 4.03: Power actuated fasteners shall be (None required for project conditions). [mfr/product/evaluation report number].
  - d. IR 25-2.13, Notes 4.04: If not otherwise specified in the evaluation report, power actuated fasteners installed in steel shall be installed so the entire pointed end of the fastener is driven through the steel member.
  - e. IR 25-2.13, Notes 4.05: Power actuated fasteners in concrete are not permitted for bracing wires.

- f. IR 25-2.13, Note 4.06: Concrete reinforcement and prestressing tendons shall be located by non-destructive means prior to installing post-installed anchors.
  - g. IR 25-2.13, Note 4.07: Welding shall be in accordance with AWS D1.3 using E60XX series electrodes.
5. Testing: All field testing must be performed in the presence of the project inspector (DSA IR 25-2.13, Notes 5.01 - 5.02).
- a. IR 25-2.13, Note 5.01: Post installed anchors in concrete used to support hanger wires shall be tested at a frequency of 10 percent. Power actuated fasteners in concrete shall be field tested for 200 lbs in tension. All other post-installed anchors in concrete shall be tested in accordance with CBC Section 1913A.7.
  - b. IR 25-2.13, Note 5.02: Post installed anchors in concrete used to attach bracing wires shall be tested at a frequency of 50 percent in accordance with CBC Section 1913A.7.
6. Light Fixtures (DSA IR 25-2.13, Notes 6.01 - 6.06):
- a. IR 25-2.13, Note 6.01: All light fixtures shall be positively attached to the ceiling suspension system by mechanical means to resist a horizontal force equal the weight of the fixture. A minimum of two screws or approved fasteners are required at each light fixture per ASTM E 580, Section 5.3.1.
  - b. IR 25-2.13, Note 6.02: Surface mounted fixtures shall be attached to the main runner with at least 2 positive clamping devices. The clamping device shall completely surround the supporting ceiling runner and be made of 14 gauge minimum thickness sheet steel; rotational spring catches do not comply. A 12 gauge slack safety wire shall be connected from each clamping device to the structure above. Provide additional supports when light fixtures are 8 feet or longer, or exceed 56 lbs. Maximum spacing between supports shall not exceed 8 feet.
  - c. IR 25-2.13, Note 6.03: Light fixtures weighing less than or equal to 10 lbs shall have a minimum of one 12 gauge slack safety wire connected to the fixture housing and the structure above.
  - d. IR 25-2.13, Note 6.04: Light fixtures weighing less than or equal to 10 lbs shall have a minimum of one 12 gauge slack safety wire connected to the fixture housing and the structure above. (Repeat of note 6.03)
  - e. IR 25-2.13, Note 6.05: Light fixtures weighing greater than 10 lbs, but less than or equal to 56 lbs, may be supported directly on the ceiling grid members, but they shall have a minimum of two (2) 12 gauge slack safety wires connected from the fixture housing at diagonal corners to the structure above.
- 1) Exception: All light fixtures greater than 2 by 4 ft weighing less than 56 lbs shall have a 12 gauge slack safety wire at each corner.



- f. IR 25-2.13, Note 6.06: Light fixtures weighing greater than 56 lbs shall be independently supported by not less than 4 taut 12 gauge wires (one at each corner) attached from the fixture housing to the structure above or other approved hangers. The 4 taut 12 gauge wires or other approved hangers, including their attachment to the structure above, shall be capable of supporting 4 times the weight of the fixture.
7. Services within the Ceiling (DSA IR 25-2.13, Notes 7.01 - 7.04):
- a. IR 25-2.13, Note 7.01: All flexible sprinkler hose fitting mounting brackets, ceiling mounted air terminals, or other services, shall be positively attached to the ceiling suspension system by mechanical means. Screws or approved fasteners are required. A minimum of 2 attachment points are required at each component.
  - b. IR 25-2.13, Note 7.02: Ceiling mounted air terminals or other services weighing less than or equal to 20 lb shall have one slack safety wire attached from the terminal or service to the structure above.
  - c. IR 25-2.13, Note 7.03: Flexible sprinkler hose fittings, ceiling mounted air terminals or other services weighing more than 20 lbs, but less than or equal to 56 lbs, shall have a minimum of two (2) 12 gauge slack safety wires (at diagonal corners) connected from terminal or service to the structure above.
  - d. IR 25-2.13, Note 7.04: Flexible sprinkler hose fittings, ceiling mounted air terminals, or other services weighing more than 56 lbs shall be supported directly from the structure above by not less than 4 taut 12 gauge hanger wires attached from the terminal or service to the structure above or other approved hangers.
8. Other Devices within the Ceiling (DSA IR 25-2.13, Note 8.01):
- a. IR 25-2.13, Note 8.01: All lightweight miscellaneous devices, such as strobe lights, occupancy sensors, speakers, exit signs, etc., shall be attached to the ceiling grid. In addition, devices weighing more than 10 lbs shall have a 12 gauge slack safety wire anchored to the structure above. Devices weighing more than 20 lbs shall be supported independently from the structure above.

## 2.2 ACOUSTICAL PANELS

- A. Source Limitations, Acoustical Ceiling Panels: Obtain acoustical panels from a single source from a single manufacturer.

- B. Manufacturer, Basis-of-Design Products: Where named manufacturer's products are indicated, Drawings and Specifications are based on products manufactured by:
1. Armstrong World Industries, Inc.
    - a. Subject to compliance with requirements, provide products indicated or comparable products by one of the following:
      - 1) BPB USA.
      - 2) CertainTeed Corp.
      - 3) USG Interiors, Inc.; Subsidiary of USG Corporation.
- C. Surface-Burning Characteristics: Comply with ASTM E 84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
1. Flame-Spread Index: Class A according to ASTM E 1264.
  2. Smoke-Developed Index: 50 or less.
- D. Glass-Fiber-Based Panels: Made with binder containing no urea formaldehyde.
- E. Acoustical Panel Standard: Provide manufacturer's standard panels of configuration indicated that comply with ASTM E 1264 classifications as designated by types, patterns, acoustical ratings, and light reflectances unless otherwise indicated.
1. Mounting Method for Measuring NRC: Type E-400; plenum mounting in which face of test specimen is 15-3/4 inches away from test surface according to ASTM E 795.
- F. Broad Spectrum Antimicrobial Fungicide and Bactericide Treatment: Provide acoustical panels treated with manufacturer's standard antimicrobial formulation that inhibits fungus, mold, mildew, and gram-positive and gram-negative bacteria and showing no mold, mildew, or bacterial growth when tested according to ASTM D 3273 and evaluated according to ASTM D 3274 or ASTM G 21.
- G. Acoustical Panel Colors and Patterns: Match appearance characteristics indicated for each product type.
- H. Acoustical Panel Types:
1. Type ACP-1: Armstrong World Industries; Cortega, No. 769.
    - a. Type and Form: Type III, mineral base with painted finish; Form 2, water felted.
    - b. Pattern: Fine fissured (ASTM E1264 pattern C D).
    - c. Size: 24 x 48 x 5/8 inches.
    - d. Edge: Square.
    - e. Color: White.
    - f. LR: Not less than 0.82.
    - g. NRC: Not less than 0.55.

## 2.3 METAL SUSPENSION SYSTEMS

- A. Source Limitations, Suspension Systems: Obtain suspensions systems from a single source from a single manufacturer.
- B. Metal Suspension-System Standard: Provide manufacturer's standard direct-hung metal suspension systems of types, structural classifications, and finishes indicated that comply with applicable requirements in ASTM C 635/C 635M, and Section 5.1 of ASTM E580.
  - 1. Main runners, cross runners, splices, expansion devices, and intersection connectors shall be designed to carry a mean ultimate test load of not less than 180 lbs in compression and tension per ASTM E 580 Section 5.1.2.
- C. Wide-Face, Capped, Double-Web Steel Suspension System: Main and cross runners roll formed from cold-rolled steel sheet; prepainted, electrolytically zinc coated, or hot-dip galvanized according to ASTM A 653/A 653M, not less than G30 coating designation; with prefinished 15/16-inch wide metal caps on flanges.
  - 1. Structural Classification: Heavy-duty system.
  - 2. End Condition of Cross Runners: Override (stepped) type.
  - 3. Face Design: Flat, flush.
  - 4. Cap Material: Steel cold-rolled sheet.
  - 5. Cap Finish: Painted white.
  - 6. Products: Subject to compliance with requirements, provide one of the following:
    - a. Armstrong World Industries, Prelude XL (ESR-1308).
      - 1) Main Runners: No. 7301.
      - 2) Cross Runners: No. XL7341 (4'), XL7328 (2').
      - 3) Perimeter Seismic Clips: No. BERC2.
    - b. Chicago Metallic Corp., 1200 (ESR-2631).
      - 1) Main Runners: No. 200.01H.
      - 2) Cross Runners: No. 1214.01H (4'), 1202.01H (2').
      - 3) Perimeter Seismic Clips: No. 1496.
- D. Edge Moldings and Trim: Manufacturer's standard roll formed sheet metal angle edge molding and trim with hemmed edges having nominal 7/8 inch legs, that fit acoustical panel edge details and suspension systems indicated, and comply with seismic design requirements; formed from sheet metal of same material, finish, and color as that used for exposed flanges of suspension-system runners.
  - 1. Perimeter Seismic Clips: Provide manufacturer's proprietary perimeter seismic clips at ends of main and cross runners at wall angles to comply with seismic standards indicated.
  - 2. For lay-in panels with reveal edge details, provide stepped edge molding that forms reveal of same depth and width as that formed between edge of panel and flange at exposed suspension member.

3. For circular penetrations of ceiling, provide edge moldings fabricated to diameter required to fit penetration exactly.

## 2.4 ACCESSORIES

- A. Attachment Devices: As indicated on Drawings; attachment devices to be sized for five times the design load indicated in ASTM C 635/C 635M, Table 1, "Direct Hung," unless otherwise indicated. Comply with seismic design requirements.
- B. Sheet Metal Screws: Comply with ASTM C1513-10, ASME B18.6.4-89 (R2005). Penetration of screws through joined material shall be not less than three exposed threads.
- C. Hanger and Brace Wires: Class 1 zinc-coated (galvanized) carbon-steel wire conforming to ASTM A 641-09a; wire to be 12 gauge (0.106 inch diameter) with soft temper and minimum tensile strength of not less than 70 ksi.
- D. Seismic Struts: Metal stud sections of size indicated on Drawings of galvanized steel sheet conforming to ASTM A653-11, or other equivalent sheet steel listed in Section A2.1 of the North American Specification for the Design of Cold-Formed Steel Structural Members 2007, including supplement 2 dated 2010 (AISI S100-07/S2-10). Material 43 mil (18 gauge) and lighter shall have a minimum yield strength of 33 ksi; material 54 mil (16 gauge) and heavier shall have a minimum yield strength of 50 ksi.
- E. Seismic Stabilizer Bars: Manufacturer's standard perimeter stabilizers designed to accommodate seismic forces.

## 2.5 ACOUSTICAL SEALANT

- A. Acoustical Sealant: As specified in Division 07 Section "Joint Sealants." Manufacturer's standard sealant complying with ASTM C 834 and effective in reducing airborne sound transmission through perimeter joints and openings in building construction as demonstrated by testing representative assemblies according to ASTM E 90.
  1. Exposed and Concealed Joints: Nonsag, paintable, nonstaining latex sealant.
  2. Concealed Joints: Nondrying, nonhardening, nonskinning, nonstaining, gunnable, synthetic-rubber sealant.
  3. Acoustical sealant shall have a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, including structural framing to which acoustical panel ceilings attach or abut, with Installer present, for compliance with requirements specified in this and other Sections that affect ceiling installation and anchorage and with requirements for installation tolerances and other conditions affecting performance of acoustical panel ceilings.
- B. Examine acoustical panels before installation. Reject acoustical panels that are wet, moisture damaged, or mold damaged.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 PREPARATION

- A. Measure each ceiling area and establish layout of acoustical panels to balance border widths at opposite edges of each ceiling. Avoid using less-than-half-width panels at borders, and comply with layout shown on reflected ceiling plans.
- B. Layout openings for penetrations centered on the penetrating items.

### 3.3 INSTALLATION

- A. General: Install acoustical panel ceilings to comply with ASTM C 636/C 636M, Section 5.2 of ASTM E 580, and seismic design requirements indicated, according to manufacturer's written instructions and CISCA's "Ceiling Systems Handbook."
  - 1. Ceiling System Installation shall comply with DSA IR 25-2.13, latest edition; requirements included in Part 2 Article "Performance Requirements" of this specification Section.
- B. Anchors and/or Clips for Hanger and Brace Wires: Anchors and/or Clips for hanger and brace wires shall be installed in such a manner that the direction of the anchor/clip aligns as closely as possible with the direction of the wire.
- C. Hanger Wires: Suspend ceiling hanger wires from the building's structural members and attach to grid members as indicated on Drawings and as follows:
  - 1. Install hanger wires spaced not more than 4 feet on center along main runners and not more than 8 inches from ends of runners at the perimeter of the ceiling.
  - 2. Install hanger wires at cross runners at the perimeter of the ceiling area not more than 8 inches from edges or one-fourth the length of the runner whichever is least. Perimeter wires are not required when the length of the runner is 8 inches or less.

3. Install hanger wires plumb and free from contact with insulation or other objects within the space above the ceiling that are not part of supporting structure or of ceiling suspension system. Hanger wires shall be separated from unbraced pipes, ducts, conduits, and similar items a minimum of 6 inches.
4. Secure hanger wires to ceiling suspension grid members and to supports above with a minimum of three tight turns in 3 inches. Hanger wire loops shall be tightly wrapped and sharply bent to prevent any vertical movement or rotation of the member within the loops.
5. Hanger wires shall not attach to or bend around interfering material or equipment. Provide trapeze or other supplementary support members at obstructions to typical hanger spacing.
6. Provide additional hangers, struts, or braces as required at all ceiling breaks, soffits, or discontinuous areas.
7. Splay hanger wires only where required to miss obstructions; hanger wires that are more than one horizontal to 6 vertical out of plumb shall have counter sloping wires. Counter sloping wires are not required at perimeter hanger wires at main runners that are positively attached to the perimeter wall closure angle.

D. Seismic Bracing/Hanger Wires and Compression Struts: Seismic bracing shall consist of a compression strut and sets of 4 splayed brace wires oriented 90 degrees from each other attached to suspension grid main runners and the structure above as indicated on Drawings and as follows:

1. Space bracing assemblies not more than 12 feet on center each way and not more than 6 feet from walls.
2. Secure brace wires to ceiling suspension main runners and to building structural members above with a minimum of four tight turns in 1-1/2 inches.
  - a. Brace wires shall attach to main runners within 2 inches of the intersection of main and cross runners.
  - b. The slope of brace wires shall not exceed 45 degrees from the plane of the ceiling.
  - c. Brace wires shall be separated from unbraced pipes, ducts, conduits, and similar items a minimum of 6 inches.
3. Compression struts shall attach to ceiling grid main runners at the intersection of the brace wires and shall be installed not more than 1 horizontal to 6 vertical out of plumb.
4. Ceiling areas of 144 square feet or less surrounded by walls attached or braced to the structure above shall not require seismic bracing.

E. Edge Molding and Trim: Install trim of type indicated at perimeter of acoustical ceiling area and where necessary to conceal edges of acoustical panels. Positively attach trim to the ceiling grid system with manufacturer's standard clips and fasteners.

1. Apply acoustical sealant in a continuous ribbon concealed on back of vertical legs of moldings before they are installed.
2. Screw attach moldings to substrate at intervals not more than 16 inches on center and not more than 3 inches from ends, leveling with ceiling suspension system to a tolerance of 1/8 inch in 12 feet. Miter corners accurately and connect securely.

- F. Suspension Grid Members: Install suspension grid members so they are level, square, and securely interlocked with one another. Remove and replace dented, bent, or kinked members.
1. Main runners shall be spaced not more than 4 feet on center and shall be supported by hanger wires spaced not more than 4 feet on center along the main runner.
  2. Grid members shall be attached to two adjacent walls per ASTM E 580, Section 5.2.3; grid members shall be at least 3/4 inches clear of other walls.
    - a. At the perimeter of the ceiling area where main or cross runners are not connected to the adjacent wall, provide an interconnection between the runners at the free ends to prevent lateral spreading. A metal spreader strut or a 16 gauge wire with a positive mechanical connection to the runner may be used and placed within 8 inches of the wall; where the perpendicular distance from the wall to the first parallel runner is 8 inches or less, the interconnection is not required.
    - b. Proprietary clips shall be provided at free ends of main and cross runners.
  3. Expansion joints shall be provided between grid members at the intersections of corridors and at the junctions of corridors and lobbies or similar areas.
  4. Seismic separations shall be provided to divide large ceiling areas into smaller areas so that no undivided ceiling area exceeds 2,500 sf. Alternately, comply with ASTM E 580, Section 5.2.9
- G. Acoustic Panels: Install acoustical panels with undamaged edges and fit accurately into suspension system runners and edge moldings. Scribe and cut panels at borders and penetrations to provide a neat, precise fit.
1. For square-edged panels, install panels with edges fully hidden from view by flanges of suspension system runners and moldings.
  2. For reveal-edged panels on suspension system runners, install panels with bottom of reveal in firm contact with top surface of runner flanges.
  3. Provide oversize penetrations through ceiling panels for sprinkler heads and similar rigid penetrating items that are not connected to the ceiling system; penetrations shall be 2 inch minimum oversized to allow for horizontal movement of 1 inch in all directions.
    - a. Penetrations shall be finished with escutcheons to seal off oversized openings; escutcheons shall allow for movement of 1 inch minimum in all directions
    - b. Flexible pipe penetrations shall not require oversize openings.

- H. Light Fixtures: All light fixtures shall be positively attached to the ceiling suspension system by mechanical means per CEC Article 410.36 to resist a horizontal force equal the weight of the fixture. A minimum of two screws or approved fasteners are required at each light fixture per ASTM E 580, Section 5.3.1.
1. Surface mounted fixtures shall be attached to the main runner with at least 2 positive clamping devices on each fixture; the clamping device shall completely surround the supporting ceiling runner and be made of 14 gauge minimum thickness sheet steel; rotational spring catches do not comply. A 12 gauge slack safety wire shall be attached to each clamping device and to the structure above. Provide additional supports when light fixtures are 8 feet or longer or exceed 56 lbs. Maximum spacing between supports shall not exceed 8 feet.
  2. Light fixtures weighing not more than 10 lbs shall have a minimum of one 12 gauge slack safety wire connected to the fixture housing and the structure above.
  3. Light fixtures weighing more than 10 lbs, but not more than 56 lbs, may be supported directly on the ceiling grid members, but they shall have a minimum of two 12 gauge slack safety wires connected to the fixture housing at diagonal corners and anchored to the structure above. Light fixtures greater than 2 by 4 ft weighing less than 56 lbs shall have a 12 gauge slack safety wire at each corner.
  4. Light fixtures weighing more than 56 lbs shall be independently supported by not less than 4 taut 12 gauge wires attached to the fixture housing, one at each corner, and the structure above; the 4 taut wires, including their attachment to the structure, must be capable of supporting 4 times the weight of the fixture.
  5. Pendant mounted fixtures shall be supported directly from the structure above with hanger wires or cables passing through each pendant hanger and capable of supporting 2 times the weight of the fixture. Refer to DSA IR 16-9 for additional requirements for pendant fixtures.
- I. Air Terminals and Other Services: Ceiling mounted air terminals and/or other services shall be positively attached to the ceiling suspension system by mechanical means to resist a horizontal force equal to the weight of the component; screws or approved fasteners are required. A minimum of 2 attachment points are required at each component.
1. Ceiling mounted air terminals and/or other services weighing not more than 20 lbs shall have one 12 gauge slack safety wire attached to the terminal or service and the structure above.
  2. Ceiling mounted air terminals and/or other services weighing more than 20 lbs, but not more than 56 lbs, shall have a minimum of two 12 gauge slack safety wires connected to the terminal or service and the structure above.
  3. Ceiling mounted air terminals and/or other services weighing more than 56 lbs shall be independently supported by not less than 4 taut 12 gauge wires attached to the terminal or service and the structure above. The 4 taut wires including their attachment to the structure must be capable of supporting 4 times the weight of the terminal or service.



4. Lightweight miscellaneous devices, such as strobe lights, occupancy sensors, speakers, exit signs, etc., shall be attached to the ceiling suspension system by mechanical means to resist a horizontal force equal to the weight of the component; screws or approved fasteners are required. A minimum of 2 attachment points are required at each component.
  - a. Devices weighing more than 10 lbs, and not exceeding 20 lbs, shall have a minimum of one 12 gauge slack safety wire connected to the fixture hosing and the structure above.
  - b. Devices weighing more than 20 lbs shall be independently supported by not less than 4 taut 12 gauge wires attached to the fixture and the structure above. The 4 taut wires including their attachment to the structure must be capable of supporting 4 times the weight of the fixture.
  
- J. Metal and Other Panels: Metal panels and panels weighing more than 1/2 psf, other than mineral fiber acoustic panels, shall be positively attached to the suspension grid members.

### 3.4 CLEANING

- A. Clean exposed surfaces of acoustical panel ceilings, including trim, edge moldings, and suspension-system members. Comply with manufacturer's written instructions for cleaning and touchup of minor finish damage. Remove and replace ceiling components that cannot be successfully cleaned and repaired to permanently eliminate evidence of damage.

END OF SECTION



SECTION 096001  
FLOORING MOISTURE AND pH TESTING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes administrative and procedural requirements for quality assurance and quality control for flooring moisture and pH testing of interior concrete slabs.
  - 1. Owner will engage a qualified testing agency to perform tests and inspections.
- B. Related Sections include the following:
  - 1. Division 01 Section "Quality and Testing Requirements."
  - 2. Division 09 Sections as applicable to adhered flooring materials.

1.3 REFERENCES

- A. ASTM F 1869 Standard Test Method for Measuring Vapor Emission Rate of Concrete Subfloor using Anhydrous Calcium Chloride.
- B. ASTM F 710 Standard Practice for Preparing Concrete Floors to receive Resilient Flooring.
- C. ASTM F 2170 Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using in situ Probes.

1.4 TESTING AGENCY

- A. General: Owner will engage a qualified testing agency to conduct tests and inspections specified.
  - 1. Costs for testing agency services will be paid by the Owner.
  - 2. Costs for retesting and reinspecting construction that replaces or is necessitated by work that failed to comply with the Contract Documents will be paid by the Owner and the amount will be deducted from the Contract Sum by Change Order.

- B. Testing Agency Responsibilities: Cooperate with Architect and Contractor in performance of duties. Provide qualified personnel to perform required tests and inspections.
1. Perform testing as required by the Contract Documents.
  2. Determine the location from which test samples will be taken and in which in-situ tests are conducted.
  3. Taking all test specimens.
  4. Prepare written reports of tests and inspections, and submit reports of each test, inspection, and similar quality-control service to Architect and Contractor.
  5. Retesting and reinspecting corrected work.
  6. Do not release, revoke, alter, or increase the Contract Document requirements or approve or accept any portion of the Work.
  7. Do not perform any duties of Contractor.

## 1.5 CONTRACTOR REQUIREMENTS

### A. Contractor Responsibilities:

1. Cooperate with agencies performing required tests, inspections, and similar quality-control services, and provide reasonable auxiliary services as requested. Notify agency sufficiently in advance of operations to permit assignment of personnel. Provide the following:
  - a. Access to the Work.
  - b. Incidental labor and facilities necessary to facilitate tests and inspections.
2. Coordinate sequence of activities to accommodate required quality-assurance and control services with a minimum of delay and to avoid necessity of removing and replacing construction to accommodate testing and inspecting.
  - a. Schedule times for tests, inspections, obtaining samples, and similar activities.

## 1.6 FIELD CONDITIONS

- A. Environmental Limitations: Testing shall not occur until spaces are enclosed and weatherproof, wet work in spaces is complete and dry, work above ceilings is complete, and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.
1. Maintain ambient temperatures within range recommended by manufacturers of flooring products, but not less than 68 deg F or more than 80 deg F, in spaces to receive adhered flooring products during the following time periods:
    - a. 48 hours before testing.
    - b. During testing.
    - c. 48 hours after installation.

- B. Until Substantial Completion, maintain ambient temperatures within range recommended by manufacturers of flooring products, but not less than 68 deg F or more than 80 deg F.

## PART 2 - PRODUCTS

### 2.1 MATERIALS AND EQUIPMENT

- A. The following materials and equipment shall be the responsibility of the Owner's testing agency:
  - 1. Test Kit as manufactured by American Moisture Test, Inc., Tramex, LTD.
    - a. ASTM F 1869 water vapor emission test.
    - b. ASTM F 2170 relative humidity test.
    - c. ASTM F 710 digital alkalinity-pH, wide range 1-14pH.

## PART 3 - EXECUTION

### 3.1 PREPARATION

- A. Contractor Responsibilities: Prepare concrete substrates according to ASTM F 710 and flooring manufacturers' written instructions to ensure adhesion of resilient products.
  - 1. Verify that substrates are dry, free of curing compounds, sealers, and hardeners, and are compatible to receive adhesive applied flooring products.
  - 2. Remove substrate coatings and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, using mechanical methods recommended by manufacturer. Do not use solvents.
  - 3. Mechanically abrade and/or grind a 20 inch by 20 inch area to remove adhesives, paint, curing/sealing compounds, and similar residue a minimum of 24 hours prior to application of testing equipment at each test location for water vapor emission testing.
    - a. Do not abrade surface where topical concrete vapor control barriers have been applied; clean surface of contamination and directly apply testing equipment to treated surface(s) without scarification methods.
- B. Temperature and Humidity: Maintain spaces at the temperature and humidity conditions anticipated during normal occupancy and as specified in Part 1 Article "Field Conditions" before, during, and after testing.
  - 1. Testing shall be performed under HVAC controlled conditions, testing performed without HVAC controlled conditions shall be subject retesting prior to flooring application.

## 3.2 TESTING

### A. Testing: Testing Agency shall perform tests as follows:

1. Anhydrous calcium chloride test, ASTM F 1869.
  - a. Do not mechanically abrade concrete surfaces that have been treated with a topical vapor control barrier.
  - b. Perform all gram scale weights on site.
  - c. Expose dome for 60 to 72 hours.
  - d. Report results as pounds of emission per 24 hours per ASTM F 1869.
    - 1) Satisfactory results shall have a maximum moisture-vapor-emission rate of not more than 3 lb of water/1000 sq. ft. in 24 hours.
2. Relative humidity test using in situ probes, ASTM F 2170.
  - a. Test method not required for areas sealed with Topical Vapor Control Barrier.
  - b. Satisfactory results shall have a maximum 75 percent relative humidity level measurement.
3. Testing for pH:
  - a. Apply pH solution to form a 1-inch diameter circle directly to interior of moisture dome.
  - b. Allow to absorb into concrete for 1 minute.
  - c. Apply flat tip pH meter to solution and document result as required by manufacturer.
    - 1) Satisfactory results shall be in the pH range 5 minimum to 9 maximum.
4. Frequency of Testing: Apply tests at a rate of three (3) test locations for areas up to 1,000 square feet and one (1) test per each 1,000 square feet thereafter. Note test location and number on next to test for future identification.
5. Do not proceed with flooring installation until satisfactory results are achieved or a topical vapor control barrier is applied.

## 3.3 REPAIR

### A. General: On completion of testing, contractor shall repair damaged construction and restore substrates and finishes.

1. Use materials for patching identical to in-place materials; refer to applicable specification sections for materials and installation. For exposed surfaces, use materials that visually match in-place adjacent surfaces to the fullest extent possible.
2. Comply with the requirements Division 01 Section "Execution."

- B. Protect construction exposed by or for quality-control service activities.
- C. Repair and protection are Contractor's responsibility, regardless of the assignment of responsibility for quality-control services.
- D. Test Results shall be reported similar to the below American Moisture Test "Report 100":

Interior Test Conditions	Relative Humidity (%)	Air Temp. (° F)
Start of Test		
End of Test		
ASTM Requirement	50 ± 10 % RH	75 ± 10° F

Results	Moisture Vapor Emission Rate (MVER) / Relative Humidity	pH
Highest	/	
Lowest	/	
Acceptable	3.0 lbs. / 75% RH	9.0pH

Location	ASTM F-1869-04 Calcium Chloride Data							Results	
	Start	End	Elapsed Time	Start Weight	Ending Weight	Weight Gain	Concrete Surface Temp Start / End	Digital pH	MVER / Relative Humidity
	Date/Ti me	Date/Ti me							

END OF SECTION





SECTION 096513  
RESILIENT BASE AND ACCESSORIES

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:
  - 1. Resilient base.
  - 2. Resilient molding accessories.

1.3 SUBMITTALS

- A. Product Data: For each type of product indicated.
  - 1. Include statement of VOC content for any adhesives or sealants.
- B. Samples for Initial Selection: For color and texture for each product indicated.
- C. Product Schedule: For resilient products, use same designations as Contract Documents.

1.4 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
  - 1. Furnish not less than 10 linear feet for every 500 linear feet or fraction thereof, of each type, color, pattern, and size of resilient product installed.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Store resilient products and installation materials in dry spaces protected from the weather, with ambient temperatures maintained within range recommended by manufacturer, but not less than 50 deg F or more than 90 deg F.

## 1.6 FIELD CONDITIONS

- A. Maintain ambient temperatures within range recommended by manufacturer, but not less than 70 deg F or more than 95 deg F, in spaces to receive resilient products during the following time periods:
  - 1. 48 hours before installation.
  - 2. During installation.
  - 3. 48 hours after installation.
- B. After installation and until Substantial Completion, maintain ambient temperatures within range recommended by manufacturer, but not less than 55 deg F or more than 95 deg F.
- C. Install resilient products after other finishing operations, including painting, have been completed.

## PART 2 - PRODUCTS

### 2.1 RESILIENT BASE

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. Tarkett.
  - 2. Burke Mercer Flooring Products; Division of Burke Industries, Inc.
  - 3. Roppe Corporation, USA.
- B. Resilient Base: ASTM F 1861, Type TS (rubber, vulcanized thermoset), Group I (solid, homogeneous).
  - 1. Style: Cove (base with toe).
  - 2. Minimum Thickness: 0.125 inch.
  - 3. Height: 4 inches unless otherwise indicated on Drawings.
  - 4. Lengths: Cut lengths 48 inches long, or coils in manufacturer's standard length.
  - 5. Outside Corners: Preformed.
  - 6. Inside Corners: Job formed or preformed.
  - 7. Colors: As selected by Architect from full range of industry colors.

### 2.2 RESILIENT MOLDING ACCESSORIES

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. Tarkett.
  - 2. Burke Mercer Flooring Products; Division of Burke Industries, Inc.
  - 3. Roppe Corporation, USA.

- B. Resilient Molding Accessories: Flooring terminations, transitions, reducer strips, and accessories as indicated and/or required for project conditions.
  - 1. Material: Rubber.
  - 2. Profile and Dimensions: As indicated in Drawings and/or as required for project conditions.
  - 3. Colors and Patterns: As selected by Architect from full range of industry colors.

## 2.3 INSTALLATION MATERIALS

- A. Trowelable Leveling and Patching Compounds: Latex-modified, portland cement based or blended hydraulic-cement-based formulation provided or approved by manufacturer for applications indicated.
- B. Adhesives: Water-resistant type recommended by manufacturer to suit resilient products and substrate conditions indicated.
  - 1. Adhesives shall comply with the following limits for VOC content when calculated according to 40 CFR 59, Subpart D (EPA Method 24):
    - a. Cove Base Adhesives: VOC content of not more than 50 g/L.
    - b. Rubber Floor and Stair Tread Adhesives: VOC content of not more than 60 g/L.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine substrates, with Installer present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.
  - 1. Verify that finishes of substrates comply with tolerances and other requirements specified in other Sections and that substrates are free of cracks, ridges, depressions, scale, and foreign deposits that might interfere with adhesion of resilient products.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.
  - 1. Installation of resilient products indicates acceptance of surfaces and conditions.

### 3.2 PREPARATION

- A. Prepare substrates according to manufacturer's written instructions to ensure adhesion of resilient products.
- B. Fill cracks, holes, and depressions in substrates with trowelable leveling and patching compound and remove bumps and ridges to produce a uniform and smooth substrate.

- C. Do not install resilient products until they are same temperature as the space where they are to be installed.
  - 1. At least 48 hours in advance of installation, move resilient products and installation materials into spaces where they will be installed.
- D. Immediately before installation, sweep and vacuum clean substrates to be covered by resilient products.

### 3.3 RESILIENT BASE INSTALLATION

- A. Comply with manufacturer's written instructions for installing resilient base.
- B. Apply resilient base to walls, columns, pilasters, casework and cabinets in toe spaces, and other permanent fixtures in rooms and areas where base is required.
- C. Install resilient base in lengths as long as practicable without gaps at seams and with tops of adjacent pieces aligned.
- D. Tightly adhere resilient base to substrate throughout length of each piece, with base in continuous contact with horizontal and vertical substrates.
- E. Do not stretch resilient base during installation.
- F. On masonry surfaces or other similar irregular substrates, fill voids along top edge of resilient base with manufacturer's recommended adhesive filler material.
- G. Outside Corners: Install preformed corners; install corners before installing straight pieces.
- H. Inside Corners: Install preformed or job formed inside corners.
  - 1. Preformed Corners: Install preformed corners before installing straight pieces.
  - 2. Job-Formed Corners: Use straight pieces of maximum lengths possible and form returns with not than 6 inches in length, miter corners to minimize open joints.

### 3.4 RESILIENT ACCESSORY INSTALLATION

- A. Comply with manufacturer's written instructions for installing resilient accessories.
- B. Resilient Molding Accessories: Butt to adjacent materials and tightly adhere to substrates throughout length of each piece. Install reducer strips at edges of carpet and resilient floor covering that would otherwise be exposed.

### 3.5 CLEANING AND PROTECTION

- A. Comply with manufacturer's written instructions for cleaning and protection of resilient products.

- B. Perform the following operations immediately after completing resilient product installation:
  - 1. Remove adhesive and other blemishes from exposed surfaces.
- C. Protect resilient products from mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period.
- D. Cover resilient products subject to wear and foot traffic until Substantial Completion.

END OF SECTION



SECTION 096516  
RESILIENT SHEET FLOORING

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:

- 1. Vinyl sheet flooring.

- B. Related Sections:

- 1. Division 09 Section "Flooring Moisture and pH Testing."
  - 2. Division 09 Section "Resilient Base and Accessories" for resilient base, reducer strips, and other accessories installed with resilient floor coverings.

1.3 SUBMITTALS

- A. Product Data: For each type of product indicated, include the following:

- 1. Documentation of VOC content for adhesives and chemical-bonding compounds.
  - 2. Documentation indicating resilient flooring complies with at least one of the following:
    - a. Resilient Floor Covering Institute (RFCI) FloorScore program.
    - b. VOC-emission limits and testing requirements specified in the California Department of Public Health's 2010 Standard Method for the Testing and Evaluation Chambers, Version 1.1, February 2010.
    - c. Collaborative for High Performance Schools California (2014 CA-CHPS) Criteria and listed in the CHPS High performance Product Database.
    - d. Certified under UL Greenguard Gold (Formerly the Greenguard Children's and Schools Program).

- B. Shop Drawings: For each type of floor covering. Include floor covering layouts, locations of seams, edges, columns, doorways, enclosing partitions, built-in furniture, cabinets, and cutouts.

- C. Samples for Verification: In manufacturer's standard size, but not less than 6-by-9 inch sections of each different color and pattern of floor covering required.

- D. Maintenance Data: For each type of floor covering to include in maintenance manuals.

#### 1.4 QUALITY ASSURANCE

- A. Installer Qualifications: A qualified installer who employs workers for this Project who are competent in techniques required by manufacturer for floor covering installation indicated.

#### 1.5 DELIVERY, STORAGE, AND HANDLING

- A. Store floor coverings and installation materials in dry spaces protected from the weather, with ambient temperatures maintained within range recommended by manufacturer, but not less than 50 deg F or more than 90 deg F. Store rolls upright.

#### 1.6 FIELD CONDITIONS

- A. Maintain ambient temperatures within range recommended by manufacturer, but not less than 70 deg F or more than 85 deg F, in spaces to receive floor coverings during the following time periods:
  - 1. 48 hours before installation.
  - 2. During installation.
  - 3. 48 hours after installation.
- B. After installation and until Substantial Completion, maintain ambient temperatures within range recommended by manufacturer, but not less than 60 deg F or more than 85 deg F.
- C. Close spaces to traffic during floor covering installation.
- D. Close spaces to traffic for 48 hours after floor covering installation.
- E. Install floor coverings after other finishing operations, including painting, have been completed.

#### 1.7 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of resilient sheet flooring that fails within specified warranty period.
  - 1. Warranty does not include deterioration or failure due to unusual traffic, vandalism, adhesive failure due to moisture or alkaline from the sub-floor, or abuse.
  - 2. Warranty Period: 5 years from date of Substantial Completion.



## PART 2 - PRODUCTS

### 2.1 PERFORMANCE REQUIREMENTS

- A. Fire-Test-Response Characteristics: As determined by testing identical products according to ASTM E 648 or NFPA 253 by a qualified testing agency.
  - 1. Critical Radiant Flux Classification: Class I, not less than 0.45 W/sq. cm.
- B. Sustainability Requirements: Resilient tile flooring shall comply with at least one of the following (Per 2019 California Green Building Standards Code, Section 5.504.4.6):
  - 1. Resilient Floor Covering Institute (RFCI) FloorScore program.
  - 2. VOC-emission limits and testing requirements specified in the California Department of Public Health's 2010 Standard Method for the Testing and Evaluation Chambers, Version 1.1, February 2010.
  - 3. Collaborative for High Performance Schools California (2014 CA-CHPS) Criteria and listed in the CHPS High performance Product Database.
  - 4. Certified under UL Greenguard Gold (Formerly the Greenguard Children's and Schools Program).

### 2.2 RESILIENT SHEET FLOORING

- A. Basis of Design Product: Subject to compliance with requirements, provide the following:
  - 1. Armstrong World Industries, Inc.; Connection CORLON.
    - a. Comparable products: In lieu of Basis of Design product and subject to compliance with requirements, provide a comparable product by one of the following:
      - 1) Congoleum Corporation.
      - 2) Forbo Flooring, Inc.
      - 3) Tarkett, Inc.
- B. Vinyl Sheet Floor Covering with Backing: ASTM F 1303, Class A backing, Grade 1, Type II.
  - 1. Backing Class: Class A (fibrous).
  - 2. Type (Binder Content): Type II, minimum binder content of 34 percent.
  - 3. Wear-Layer Thickness: Grade 1, 0.050 inches.
  - 4. Overall Thickness: 0.080 inches.
  - 5. Critical Radiant Flux Classification: Class I, not less than 0.45 W/sq. cm.
  - 6. Sheet Width: 6 feet.
  - 7. Seaming Method: Heat welded.
  - 8. Colors and Patterns: 88701 Granite Gray.

## 2.3 INSTALLATION MATERIALS

- A. Trowelable Leveling and Patching Compounds: Latex-modified, portland cement based or blended hydraulic-cement-based formulation provided or approved by manufacturer for applications indicated.
- B. Adhesives: Water-resistant type recommended by manufacturer to suit floor covering and substrate conditions indicated.
  - 1. Adhesives shall have a VOC content of not more than 50 g/L when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
- C. Seamless-Installation Accessories:
  - 1. Heat-Welding Bead: Manufacturer's solid-strand product for heat welding seams.
    - a. Color: Match floor covering.
- D. Floor Polish: Provide protective liquid floor polish products as recommended by manufacturer.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine substrates, with Installer present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.
  - 1. Verify that finishes of substrates comply with tolerances and other requirements specified in other Sections and that substrates are free of cracks, ridges, depressions, scale, and foreign deposits that might interfere with adhesion of floor coverings.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 PREPARATION

- A. Prepare substrates according to manufacturer's written instructions to ensure adhesion of floor coverings.
- B. Concrete Substrates: Prepare according to ASTM F 710.
  - 1. Verify that substrates are dry and free of curing compounds, sealers, and hardeners.
    - a. Remove substrate coatings and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, using mechanical methods recommended by manufacturer. Do not use solvents.

- b. Do not abrasively clean concrete substrates have been treated with a topical concrete vapor control barrier; comply with requirements of vapor control barrier manufacturer.
- 2. Testing Concrete Substrates: Owner will engage a testing agency to perform tests for moisture vapor emission, humidity, and pH per Division 09 Section "Flooring Moisture and pH Testing." In the absence of Owner testing, perform the following tests:
  - a. Testing for pH: Perform tests recommended by floor tile manufacturer. Proceed with installation only after substrate pH falls within range on pH scale recommended by manufacturer in writing, but not less than 5 or more than 9.
  - b. Moisture Testing: Proceed with installation only after substrates pass testing according to floor tile manufacturer's written recommendations, but not less stringent than the following:
    - 1) Perform anhydrous calcium chloride test according to ASTM F 1869. Proceed with installation only after substrates have maximum moisture-vapor-emission rate of 3 lb of water/1000 sq. ft. in 24 hours.
    - 2) Perform relative humidity test using in situ probes according to ASTM F 2170. Proceed with installation only after substrates have a maximum 75 percent relative humidity level.
- 3. Adhesion Testing: Perform tests recommended by floor tile manufacturer.
- C. Fill cracks, holes, and depressions in substrates with trowelable leveling and patching compound and remove bumps and ridges to produce a uniform and smooth substrate.
- D. Do not install floor coverings until they are same temperature as space where they are to be installed.
  - 1. Move floor coverings and installation materials into spaces where they will be installed at least 48 hours in advance of installation.
- E. Sweep and vacuum clean substrates to be covered by floor coverings immediately before installation.

### 3.3 FLOOR COVERING INSTALLATION

- A. Comply with manufacturer's written instructions for installing floor coverings.
- B. Unroll floor coverings and allow them to stabilize before cutting and fitting.
- C. Lay out floor coverings as follows:
  - 1. Maintain uniformity of floor covering direction.
  - 2. Minimize number of seams; place seams in inconspicuous and low-traffic areas, at least 6 inches away from parallel joints in floor covering substrates.

3. Match edges of floor coverings for color shading at seams.
  4. Avoid cross seams.
- D. Scribe and cut floor coverings to butt neatly and tightly to vertical surfaces, permanent fixtures, and built-in furniture including cabinets, pipes, outlets, and door frames.
- E. Extend floor coverings into toe spaces, door reveals, closets, and similar openings.
- F. Maintain reference markers, holes, or openings that are in place or marked for future cutting by repeating on floor coverings as marked on substrates. Use chalk or other nonpermanent marking device.
- G. Adhere floor coverings to substrates using a full spread of adhesive applied to substrate to produce a completed installation without open cracks, voids, raising and puckering at joints, telegraphing of adhesive spreader marks, and other surface imperfections.
- H. Seamless Installation:
1. Heat-Welded Seams: Comply with ASTM F 1516. Rout joints and use welding bead to permanently fuse sections into a seamless floor covering. Prepare, weld, and finish seams to produce surfaces flush with adjoining floor covering surfaces.

### 3.4 CLEANING AND PROTECTION

- A. Comply with manufacturer's written instructions for cleaning and protection of floor coverings.
- B. Perform the following operations immediately after completing floor covering installation:
1. Remove adhesive and other blemishes from floor covering surfaces.
  2. Sweep and vacuum floor coverings thoroughly.
  3. Damp-mop floor coverings to remove marks and soil.
- C. Protect floor coverings from mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period.
- D. Floor Polish: Remove soil, visible adhesive, and surface blemishes from floor covering before applying liquid floor polish.
1. Apply three coat(s).
- E. Cover floor coverings until Substantial Completion.

END OF SECTION

SECTION 096816  
CARPETING

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:

- 1. Tufted carpet.

- B. Related Requirements:

- 1. Division 02 Section "Selective Demolition" for removing existing floor coverings.
  - 2. Division 09 Section "Flooring Moisture and PH Testing" for testing of concrete floor substrates.
  - 3. Division 09 Section "Resilient Base and Accessories" for resilient wall base and accessories installed with carpet.

1.3 ACTION SUBMITTALS

- A. Product Data: For carpet, adhesives, and accessory materials.

- 1. Carpet: For each type indicated, include manufacturer's written data on physical characteristics, durability, fade resistance, and installation recommendations for each type of substrate.
  - 2. Documentation of VOC content for adhesives.
  - 3. Documentation indicating carpet complies with at least one of the following:
    - a. Carpet and Rug Institute's Green Label Plus Program.
    - b. VOC emission limits and testing requirements specified in the California Department of Public Health Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers, Version 1.1, February 2010 (also known as CDPH Standard Method V1.1 or Specification 01350).
    - c. NSF/ANSI 140 at the Gold level or higher.
    - d. Scientific Certifications Systems Sustainable Choice.
    - e. Collaborative for High Performance Schools California (2014 CA-CHPS) Criteria and listed in the CHPS High performance Product Database.

- B. Shop Drawings: Show the following:
1. Columns, doorways, enclosing walls or partitions, built-in cabinets, and locations where cutouts are required in carpet.
  2. Carpet type, color, and dye lot.
  3. Locations where dye lot changes occur.
  4. Seam locations, types, and methods.
  5. Type of subfloor.
  6. Type of installation.
  7. Pattern type, repeat size, location, direction, and starting point.
  8. Pile direction.
  9. Type, color, and location of insets and borders.
  10. Type, color, and location of edge, transition, and other accessory strips.
  11. Transition details to other flooring materials.
- C. Samples: For each of the following products and for each color and texture required. Label each Sample with manufacturer's name, material description, color, pattern, and designation indicated on Drawings and in schedules.
1. Carpet: 12-inch square Sample.
  2. Carpet Seam: 6-inch Sample.
- D. Product Schedule: For carpet. Use same designations indicated on Drawings.

#### 1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For qualified Installer.
- B. Product Test Reports: For carpet, for tests performed by a qualified testing agency.
- C. Sample Warranties: For special warranties.

#### 1.5 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For carpet to include in maintenance manuals. Include the following:
1. Methods for maintaining carpet, including cleaning and stain-removal products and procedures and manufacturer's recommended maintenance schedule.
  2. Precautions for cleaning materials and methods that could be detrimental to carpet.

## 1.6 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. Carpet: Full-width rolls equal to 5 percent of amount installed for each type indicated, but not less than 10 sq. yd.

## 1.7 QUALITY ASSURANCE

- A. Installer Qualifications: An experienced Installer who is certified by the International Certified Floorcovering Installers Association at the Commercial II certification level.
- B. Fire-Test-Response Ratings: Where indicated, provide carpet identical to those of assemblies tested for fire response per NFPA 253 by a qualified testing agency.

## 1.8 DELIVERY, STORAGE, AND HANDLING

- A. Comply with CRI 104.

## 1.9 FIELD CONDITIONS

- A. Comply with CRI 104 for temperature, humidity, and ventilation limitations.
- B. Environmental Limitations: Do not deliver or install carpet until spaces are enclosed and weathertight, wet work in spaces is complete and dry, and ambient temperature and humidity conditions are maintained at occupancy levels during the remainder of the construction period.
- C. Do not install carpet over concrete slabs until slabs have cured, are sufficiently dry to bond with adhesive, and have pH range recommended by carpet manufacturer.
- D. Where demountable partitions or other items are indicated for installation on top of carpet, install carpet before installing these items.

## 1.10 WARRANTY

- A. Special Warranty for Carpet: Manufacturer agrees to repair or replace components of carpet installation that fail in materials or workmanship within specified warranty period.
  - 1. Warranty does not include deterioration or failure of carpet due to unusual traffic, failure of substrate, vandalism, or abuse.
  - 2. Failures include, but are not limited to, more than 10 percent loss of face fiber, edge raveling, snags, runs, loss of tuft bind strength, excess static discharge, and delamination.
  - 3. Warranty Period: (10) Ten years from date of Substantial Completion.

## PART 2 - PRODUCTS

### 2.1 PERFORMANCE REQUIREMENTS

- A. Carpet shall meet product and testing requirements of at least one of the following:
1. Testing and product requirements of CRI's "Green Label Plus" program.
  2. Carpet and installation adhesives products comply with the testing and product requirements of the California Department of Public Health' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."
  3. NSF/ANSI 140 at the Gold level or higher.
  4. Scientific Certifications Systems Sustainable Choice.

### 2.2 TUFTED CARPET

- A. Basis-of-Design Product: Drawings and Specifications are based on the following:\

1. Mohawk Group; GL154 Faculty Remix.

- B. Physical Properties:

1. Color: 599 Pronounced Navy.
2. Fiber Type: Duracolor® Premium Nylon.
3. Pile Characteristic: Textured-loop pile.
4. Density: 5,639 oz./cu. yd.
5. Pile Height Average: 0.166 inch for finished carpet.
6. Stitches: 8.3 stitches per inch.
7. Gage: 1/8 (31.50 rows per 10 cm).
8. Backing System: Unibond® Plus.
9. Width: 12 feet.
10. Stain Release Technology: Permanent, built into fiber.

- C. Performance Characteristics:

1. Static: Under 3.5KV per AATCC-134.
2. Flammability: Class 1 per ASTM E 648.
3. Smoke Density: Less than 450 per ASTM E662.
4. Critical Radiant Flux Classification: Not less than 0.45 W/sq. cm according to NFPA 253.

### 2.3 INSTALLATION ACCESSORIES

- A. Trowelable Leveling and Patching Compounds: Latex-modified, hydraulic-cement-based formulation provided or recommended by carpet manufacturer.



- B. Adhesives: Water-resistant, mildew-resistant, nonstaining type to suit products and subfloor conditions indicated, that complies with flammability requirements for installed carpet and is recommended or provided by carpet manufacturer.
  - 1. Adhesives shall have a VOC content of not more than 50 g/L when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
- C. Seam Adhesive: Hot-melt adhesive tape or similar product recommended by carpet manufacturer for sealing and taping seams and butting cut edges at backing to form secure seams and to prevent pile loss at seams.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for maximum moisture content, pH range, installation tolerances, and other conditions affecting carpet performance. Examine carpet for type, color, pattern, and potential defects.
- B. Concrete Slabs: Verify that finishes comply with requirements specified in Division 03 Section "Miscellaneous Cast-in-Place Concrete" and that surfaces are free of cracks, ridges, depressions, scale, and foreign deposits.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 PREPARATION

- A. General: Comply with CRI's "CRI Carpet Installation Standard" and with carpet manufacturer's written installation instructions for preparing substrates to ensure adhesion of flooring products.
- B. Concrete Substrates: Prepare according to ASTM F 710.
  - 1. Verify that substrates are dry and free of curing compounds, sealers, and hardeners.
    - a. Remove substrate coatings and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, using mechanical methods recommended by manufacturer. Do not use solvents.
    - b. Do not abrasively clean concrete substrates have been treated with a topical concrete vapor control barrier; comply with requirements of vapor control barrier manufacturer.

2. Testing Concrete Substrates: Owner will engage a testing agency to perform tests for moisture vapor emission, humidity, and pH per Division 09 Section "Flooring Moisture and pH Testing." In the absence of Owner testing, perform the following tests:
    - a. Testing for pH: Perform tests recommended by floor tile manufacturer. Proceed with installation only after substrate pH falls within range on pH scale recommended by manufacturer in writing, but not less than 5 or more than 9.
    - b. Moisture Testing: Proceed with installation only after substrates pass testing according to floor tile manufacturer's written recommendations, but not less stringent than the following:
      - 1) Perform anhydrous calcium chloride test according to ASTM F 1869. Proceed with installation only after substrates have maximum moisture-vapor-emission rate of 3 lb of water/1000 sq. ft. in 24 hours.
      - 2) Perform relative humidity test using in situ probes according to ASTM F 2170. Proceed with installation only after substrates have a maximum 75 percent relative humidity level.
  3. Adhesion Testing: Perform tests recommended by floor tile manufacturer.
- C. Use trowelable leveling and patching compounds, according to manufacturer's written instructions, to fill cracks, holes, depressions, and protrusions in substrates. Fill or level cracks, holes and depressions 1/8 inch wide or wider, and protrusions more than 1/32 inch, unless more stringent requirements are required by manufacturer's written instructions.
  - D. Remove coatings, including curing compounds, and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, without using solvents. Use mechanical methods recommended in writing by carpet manufacturer.
  - E. Broom and vacuum clean substrates to be covered immediately before installing carpet.

### 3.3 INSTALLATION

- A. Comply with CRI's "CRI Carpet Installation Standard and carpet manufacturer's written installation instructions for the following:
  1. Direct-Glue-Down Installation: Comply with CRI 104, Section 9, "Direct Glue-Down Installation."
- B. Comply with carpet manufacturer's written recommendations and Shop Drawings for seam locations and direction of carpet; maintain uniformity of carpet direction and lay of pile. At doorways, center seams under the door in closed position.
- C. Do not bridge building expansion joints with carpet.

- D. Cut and fit carpet to butt tightly to vertical surfaces, permanent fixtures, and built-in furniture including cabinets, pipes, outlets, edgings, thresholds, and nosings. Bind or seal cut edges as recommended by carpet manufacturer.
- E. Extend carpet into toe spaces, door reveals, closets, open-bottomed obstructions, removable flanges, alcoves, and similar openings.
- F. Maintain reference markers, holes, and openings that are in place or marked for future cutting by repeating on finish flooring as marked on subfloor. Use nonpermanent, nonstaining marking device.

#### 3.4 CLEANING AND PROTECTING

- A. Perform the following operations immediately after installing carpet:
  - 1. Remove excess adhesive, seam sealer, and other surface blemishes using cleaner recommended by carpet manufacturer.
  - 2. Remove yarns that protrude from carpet surface.
  - 3. Vacuum carpet using commercial machine with face-beater element.
- B. Protect installed carpet to comply with CRI's "CRI Carpet Installation Standard."
- C. Protect carpet against damage from construction operations and placement of equipment and fixtures during the remainder of construction period. Use protection methods indicated or recommended in writing by carpet manufacturer and carpet adhesive manufacturer.

END OF SECTION



SECTION 097723  
VINYL COVERED TACKBOARD PANELS

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. This Section includes the following:
  - 1. Unframed vinyl fabric wrapped tackable wall panels (vinyl covered tackboard) adhesively mounted to wall substrates.
- B. Related Sections include the following:
  - 1. Division 09 Section "Gypsum Board."

1.3 SUBMITTALS

- A. Product Data: For each type of product indicated.
  - 1. Documentation of VOC content for adhesives.
- B. Shop Drawings: Included plans and elevations showing location and extent of each panel type, indicate joints, termination points, and edge details.
- C. Samples for Initial Selection: Fabric facing material selections from panel manufacturer's full range.
- D. Maintenance Data: For wall coverings to include in maintenance manuals.

1.4 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials from same production run that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
  - 1. For each color, and pattern installed, provide full size panels in quantity equal to not less than 5 percent of amount installed.

## 1.5 DELIVERY, STORAGE, AND HANDLING

- A. Comply with manufacturers' written instructions for minimum and maximum temperature and humidity requirements for shipment, storage, and handling.
- B. Deliver materials and panels in unopened bundles and store in a temperature-controlled dry place with adequate air circulation.
- C. Protect panel edges from crushing and impact.

## 1.6 FIELD CONDITIONS

- A. Environmental Limitations: Do not deliver or install wall panels until spaces are enclosed and weather tight, wet work in spaces is complete and dry, work above ceilings is complete, and ambient temperature and humidity conditions are achieved and maintained at the levels anticipated for Project when occupied for its intended use.
  - 1. Condition materials and spaces for not less than 48 hours before installation.
  - 2. Maintain established temperature and humidity conditions until final completion.
- B. Field Measurements: Verify locations of acoustical wall panels by field measurements before fabrication and indicate measurements on Shop Drawings.

## PART 2 - PRODUCTS

### 2.1 PERFORMANCE REQUIREMENTS

- A. Fire-Test-Response Characteristics: As determined by testing identical wall coverings applied with identical adhesives to substrates according to test method indicated below by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
  - 1. Surface-Burning Characteristics: Comply with ASTM E 84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
    - a. Class A; flame-spread index of 25 or less; smoke developed index of 450 or less.

## 2.2 VINYL COVERED TACKBOARD WALL PANELS

- A. Source Limitations: Obtain panels through one source from a single manufacturer.
- B. Basis of Design Manufacturer: Design, Drawings, and Specifications are based on panels manufactured by the following:
  - 1. Chatfield Clarke Co.
    - a. Subject to compliance with requirements, provide products by the manufacturer indicated or a comparable manufacturer subject to Request for Substitution prior to bidding.
- C. Vinyl Covered Tackable Wall Panels: Manufacturer's standard vinyl fabric wrapped tackboard wall panels as follows:
  - 1. Panel Substrate: Cellulosic wood fiber board, ASTM C 208, 1/2 inch thickness.
    - a. Width: 4 feet.
    - b. Length: 8, 9, and 10 foot lengths as standard with manufacturer and as required by project conditions.
    - c. Surface Burning Characteristics: Class B, flame spread of 75 or less when tested in accordance with ASTM E84.
    - d. Edges: Square.
  - 2. Fabric: Backed vinyl fabric as follows:
    - a. Manufacturer: Koroseal Wallcoverings, a Division of RJF International Corporation.
    - b. Fabric Width: 54 inches.
    - c. Type II Fabric:
      - 1) Total Weight (Oz./Lineal yard, 54 inch width): 21.0.
      - 2) Backing: Osnaburg.
    - d. Surface-Burning Characteristics: Comply with ASTM E 84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
      - 1) Class A; flame-spread index of 25 or less; smoke developed index of 450 or less.
    - e. Color and Pattern: As selected by Architect from Manufacturer's full range. One color per room, up to 4 colors per project.

## 2.3 FABRICATION

- A. Fabric facing shall be stretched tight and square and be fully adhered to substrate panels. Adhered fabric shall be free from puckers, ripples, wrinkles, sags, blisters, seams, adhesive, or other foreign matter. Long edges shall be wrapped and fabric returned around the back face of panels for 1-1/2 inches.

## 2.4 ACCESSORIES

- A. Trim: J and H-shaped extruded vinyl trim with exposed faces wrapped with vinyl fabric to match panels.
- B. Adhesive: Mildew-resistant, non-staining adhesive, for use with specific wall panel and substrate application, and as recommended in writing by wall panel manufacturer.
  - 1. Adhesive shall have a VOC content of 50 g/L or less.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine substrates and conditions, with Installer present, for compliance with requirements, installation tolerances, and other conditions affecting performance of acoustical wall panels.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 PREPARATION

- A. Measure each wall area and establish layout of panels, balance widths at opposite ends of each wall. Avoid using less-than-half-width panels at ends of walls and comply with layout shown on Drawings.

### 3.3 INSTALLATION OF WALL PANELS

- A. Adhere panels to walls according to manufactures written installation instructions.
  - 1. Temporary nailing used to hold panels in place during setting of adhesive shall be removed; nails shall be of a size and type that will leave no evidence of nailing in the vinyl covering when the nails are removed.
- B. Install wall panels in locations indicated with vertical surfaces and edges plumb, top edges level and in alignment with other panels, faces flush, and scribed to fit adjoining work accurately at borders and at penetrations.
  - 1. Install panels vertically, continuous from floor to ceiling without horizontal joints unless distance is greater than the maximum available panel length. Where horizontal joints cannot be avoided, provide H-shaped trim between panels.
  - 2. Vertical Joints: Tightly butt fabric wrapped edges.
- C. Extend panels above suspended ceilings as indicated on the Drawings.
- D. Cut panels to be at least 50 percent of panel width. At longitudinal cuts, leave excess fabric and wrap cut edge and back face of panel with fabric to match uncut edges, secure fabric to panel with adhesive recommended in writing by manufacturer.



- E. Edge and Corner Trim: Provide edge and corner trim at exposed ends, edges, terminations, outside corners, and where necessary to conceal edges of panels. Miter corners of trim.

#### 3.4 CLEANING

- A. Clean panels according to manufacturer's written instructions on completion of installation to remove dust and other foreign materials.

#### 3.5 PROTECTION

- A. Provide final protection and maintain conditions, in a manner acceptable to manufacturer and installer, to ensure that wall panels are without damage or deterioration at time of Substantial Completion.
- B. Replace wall panels that cannot be cleaned and repaired, in a manner approved by Architect, before time of Final Inspection.

END OF SECTION



SECTION 099100  
PAINTING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes surface preparation and field painting, staining or refinishing of the following:
  - 1. Exposed exterior items and surfaces.
  - 2. Exposed interior items and surfaces.
  - 3. Surface preparation, priming, and finish coats specified in this Section are in addition to shop priming and surface treatment specified in other Sections.
- B. Related Sections include but are not limited to the following:
  - 1. Division 08 Sections for shop priming of metal doors and frames with primers specified in this Section.
  - 2. Division 09 Section "Gypsum Board" for sealing gypsum board surfaces before application of surface textures with primers/sealers specified in this Section.
  - 3. Division 21 through 23 Sections for additional requirements for painting of plumbing and mechanical items.
  - 4. Division 26 through 28 Sections for additional requirements for painting of electrical items.
  - 5. Division 32 Section "Paving Specialties" for pavement markings.

1.3 SPECIAL REQUIREMENTS

- A. Unauthorized removal or disconnecting of electrical fixtures, switches, or control devices may result in additional electrical work to comply with energy regulations of governing agencies. Contractor shall be financially responsible with no additional cost to the Owner for additional electrical work due to unauthorized removal or disconnecting of electrical fixtures, swithes, or control devices.

## 1.4 DEFINITIONS

- A. Definitions of gloss levels below are from "MPI Architectural Painting Specification Manual" (hereafter, "MPI Manual").
1. Gloss Level 1: Not more than 5 units at 60 degrees and 10 units at 85 degrees, according to ASTM D 523.
  2. Gloss Level 3: 10 to 25 units at 60 degrees and 10 to 35 units at 85 degrees, according to ASTM D 523.
  3. Gloss Level 4: 20 to 35 units at 60 degrees and not less than 35 units at 85 degrees, according to ASTM D 523.
  4. Gloss Level 5: 35 to 70 units at 60 degrees, according to ASTM D 523.
  5. Gloss Level 6: 70 to 85 units at 60 degrees, according to ASTM D 523.
  6. Gloss Level 7: More than 85 units at 60 degrees, according to ASTM D 523.

## 1.5 SUBMITTALS

- A. Product Data: For each type of product. Include preparation requirements and application instructions.
- B. Samples for Initial Selection: Manufacturer's color charts showing the full range of colors available for each type of finish-coat material indicated.
- C. Samples for Verification: For each type of paint system and each color and gloss of topcoat.
1. Submit Samples on 8 inch square samples of actual material to be painted or stained. For masonry surfaces, include a mortar joint.
  2. Step coats on Samples to show each coat required for system.
  3. Label each coat of each Sample.
  4. Label each Sample for location and application area.
- D. Product List: For each product indicated, include the following:
1. Cross-reference to paint system and locations of application areas. Use same designations indicated on Drawings and in schedules.
  2. VOC content.
- E. Coating Maintenance Manual: Submit with Closeout/Maintenance Submittals a Coating Maintenance manual; manual shall include a floor plan with rooms identified by name and number, a finish schedule coordinated with the floor plan, designations of where each product/color/finish was used, product data pages, Material Safety Data Sheets, care and cleaning instructions, touch-up procedures, and color samples of each color and finish used.

## 1.6 QUALITY ASSURANCE

- A. Applicator Qualifications: Engage an experienced applicator who has completed painting system applications similar in material and extent to that indicated for this Project with a record of successful in-service performance.
- B. Source Limitations: Obtain block fillers, primers, and undercoat materials for each coating system from the same manufacturer as the finish coats.

## 1.7 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials to the Project Site in manufacturer's original, unopened packages and containers bearing manufacturer's name and label, and the following information:
  - 1. Product name or title of material.
  - 2. Product description (generic classification or binder type).
  - 3. Manufacturer's stock number and date of manufacture.
  - 4. Contents by volume, for pigment and vehicle constituents.
  - 5. Thinning instructions.
  - 6. Application instructions.
  - 7. Color name and number.
  - 8. VOC content.
- B. Store materials not in use in tightly covered containers in a well-ventilated area at a minimum ambient temperature of 45 deg F.
  - 1. Maintain containers used in storage in a clean condition, free of foreign materials and residue.
  - 2. Keep storage area neat and orderly. Remove oily rags and waste daily.
  - 3. Take necessary measures to ensure that workers and work areas are protected from fire and health hazards resulting from handling, mixing, and application.

## 1.8 PROJECT CONDITIONS

- A. Apply paints only when the temperature of surfaces to be painted and ambient air temperatures are between 50 and 95 deg F.
- B. Do not apply paint in snow, rain, fog, or mist; or when the relative humidity exceeds 85 percent; or at temperatures less than 5 deg F above the dew point; or to damp or wet surfaces.
- C. Protection:
  - 1. Cover or otherwise protect finished work of other trades, work not to be painted concurrently, landscaping, and adjacent property from damage.
  - 2. When not in use, store paints in designated areas. Keep containers closed. At end of day's work, remove empty containers, paint soaked rags, and debris. Vent fumes. Take precautions to prevent fire.

- D. Sequencing, Scheduling:
  - 1. Coordinate removal and replacement of hardware, electrical fixtures and trim, and related work of other Sections.
  - 2. Stain, prime, back paint, and pre-finish items before installation as required.
- E. Cleaning and Disposal:
  - 1. Do not use Project plumbing fixtures or piping systems for:
    - a. Cleaning painting equipment and utensils.
    - b. Disposal of waste from cleaning or disposal of paints.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

- A. Scheduled Paint Systems: Provide paint systems as scheduled on the Drawings and listed in Part 3 Article "Paint Systems" to comply with requirements in this Section.
  - 1. Named Manufacturers' Products: Manufacturer and product designations indicated in the scheduled paint systems are for the purpose of establishing minimum requirements; unless otherwise indicated, paint products are based on products manufactured by the following:
    - a. Dunn Edwards Paints.
      - 1) Subject to compliance with requirements, provide the named products or comparable products by one of the following:
        - a) Sherwin Williams Paints.
        - b) Glidden Professional.
        - c) PPG Paints.
        - d) Tnemec.

### 2.2 PAINT MATERIALS, GENERAL

- A. Material Compatibility: Provide materials for use within each paint system that are compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
  - 1. For each coat in a paint system, provide products recommended in writing by manufacturers of topcoat for use in paint system and on substrate indicated.
- B. Material Quality: Provide manufacturer's best-quality paint material of the various coating types specified. Paint-material containers not displaying manufacturer's product identification will not be acceptable.

- C. VOC Content: Paints and coatings applied at the Project site shall comply with VOC limits of authorities having jurisdiction; VOC limits, exclusive of colorants added to a tint base, when calculated according to 40 CFR 59, Subpart D (EPA Method 24); and VOC limits of the California Green Building Standards Code (CGBSC), Section 5.504.4.3 and Table 504.4.3 as follows:
1. Flat Paints and Coatings: VOC not more than 50 g/L.
  2. Nonflat Paints and Coatings: VOC not more than 100 g/L.
  3. Nonflat High-Gloss Paints and Coatings: VOC not more than 150 g/L.
  4. Dry-Fog Coatings: VOC not more than 150 g/L.
  5. Floor Coatings: VOC not more than 100 g/L.
  6. Pretreatment Wash Primers: VOC not more than 420 g/L.
  7. Primers, Sealers, and Undercoaters: VOC not more than 100 g/L.
  8. Rust Preventative Coatings Applied to Ferrous Metals: VOC not more than 250 g/L.
  9. Shellacs, Clear: VOC not more than 730 g/L.
  10. Shellacs, Pigmented: VOC not more than 550 g/L.
  11. Stains: VOC not more than 250 g/L.
  12. Clear Wood Finishes, Varnishes: VOC not more than 275 g/L.
  13. Clear Wood Finishes, Lacquers: VOC not more than 275 g/L.
  14. Zinc-Rich Industrial Maintenance Primers: VOC not more than 340 g/L.
- D. Colors: Provide color selections made by the Architect. Colors shall be factory mixed and match approved samples.

## 2.3 INTUMESCENT PAINTS

- A. Intumescent Paint: Water based latex post treatment interior fire retardant intumescent paint; non-toxic and mold resistant.
1. Product: Flame Stop Inc.; Flame Stop IM.
  2. Flame Spread: Zero (0) per ASTM E 84; 30 Minute Test Method of Test of Surface Burning Characteristics of Building Materials.
  3. VOC Content: Not more than 50 g/L.
  4. Applied Thickness: Two coats, each coat applied at a rate of 200 sf/gal.
  5. Color and Gloss: As selected by Architect from manufacturer's full range.
  6. Substrate Primers: Primers approved by intumescent paint manufacturer; use where manufacturer recommends use of a primer.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.

- B. Maximum Moisture Content of Substrates: When measured with an electronic moisture meter as follows:
  - 1. Concrete: 12 percent.
  - 2. Masonry (Clay and CMU): 12 percent.
  - 3. Wood: 15 percent.
  - 4. Portland Cement Plaster: 12 percent.
  - 5. Gypsum Board: 12 percent.
- C. Portland Cement Plaster Substrates: Verify that plaster is fully cured.
- D. Gypsum Board Substrates: Verify that finishing compound is sanded smooth.
- E. Verify suitability of substrates, including surface conditions and compatibility with existing finishes and primers.
- F. Proceed with coating application only after unsatisfactory conditions have been corrected.
  - 1. Application of coating indicates acceptance of surfaces and conditions.
- G. Coordination of Work: Review other Sections in which primers are provided to ensure compatibility of the total system for various substrates. On request, furnish information on characteristics of finish materials to ensure use of compatible primers.
  - 1. Notify the Architect of anticipated problems using the materials specified over substrates primed by others.

### 3.2 PREPARATION

- A. Comply with manufacturer's written instructions and recommendations in "MPI Manual" applicable to substrates and paint systems indicated.
- B. Remove hardware, covers, plates, and similar items already in place that are removable and are not to be painted. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and painting.
  - 1. Electrical Items: Remove only switch and outlet cover plates and similar items that do not require disconnecting wiring. Do not disconnect wiring or remove electrical fixtures, switches, or control devices unless otherwise indicated on Electrical Drawings.
    - a. Contractor may be subject to additional costs due to unauthorized removal of items, refer to Part 1 Article "Special Requirements."
  - 2. After completing painting operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection.



- C. Clean substrates of substances that could impair bond of paints, including dust, dirt, oil, grease, and incompatible paints and encapsulants.
  - 1. Remove incompatible primers and reprime substrate with compatible primers or apply tie coat as required to produce paint systems indicated.
  - 2. Schedule cleaning and painting so dust and other contaminants from the cleaning process will not fall on wet, newly painted surfaces.
- D. Concrete and Masonry Substrates: Remove release agents, curing compounds, efflorescence, and chalk. Perform appropriate tests to determine alkalinity and moisture content of surfaces; testing shall be performed or witnessed by a certified representative of the paint manufacturer. Do not paint surfaces if moisture content or alkalinity of surfaces or mortar joints exceeds that permitted in manufacturer's written instructions.
  - 1. Cracks and defects at concrete and masonry surfaces shall be filled with cement grout; match surface texture.
  - 2. Clean concrete floors to be painted with a 5 percent solution of muriatic acid or other etching cleaner. Flush the floor with clean water to remove acid, neutralize with ammonia, rinse, allow to dry, and vacuum before painting.
- E. Steel Substrates: Remove rust, loose mill scale, and shop primer if any. Clean using methods recommended in writing by paint manufacturer but not less than the following:
  - 1. Steel Structures Painting Council's (SSPC), SSPC-SP 3, "Power Tool Cleaning."
- F. Shop-Primed Steel Substrates: Clean field welds, bolted connections, and abraded areas of shop paint, and paint exposed areas with the same material as used for shop priming to comply with SSPC-PA 1 for touching up shop-primed surfaces.
- G. Galvanized-Metal Substrates: Remove grease and oil residue from galvanized sheet metal by mechanical methods to produce clean, lightly etched surfaces that promote adhesion of subsequently applied paints.
- H. Aluminum Substrates: Remove loose surface oxidation.
- I. Wood Substrates: Clean surfaces of dirt, oil, and other foreign substances with scrapers, mineral spirits, and sandpaper, as required.
  - 1. Scrape and clean knots. Before applying primer, apply coat of knot sealer recommended in writing by topcoat manufacturer for exterior use in paint system indicated.
  - 2. Sand surfaces that will be exposed to view, and dust off.
  - 3. Prime, stain, or seal wood to be painted immediately on delivery. Prime edges, ends, faces, undersides, and backsides of wood.
    - a. When transparent finish is required, backprime with spar varnish.
    - b. Backprime paneling on interior partitions where masonry, plaster, or other wet wall construction occurs on backside.

- c. Seal tops, bottoms, and cutouts of unprimed wood doors with a heavy coat of varnish or sealer immediately on delivery.
4. After priming, fill holes and imperfections in the finish surfaces with putty or plastic wood filler. Sand smooth when dried.
- J. Plastic Trim Fabrication Substrates: Remove dust, dirt, and other foreign material that might impair bond of paints to substrates.
- K. Materials Preparation: Mix and prepare paint materials according to manufacturer's written instructions.
  1. Maintain containers used in mixing and applying paint in a clean condition, free of foreign materials and residue.
  2. Stir material before application to produce a mixture of uniform density. Stir as required during application. Do not stir surface film into material. If necessary, remove surface film and strain material before using.
  3. Use only thinners approved by paint manufacturer and only within recommended limits.
- L. Drywall: Fill any cracks or defects with drywall joint compound. Sand any rough spots smooth. Do not raise nap on paper covering.

### 3.3 APPLICATION

- A. General: Apply paints according to manufacturer's written instructions and recommendations in "MPI Manual." Paint/stain exposed surfaces, except where schedules indicate that a surface or material is not to be painted/stained or is to remain natural. If schedules do not specifically mention an item or surface to be painted, paint the item or surface the same as similar adjacent materials or surfaces whether or not schedules indicate colors. If the schedules do not indicate color or finish, the Architect will select from standard colors and finishes available.
  1. Use applicators and techniques suited for paint and substrate indicated.
  2. Paint surfaces behind movable items same as similar exposed surfaces. Before final installation, paint surfaces behind permanently fixed items with prime coat only.
  3. Paint both sides and edges of exterior doors and entire exposed surface of exterior door frames.
  4. Paint front and backsides of access panels, removable or hinged covers, and similar hinged items to match exposed surfaces.
  5. Do not paint over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.
  6. Primers specified in painting schedules may be omitted on items that are factory primed or factory finished if acceptable to topcoat manufacturers.
  7. Do not paint over dirt, rust, scale, grease, moisture, scuffed surfaces, or conditions detrimental to formation of a durable paint film.

8. The term "exposed surfaces" includes areas visible when permanent or built-in fixtures, convector covers, covers for finned-tube radiation, grilles, and similar components are in place. Extend coatings in these areas, as required, to maintain the system integrity and provide desired protection.
9. Do not paint prefinished items, concealed surfaces, finished metal surfaces, operating parts, and labels.
  - a. Prefinished items include the following factory-finished components:
    - 1) Acoustical wall panels.
    - 2) Toilet and urinal partitions.
    - 3) Stainless steel items.
    - 4) Finished mechanical and electrical equipment.
    - 5) Light fixtures.
    - 6) Distribution cabinets.
  - b. Labels: Do not paint over Underwriters Laboratories (UL), Factory Mutual (FM), or other code-required labels or equipment name, identification, performance rating, or nomenclature plates.
- B. If undercoats or other conditions show through topcoat, apply additional coats until cured film has a uniform paint finish, color, and appearance.
- C. Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks.
- D. Apply first coat to surfaces that have been cleaned, pretreated, or otherwise prepared for painting as soon as practicable after preparation and before subsequent surface deterioration.
  1. The number of coats and the film thickness required are the same regardless of application method. Do not apply succeeding coats until the previous coat has cured as recommended by the manufacturer. If sanding is required to produce a smooth, even surface according to manufacturer's written instructions, sand between applications.
  2. Omit primer on metal surfaces that have been shop primed and touchup painted.
  3. If undercoats, stains, or other conditions show through final coat of paint, apply additional coats until paint film is of uniform finish, color, and appearance. Give special attention to ensure edges, corners, crevices, welds, and exposed fasteners receive a dry film thickness equivalent to that of flat surfaces.
  4. Allow sufficient time between successive coats to permit proper drying. Do not recoat surfaces until paint has dried to where it feels firm, does not deform or feel sticky under moderate thumb pressure, and where application of another coat of paint does not cause the undercoat to lift or lose adhesion.

- E. Application Procedures: Apply paints and coatings by brush, roller, spray, or other applicators according to manufacturer's written instructions and recommendations in "MPI Manual."
  - 1. Brushes: Use brushes best suited for the type of material applied. Use brush of appropriate size for the surface or item being painted.
  - 2. Rollers: Use rollers of carpet, velvet back, or high-pile sheep's wool as recommended by the manufacturer for the material and texture required.
  - 3. Spray Equipment: Use airless spray equipment with orifice size as recommended by the manufacturer for the material and texture required.
- F. Minimum Coating Thickness: Apply paint materials no thinner than manufacturer's recommended spreading rate. Provide the total dry film thickness of the entire system as recommended by the manufacturer.
- G. Block Fillers: Apply block fillers to concrete masonry block at a rate to ensure complete coverage with pores filled.
- H. Prime Coats: Before applying finish coats, apply a prime coat of material, as recommended by the manufacturer, to material that is required to be painted or finished and that has not been prime coated by others. Recoat primed and sealed surfaces where evidence of suction spots or unsealed areas in first coat appears, to ensure a finish coat with no burn through or other defects due to insufficient sealing.
- I. Pigmented (Opaque) Finishes: Completely cover surfaces as necessary to provide a smooth, opaque surface of uniform finish, color, appearance, and coverage. Cloudiness, spotting, holidays, laps, brush marks, runs, sags, ropiness, or other surface imperfections will not be acceptable.
- J. Stipple Enamel Finish: Roll and redistribute paint to an even and fine texture. Leave no evidence of rolling, such as laps, irregularity in texture, skid marks, or other surface imperfections.
- K. Completed Work: Match approved samples for color, texture, and coverage. Remove, refinish, or repaint work not complying with requirements.
- L. Painting Plumbing, HVAC, Electrical, Communication, and Electronic Safety and Security Work: Paint the following work where exposed to view at applications indicated:
  - 1. Equipment rooms:
    - a. Telecommunications backboards; paint with intumescent paint.
  - 2. Occupied areas:
    - a. Equipment, including panelboards.
    - b. Uninsulated metal piping.
    - c. Uninsulated plastic piping.
    - d. Pipe hangers and supports.

- e. Metal conduit.
- f. Plastic conduit.
- g. Ducts, equipment, and pipe insulation having cotton or canvas insulation covering or other paintable jacket material.
- h. Interior surfaces of ducts with a flat, nonspecular black paint where visible through registers or grilles.
- i. Other items as directed by Architect.

3. Exterior locations:

- a. Equipment, including panelboards.
- b. Uninsulated metal piping.
- c. Uninsulated plastic piping.
- d. Pipe hangers and supports.
- e. Metal conduit.
- f. Plastic conduit.
- g. Tanks that do not have factory-applied final finishes.

### 3.4 CLEANING AND PROTECTION

- A. At the end of each workday, remove empty cans, rags, rubbish, and other discarded paint materials from the site.
- B. After completing paint application, clean spattered surfaces. Remove spattered paints by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.
- C. Protect work of other trades against damage from paint application. Correct damage to work of other trades by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in an undamaged condition.
- D. Provide "Wet Paint" signs to protect newly painted finishes. Remove temporary protective wrappings provided by others to protect their work after completing painting operations.
- E. Correction of Defective Work:
  - 1. Repair abraded, damaged or incomplete paint surfaces by methods acceptable to Architect. Spot repairs to be well-blended into adjacent work. For large repairs, re-coat entire plane or building element in which damaged area occurs.
  - 2. Defaced surfaces of work not to be painted shall be cleaned and their original finish restored.
- F. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

### 3.5 PAINT SYSTEMS

(Interior and exterior paint systems are on the following pages)

A. Interior Paint Systems:

SURFACE		PAINT SYSTEM		COATS	MANUFACTURER'S DESIGNATION	
(1)	Gypsum Drywall	P12.A	Flat, Latex	First Coat Second Coat Third Coat	VNSL00 EVER10 EVER10	Vynylastic Select Primer Everest Flat Everest Flat
		P12.B	Semi-Gloss Latex	First Coat Second Coat Third Coat	VNSL00 EVER50 EVER50	Vynylastic Select Primer Everest Semi-Gloss Everest Semi-Gloss
		P12.C	Eggshell Enamel Latex	First Coat Second Coat Third Coat	VNSL00 EVER30 EVER30	Vynylastic Select Everest Eggshell Everest Eggshell
	(Textured)	P12.D	Flat	One Coat	A44	Tuff Surface
(2)	Wood	P13.A	Semi-Gloss Latex	First Coat Second Coat Third Coat	IKPR00 EVER50 EVER50	Inter-Kote Wood Primer Everest Semi-Gloss Everest Semi-Gloss
		P13.B	Eggshell Enamel, Latex	First Coat Second Coat Third Coat	IKPR00 EVER30 EVER30	Inter-Kote Wood Primer Everest Eggshell Everest Eggshell
		P13.C	Lacquer Velvet	Stain First Coat Second Coat Third Coat	210-0222 510-0276 510-0276	Gemini Craftsman Collection 240 VOC Stain Precat Sealer Clear Satin Precat Lacquer Satin Precat Lacquer
		P13.D	Lacquer Semi-Gloss	Stain First Coat Second Coat Third Coat	210-0222 510-0275 510-0275	Gemini Craftsman Collection 240 VOC Stain Precat Sealer Clear Semi-Gloss Precat Lacquer Semi-Gloss Precat Lacquer
		P13.E	Lacquer Gloss	Stain First Coat Second Coat Third Coat	210-0222 510-0274 510-0274	Gemini Craftsman Collection 240 VOC Stain Precat Sealer Clear Gloss Precat Lacquer Gloss Precat Lacquer
		P13.F	Varnish Velvet	Stain First Coat Second Coat Third Coat	HPURE-0030 HPURE-0030 HPURE-0030	Gemini Craftsman Collection 240 VOC stain EVO Hydropure EVO Hydropure EVO Hydropure
		P13.G	Varnish Semi-Gloss	Stain First Coat Second Coat Third Coat	HPURE-0030 HPURE-0030 HPURE-0030	Gemini Craftsman Collection 240 VOC stain EVO Hydropure EVO Hydropure EVO Hydropure

(2A)	Telecom Plywood Backboard	P13.H	Intumescent Paint	Primer First Coat Second Coat		Albi 490W Albi Clad FP Albi Clad FP
(3)	Ferrous Metal	P14.A	Flat Latex	First Coat Second Coat Third Coat	ENPR00 EVER10E VER10	Enduraprime Metal Primer Everest Flat Everest Flat
		P14.B	Semi-Gloss Latex	First Coat Second Coat Third Coat	ENPR00 EVER50E VER50	Enduraprime Metal Primer Everest Semi-Gloss Everest Semi-Gloss
	Ferrous Metal (Cont.)	P14.C	Eggshell Latex	First Coat Second Coat Third Coat	ENPR00 EVER30E VER30	Enduraprime Metal Primer Everest Eggshell Everest Eggshell
(4)	Galvanized Metal/ Aluminum	P15.A	Flat Latex	First Coat Second Coat Third Coat	ULGM00 EVER10E VER10	Ultrasield Galvanized Metal Everest Flat Everest Flat
		P15.B	Semi-Gloss Latex	First Coat Second Coat Third Coat	ULGM00 EVER50E VER50	Ultrasield Galvanized Metal Everest Semi-Gloss Everest Semi-Gloss
		P15.C	Eggshell Latex	First Coat Second Coat Third Coat	ULGM00 EVER30E VER30	Ultrasield Galvanized Metal Everest Eggshell Everest Eggshell
(5)	Plaster, Concrete, Brick	P16.A	Flat Latex	First Coat Second Coat Third Coat	ESPR00 EVER10 EVER10	Eff-Stop Premium Primer Everest Flat Everest Flat
		P16.B	Semi-Gloss Latex	First Coat Second Coat Third Coat	ESPR00 EVER50 EVER50	Eff-Stop Premium Primer Everest Semi-Gloss Everest Semi-Gloss
		P16.C	Eggshell Latex	First Coat Second Coat Third Coat	ESPR00 EVER30 EVER30	Eff-Stop Premium Primer Everest Eggshell Everest Eggshell
(6)	Concrete Block	P17.A	Flat latex	First Coat Second Coat Third Coat	SBPR00 EVER10 EVER10	Smooth Blocfil Premium Everest Flat Everest Flat
		P17.B	Semi-Gloss Latex	First Coat Second Coat Third Coat	SBPR00 EVER50 EVER50	Smooth Blocfil Premium Everest Semi-Gloss Everest Semi-Gloss
		P17.C	Eggshell Latex	First Coat Second Coat Third Coat	SBPR00 EVER30 EVER30	Smooth Blocfil Premium Everest Eggshell Everest Eggshell

(7)	Acoustical Ceiling Tile/ Plaster	P18.A	Latex	One Coat to Cover	W615	Acoustikote Flat
(8)	Ceramic Tile like Finishes	P19.A	Epoxy	First Coat Second Coat Third Coat	UGPR00 ENPX50 ENPX50	Ultragrip Premium Primer Enduracat Pre-Catalyzed Enduracat Pre-Catalyzed
(9)	Ceiling and Wall w/ misc. Pipes & Conduit Exposed, Trusses & Beams w/Spray-on Fire Insulation	P20.A	Latex Dry Fall	One Coat	AQUA10	Aquafall Latex Dry fall White or Black

(Exterior Paint Systems start on the following page)



B. Exterior Paint Systems:

SURFACE		PAINT SYSTEM		COATS	MANUFACTURER'S DESIGNATION	
(1)	Plaster, Concrete	P50.A	Flat, Acrylic	First Coat Second Coat Third Coat	ESPR00 EVSH10 EVSH10	Eff-Stop Premium Primer Evershield Flat Evershield Flat
		P50.B	Low Sheen Enamel Acrylic	First Coat Second Coat Third Coat	ESPR00 EVSH20 EVSH20	Eff-Stop Premium Primer Evershield Velvet Evershield Velvet
		P50.C	Elastomeric (Smooth) 5 year labor warranty	First Coat Second Coat Third Coat (Spray App.)	ESPR00 EDLV10 EDLV10	Eff-Stop Premium Primer Enduralastic 5 Enduralastic 5
		P50.D	Elastomeric (Medium Aggregate) 5 year labor warranty	First Coat Second Coat Third Coat	ESPR00 EDLV10 EDLV10	Eff-Stop Premium Primer Enduralastic 5 Enduralastic 5
(2)	Concrete Block Masonry	P51.A	Flat, acrylic emulsion	First Coat Second Coat Third Coat	SBPR00 EVSH10E VSH10	Smooth Blocfil Premium Evershield Flat Evershield Flat
		P51.B	Elastomeric Smooth 5 year labor warranty	First Coat Second Coat Third Coat	ESPR00 EDLV10 EDLV10	Smooth Blocfil Premium Enduralastic 5 Enduralastic 5
		P51.C	Elastomeric (Medium Aggregate) 5 year labor warranty	First Coat Second Coat Third Coat	ESPR00 EDLV10 EDLV10	Smooth Blocfil Premium Enduralastic 5 Enduralastic 5
		P51.D	Elastomeric (Coarse Aggregate)	First Coat Second Coat Third Coat	ESPR00 EDLV10 EDLV10	Smooth Blocfil Premium Enduralastic 5 Enduralastic 5
		P51.E	Clear Water Repellent 10 year Warranty	1 Coat		RainGuard Micro-Seal Water Repellent
(3)	Wood	P53.A	Flat Acrylic Emulsion	First Coat Second Coat Third Coat	EZPR00 EVSH10 EVSH10	EZ-Prime Evershield Flat Evershield Flat
		P53.B	Semi-Gloss Acrylic	First Coat Second Coat Third Coat	EZPR00 EVSH50 EVSH50	EZ-Prime Evershield Semi-Gloss Evershield Semi-Gloss
		P53.C	Low Sheen Enamel Acrylic	First Coat Second Coat Third Coat	EZPR00 EVSH20 EVSH20	EZ-Prime Evershield Velvet Evershield Velvet

(3) (Cont.)	Wood	P53.D	Flat, Stain, Water Base, Semi-Transp.	First Coat Second Coat	16300 16300	Cabot ST Deck and Siding Stain Cabot ST Deck and Siding Stain
		P53.E	Flat, Stain Opaque	First Coat Second Coat	0800 0800	Cabot Solid Color Acrylic Cabot Solid Color Acrylic
		P53.F	Varnish Clear Gloss	First Coat Second Coat Third Coat	6509 6509 6509	McCloskey's Spar McCloskey's Spar McCloskey's Spar
		P53.G	Stain and Varnish	First Coat Second Coat Third Coat	6509 6509	Aqua Seal McCloskey's McCloskey's
(4)	Ferrous Metal	P55.D	Gloss, High Perform.	First Coat Second Coat Third Coat	EG2000 UG3000 UG3000	US Coatings EpoxyGrip 2000 US Coatings UreGrip 3000 HS VOC US Coatings UreGrip 3000 HS VOC
		P55.E	Semi-Gloss High Perform.	First Coat Second Coat Third Coat	ENPR00 ENCT50 ENCT50	Enduraprime Metal Primer Endura-Coat Semi-Gloss Endura-Coat Semi-Gloss
(5)	Galv. Metal & Aluminum	P56.A	Gloss	First Coat Second Coat Third Coat	ULGM00 EVSH60 EVSH60	Ultrashield Galvanized Metal Evershield Gloss Evershield Gloss
		P56.B	Flat, Acrylic	First Coat Second Coat Third Coat	ULGM00 EVSH10 EVSH10	Ultrashield Galvanized Metal Evershield Flat Evershield Flat
		P56.C	Semi-Gloss Enamel Acrylic	First Coat Second Coat Third Coat	ULGM00 ASHL50 ASHL50	Ultrashield Galvanized Metal Aristoshield Semi-Gloss Aristoshield Semi-Gloss
		P56.D	Gloss	First Coat Second Coat Third Coat	ULGM00 EVSH60 EVSH60	Ultrashield Galvanized Metal Evershield Gloss Evershield Gloss
		P56.E	Semi Gloss	First Coat Second Coat Third Coat	ULGM00 EVSH60 EVSH60	Ultrashield Galvanized Metal Evershield Gloss Evershield Gloss
(6)	Galv. Metal & Aluminum  High Perf.	P57.C	Gloss High Perform.	First Coat Second Coat Third Coat	ULGM00 ASHL70 ASHL70	Ultrashield Galvanized Metal Aristoshield High-Gloss Aristoshield High-Gloss
		P57.D	Semi-Gloss High Perform.	First Coat Second Coat Third Coat	ULGM00 ASHL50 ASHL50	Ultrashield Galvanized Metal Aristoshield Semi-Gloss Aristoshield Semi-Gloss

END OF SECTION

SECTION 101400  
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:

- 1. Interior and exterior panel signs for room or space identification.

- B. Related Sections:

- 1. Division 01 Section "Temporary Facilities and Controls" for Project identification signage.
  - 2. Division 22, 23, and 26 Sections as applicable to Plumbing, Mechanical, and Electrical Work for tags and nameplates for equipment.

1.3 SUBMITTALS

- A. Product Data: Manufacturer's product data including construction details, material descriptions, dimensions of individual components and profiles, and finishes for each type of sign.
- B. Shop Drawings: Include plans, elevations, and full-scale template layout of characters and other components. Show mounting methods, grounds, mounting heights, layout, spacing, reinforcement, accessories, and installation details.
  - 1. Provide message list for each sign, including large-scale details of wording, lettering, and Braille layout.
- C. Schedule: Schedule indicating sign locations, type, other pertinent data, and referenced to rooms or doors with the same referencing as used on the Drawings.
- D. Braille Text Certification: Provide certification from the sign manufacturer that Braille text complies with regulatory requirements indicated (Contracted (Grade 2) per 2019 CBC Section 11B-703.3).
- E. Braille Text Translation Confirmation: Provide confirmation of Braille text translations.

- F. Samples for Initial Selection: Manufacturer's color charts consisting of actual units or sections of units showing the full range of colors available for each type of sign and material indicated.
- G. Samples for Verification: Provide 2 full size sample signs showing edge and corner condition, border, text characters of height specified, Braille text, and selected colors, of each type of sign indicated. Sample will be retained by Architect.
- H. Maintenance Data: For signage cleaning and maintenance requirements to include in maintenance manuals.

#### 1.4 QUALITY ASSURANCE

- A. Source Limitations: Obtain each sign type through one source from a single manufacturer.

#### 1.5 FIELD CONDITIONS

- A. Field Measurements: Where sizes of signs are determined by dimensions of surfaces on which they are installed, verify dimensions by field measurement before fabrication and indicate measurements on Shop Drawings.

#### 1.6 WARRANTY

- A. Warranty: Manufacturer's standard form in which manufacturer agrees to replace signs that fail in materials or workmanship within specified warranty period.
  - 1. Damage from deliberate destruction and vandalism is excluded.
  - 2. Warranty Period for Interior Signs: Building lifetime.
  - 3. Warranty Period for Exterior Signs: 20 years from date of Substantial Completion.

### PART 2 - PRODUCTS

#### 2.1 REGULATORY REQUIREMENTS FOR SIGNS

- A. Regulatory Requirements: Comply with requirements of the following:
  - 1. 2010 ADA Standards for Accessible Design.
  - 2. ANSI A117.1.
  - 3. 2019 California Building Code, Sections 11B-216 and 11B-703.

- B. Room or Space Identification Signs, CBC 11B-216.2: Where provided, signs identifying permanent rooms and spaces shall comply with CBC Sections 11B-703.1, 11B-703.2, 11B-703.3, and 11B-703.5. Where pictograms are provided as designations of permanent rooms and spaces, the pictograms shall comply with CBC Section 11B-703.6 and shall have text descriptors complying with CBC Sections 11B-703.2, 11B-703.3 and 11B-703.4. Exterior signs that are not located at the door to the space they serve shall not be required to comply with CBC Section 11B-703.2.
- C. Directional and Informational Signs, CBC 11B-216.3: Signs that provide direction to or information about spaces and facilities shall comply with CBC Section 11B-703.5.
- D. Means of Egress Signs, CBC 11B-216.4: Tactile exit signs required by CBC Section 1013.4 at doors to exit passageways, exit discharge, and exit stairways shall comply with CBC Sections 11B-703.1, 11B-703.2, 11B-703.3, and 11B-703.5.
- E. Inspection, CBC 11B-703.1.1.2: Signs and identification devices shall be field inspected after installation and approved by the enforcing agency prior to the issuance of a final certificate of occupancy per Chapter 1, Division II, Section III, or final approval where no certificate of occupancy is issued. The inspection shall include, but not be limited to, verification that Braille dots and cells are properly spaced and the size, proportion and type of raised characters are in compliance with the regulations of CBC Section 11B-703.
- F. Raised Characters, CBC 11B-703.2: Raised characters shall comply with CBC Section 11B-703.2 and shall be duplicated in Braille complying with CBC Section 11B-703.3. Raised characters shall be installed in accordance with CBC 11B-703.4.
  - 1. Depth: Raised characters shall be raised 1/32-inch minimum above their background.
  - 2. Case: Raised characters shall be upper case.
  - 3. Style: Raised characters shall be sans serif. Characters shall not be italic, oblique, script, highly decorative, or other unusual forms.
  - 4. Character Proportions: Raised characters (Text) on signs shall be selected from fonts where the width of the uppercase letter "O" is 60 percent minimum and 110 percent maximum of the height of the uppercase letter "I".
  - 5. Character Height: Character height measured vertically from the baseline of the character shall be of 5/8-inch minimum and 2-inches maximum based on the height of the uppercase letter "I".
  - 6. Stroke Thickness: Stroke thickness of the uppercase letter "I" shall be 15 percent maximum of the height of the character.
  - 7. Character Spacing: Character spacing shall be measured between the two closest points of adjacent raised characters within a message, excluding word spaces. Where characters have rectangular cross sections, spacing between individual raised characters shall be 1/8 inch minimum and 4 times the raised character stroke width maximum. Where characters have other cross sections, spacing between individual raised characters shall be 1/16 inch minimum and 4 times the raised character stroke width maximum at the base of the cross sections, and 1/8 inch minimum and 4 times the raised character ma stroke width maximum at the top of the cross sections. Characters shall be separated from raised borders and decorative elements 3/8 inch minimum.

8. Line Spacing: Spacing between the baselines of separate lines of raised characters within a message shall be 135 percent minimum and 170 percent maximum of the raised character height.
  9. Format: Text shall be in a horizontal format.
- G. Braille, CBC 11B-703.3: Braille shall be contracted (Grade 2) and shall comply with CBC Sections 11B-703.3 and 11B-703.4.
1. Dimensions and Capitalization (CBC 11B-703.3.1): Braille dots shall have a domed or rounded shape and shall comply with CBC Table 11B-703.3.1. The indication of an uppercase letter or letters shall only be used before the first word of sentences, proper nouns and names, individual letters of the alphabet, initials, and acronyms. Braille dot physical requirements per CBC Table 11B-703.3.1 as follows:
    - a. Dot Base Diameter: 0.059 inch minimum, 0.063 inch maximum.
    - b. Distance between Two Dots in the same Cell: 0.100 inches.
    - c. Distance between corresponding Dots in adjacent Cells: 0.300 inches.
    - d. Dot Height: 0.025 inch minimum, 0.037 inch maximum.
    - e. Distance between corresponding Dots from one cell directly below: 0.395 inch minimum, 0.400 inch maximum.
  2. Position (CBC 11B-703.3.2): Braille shall be positioned below the corresponding text in a horizontal format, flush left, or centered. If text is multi-lined, Braille shall be placed below the entire text. Braille shall be separated 3/8 inch minimum and 1/2 inch maximum from any other tactile characters and 3/8 inch minimum and from raised borders and decorative elements.
- H. Sign Installation Height and Location, CBC 11B-703.4:
1. Height Above Ground or Floor: Tactile characters on signs shall be located 48 inches minimum above the finish floor or ground surface, measured from the baseline of the lowest Braille cells and 60 inches maximum above the finish floor or ground surface, measured from the baseline of the highest line of raised characters.
  2. Location: Where a tactile sign is provided at a door, the sign shall be located alongside the door at the latch side. Where a tactile sign is provided at double doors with one active leaf, the sign shall be located on the inactive leaf. Where a tactile sign is provided at double doors with two active leafs, the sign shall be located to the right of the right hand door. Where there is no wall space at the latch side of a single door or at the right side of double doors, signs shall be located on the nearest adjacent wall. Signs containing tactile characters shall be located so that a clear floor space of 18 inches minimum by 18 inches minimum, centered on the tactile characters, is provided beyond the arc of any door swing between the closed position and 45 degree open position. Where provided, signs identifying permanent rooms and spaces shall be located at the entrance to, and outside of the room or space. Where provided, signs identifying exits shall be located at the exit door when approached in the direction of egress travel.

- I. Visual Characters, CBC 11B-703.5: Visual characters are considered to be intended for signage that is not accompanied by Braille. (The requirements of this Section do not apply to room identification signage).
  1. Finish and Contrast: Characters and their background shall have a non-glare finish. Characters shall contrast with their background with either light characters on a dark background or dark characters on a light background. Requirement applies to all signs.
  2. Case: Characters shall be upper case or lower case or a combination of both.
  3. Style: Characters shall be conventional in style. Characters shall not be italic, oblique, script, highly decorative, or other unusual forms.
  4. Character Proportions: Characters shall be selected from fonts where the width of the uppercase letter "O" is 60 percent minimum and 110 percent maximum of the height of the uppercase letter "I".
  5. Character Height: Minimum character height shall be based on the uppercase letter "I" and shall comply with CBC Table 11B-703.5.5 as follows:
    - a. Height of baseline of character from finish floor:
      - 1) 40 inches minimum to less than or equal to 70 inches with a horizontal viewing distance of:
        - a) Less than 72 inches: Minimum character height to be 5/8 inch.
        - b) 72 inches and Greater: Minimum character height to be 5/8 inch plus 1/8 inch for each foot of viewing distance beyond 72 inches.
      - 2) Greater than 70 inches to less than or equal to 120 inches with a horizontal viewing distance of:
        - a) Less than 180 inches: Minimum character height to be 2 inches.
        - b) 180 inches and Greater: Minimum character height to be 2 inches plus 1/8 inch for each foot of viewing distance beyond 180 inches.
      - 3) Greater than 120 inches, with a horizontal viewing distance of:
        - a) Less than 21 feet: Minimum character height to be 3 inches.
        - b) 21 feet and Greater: Minimum character height to be 3 inches plus 1/8 inch for each foot of viewing distance beyond 21 feet.
    6. Height from Finish Floor or Ground: Visual characters shall be 40 inches minimum above the finish floor or ground measured to the baseline of the character.
    7. Stroke Thickness: Stroke thickness of the uppercase letter "I" shall be 10 percent minimum and 20 percent maximum of the height of the character.
    8. Character Spacing: Character spacing shall be measured between the two closest points of adjacent raised characters, excluding word spaces. Spaces between individual characters shall be 10 percent minimum and 35 percent maximum of character height.

9. Line Spacing: Spacing between the baselines of separate lines of characters within a message shall be 135 percent minimum and 170 percent maximum of the raised character height.
10. Format: Text shall be in a horizontal format.

J. Pictograms, CBC 11B-703.6:

1. Pictogram Field: Pictograms shall have a field height of 6 inches minimum. Characters and Braille shall not be located in the pictogram field.
2. Finish and Contrast: Pictograms and their field shall have a non-glare finish. Pictograms shall contrast with their field with either a light pictogram on a dark field or a dark pictogram on a light field.
3. Text Descriptors: Pictograms shall have text descriptors located directly below the pictogram field. Text descriptors shall comply with CBC Sections 11B-703.2, 11B-703.3, and 11B-703.4.

K. Symbols of Accessibility, CBC 11B-703.7:

1. Finish and Contrast: Symbols of accessibility and their background shall have a non-glare finish. Symbols of accessibility shall contrast with their background with either a light symbol on a dark background or a dark symbol on a light background.
2. Symbols:
  - a. International Symbol of Accessibility (ISA): ISA symbols shall comply with CBC Figure 11B-703.7.2.1. The symbol shall consist of a white figure on a blue background. The blue shall be Color No. 15090 in Federal Standard 595B.
  - b. International Symbol of Teletypewriter (TTY): The International Symbol of Teletypewriter (TTY) shall comply with CBC Figure 11B-703.7.2.2.
  - c. Volume Control Telephones: Telephones with a volume control shall be identified with a pictogram complying with CBC Figure 11B-703.7.2.3.
  - d. Assistive Listening Systems: Assistive listening systems shall be identified by the International Symbol of Access for Hearing loss complying with CBC Figure 11B-703.7.2.4.
  - e. Toilet and Bathing Facilities, Geometric Symbols: Doorways leading to toilet and bathing rooms shall be identified by a geometric symbol complying with CBC Section 11B-703.7.2.6. The symbol shall be mounted at 58 inches minimum and 60 inches maximum above the finish floor measured from the centerline of the symbol. Where a door is provided, the symbol shall be mounted within 1 inch of the vertical centerline of the door.
    - 1) Men's Toilet and Bathing Facilities: Men's toilet and bathing facilities shall be identified by an equilateral triangle, 1/4 inch thick, with edges 12 inches long and a vertex pointing upward. The triangle symbol shall contrast with the door, either light on dark background or dark on a light background.
    - 2) Women's Toilet and Bathing Facilities: Women's toilet and bathing facilities shall be identified by a circle, 1/4 inch thick and 12 inches in diameter. The circle symbol shall contrast with the door, either light on dark background or dark on a light background.



- 3) Unisex Toilet and Bathing Facilities: Unisex toilet and bathing facilities shall be identified by a circle, 1/4 inch thick and 12 inches in diameter with a 1/4 inch thick triangle with a vertex pointing upward superimposed on the circle and within the 12 inch diameter. The triangle symbol shall contrast with the circle symbol, either light on dark background or dark on a light background, the circle symbol shall contrast with the door, either light on dark background or dark on a light background.
- 4) Edges and Corners: Edges of geometric symbols shall be rounded, chamfered, or eased. Corners of geometric symbols shall have a minimum radius of 1/8 inch.

## 2.2 MANUFACTURERS

- A. Manufacturers, Basis-of-Design Products: In other Articles where named manufacturer's products are indicated, Drawings and Specifications are based on products manufactured by:
  1. ADA Sign Factory.
    - a. Subject to compliance with requirements, provide the product indicated or a comparable products by one of the following:
      - 1) Best Sign Systems Inc.
      - 2) ASI-Modulex, Inc.
      - 3) Gemini Incorporated.

## 2.3 PANEL SIGNS

- A. General: Provide smooth panel sign surfaces constructed to remain flat under installed conditions within tolerance of plus or minus 1/16 inch measured diagonally from corner to corner complying with requirements indicated for materials, thicknesses, finishes, colors, designs, shapes, sizes, and details of construction.
- B. Design Requirements: Panel signs shall comply with Part 2 Article "Regulatory Requirements for Signs."
- C. Scheduled Signs: Provide signs as indicated on Drawings and as scheduled in Part 3 Article "Sign Schedule."
- D. Panel Signs:
  1. Material: 1/16" thick durable, vandal-proof, high impact CAD-cut acrylic.
  2. Edge Condition: Manufacturer's standard.
  3. Text Font: Manufacturer's standard.
  4. Text Height: As indicated on Drawings.
  5. Mounting: Unframed, wall mounted.
  6. Color: As selected by Architect from manufacturer's full range, text shall contrast with background.

## 2.4 ACCESSORIES

- A. Mechanical Fasteners: Use tamper resistant fasteners fabricated from materials that are not corrosive to sign material and mounting surface.
- B. Adhesives: As recommended by sign manufacturer and with a VOC content of 70 g/L or less for adhesives used inside the weatherproofing system and applied on-site when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
- C. Two-Face Tape: Manufacturer's standard high-bond, foam-core tape, 0.045 inch thick, with adhesive on both sides.

## 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 work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 INSTALLATION

- A. General: Locate signs and accessories where indicated, using mounting methods of types described and in compliance with manufacturer's written instructions.
  - 1. Install signs level, plumb, and at heights indicated on Drawings, with sign surfaces free from distortion and other defects in appearance.
  - 2. Install signs at locations and heights required by regulatory requirements and as indicated on the Drawings and in this Specification section.
- B. Wall-Mounted Panel Signs: Attach panel signs to wall surfaces using methods indicated below:
  - 1. Vinyl-Tape Mounting: Use double-sided foam tape to mount signs to smooth, nonporous surfaces that cannot be drilled or screwed. Do not use this method for vinyl-covered or rough surfaces.
  - 2. Silicone-Adhesive Mounting: Use liquid-silicone adhesive recommended in writing by sign manufacturer to attach signs to irregular, porous, or vinyl-covered surfaces. Use double-sided vinyl tape where recommended in writing by sign manufacturer to hold sign in place until adhesive has fully cured.
  - 3. Mechanical Fasteners: Use non-removable mechanical fasteners placed through predrilled holes. Attach signs with fasteners and anchors suitable for secure attachment to substrate as recommended in writing by sign manufacturer.
  - 4. Where panel signs are mounted on glass, provide matching plate on opposite side of glass to conceal mounting materials.

### 3.3 CLEANING AND PROTECTION

- A. After installation, clean soiled sign surfaces according to manufacturer's written instructions. Protect signs from damage until acceptance by Owner.
- B. Clean per manufacturer's recommendation prior to final inspection.

### 3.4 SIGN SCHEDULE

- A. Interior Room Identification Signs: Provide interior room identification signage adjacent to doors as indicated and scheduled on the Drawings.
  - 1. Text Content: Identify rooms by number and name unless otherwise indicated. Room names and numbering shall comply with Owner's instructions (not Architect's referencing or numbering as indicated on the Drawings).
  - 2. Text Height: As indicated on Drawings and in compliance with referenced CBC and ADA requirements.
  - 3. Sign Size: As indicated on drawings.
- B. Tactile Exit Signs: Provide tactile exit signs at locations indicated on Drawings, as required to comply with regulatory requirements, and as follows:
  - 1. Exterior Doors: Each grade level exterior exit door from a room or space having an illuminated exit sign shall be identified by a tactile exit sign with the word "EXIT".
  - 2. Interior Rooms to Exits: Each exit door to a corridor, exit enclosure, or exit passageway, from a room having an illuminated exit sign shall be identified by a tactile exit sign with the words "EXIT ROUTE".
- C. Toilet Room Identification Signs: Signage shall consist of door mounted geometric symbols and wall mounted identification signs to comply with regulatory requirements and as indicated on the Drawings.
- D. Exterior Room/Space Identification Signs: Provide exterior identification signage at exterior public access doors to each usable or occupied space of the building.
  - 1. Text Content: Identify building areas by functional use. Text content shall comply with Owner's instructions.
  - 2. Text Height: As indicated on Drawings and in compliance with referenced CBC and ADA requirements.
  - 3. Sign Size: As indicated on drawings.

END OF SECTION



SECTION 102113  
TOILET COMPARTMENTS

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. This Section includes solid-polymer plastic toilet compartments configured as toilet enclosures and urinal screens; floor anchored and overhead braced.
- B. Related Sections:
  - 1. Division 06 Section "Rough Carpentry" for backing and blocking for supports for toilet compartments.
  - 2. Division 10 Section "Toilet Room Accessories" for toilet tissue dispensers, seat cover dispensers, grab bars, and similar accessories.

1.3 SUBMITTALS

- A. Product Data: For each type of product indicated, include construction details, material descriptions, dimensions of individual components and profiles, hardware, and finishes.
- B. Shop Drawings: Include plans, elevations, sections, details, and attachments to other work.
- C. Samples for Verification: Of each type of color and finish required for units, prepared on not less than 4-inch square Samples of same thickness and material indicated for Work.
- D. Maintenance Data: For toilet compartments to include in maintenance manuals.

1.4 COORDINATION

- A. Coordinate blocking and backing for wall anchorage of toilet compartments with wall framing.

## 1.5 FIELD CONDITIONS

- A. Field Measurements: Verify actual locations of walls, columns, ceilings, and other construction contiguous with toilet compartments by field measurements before fabrication and indicate measurements on Shop Drawings.
  - 1. Established Dimensions: Where field measurements cannot be made without delaying the Work, establish dimensions and proceed with fabricating toilet compartments without field measurements. Coordinate wall, floor, ceilings, and other contiguous construction to ensure that actual dimensions correspond to established dimensions.

## PART 2 - PRODUCTS

### 2.1 PERFORMANCE AND REGULATORY REQUIREMENTS

- A. Fire Performance: Tested in accordance with, and pass the acceptance criteria of, NFPA 286.
- B. Surface-Burning Characteristics: Comply with ASTM E84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
  - 1. Flame-Spread Index: 200 or less.
  - 2. Smoke-Developed Index: 450 or less.
- C. Accessible Compartments and Urinal Screens: Toilet compartments and urinal screens designated as being accessible to persons using wheelchairs shall comply with applicable provisions in the 2010 ADA Standards for Accessible Design, ICC/ANSI A117.1, and the 2019 California Building Code with latest Supplement(s).
  - 1. Wheelchair accessible toilet compartments shall have minimum clear dimensions as follows:
    - a. Width: 60 inches.
    - b. Length: As required to provide the following clear spaces and/or clearances:
      - 1) Clear Space from Rear Wall: Clear space measured from the rear wall; no doors may swing into this clear space, clear space shall include the water closet:
        - a) Wall Mounted Water Closets: 56 inches.
        - b) Floor Mounted Water Closets: 59 inches.
      - 2) Clear space in front of water closets:
        - a) End opening stalls: 48 inches.
        - b) Side opening stalls: 60 inches.

- 3) Additional clearance as may be required for door pull side strike edge clearance.
- c. Doors:
- 1) Clear Width:
    - a) End opening stalls: 32 inches.
    - b) Side opening stall: 34 inches.
- d. Door Maneuvering Clearances, Location, and Hardware:
- 1) Pull Side Clearances:
    - a) Pull side strike edge clearance: 18 inches measured from the strike edge of the door in a closed position.
    - b) Pull Side Clearance Perpendicular to Door: 60 inches from the door in a closed position.
  - 2) Push Side Clearance Perpendicular to Door: 48 inches from the face of the door in a closed position.
  - 3) Maximum distance from edge of door opening to adjacent intersecting wall or partition panel: 4 inches.
  - 4) Doors located at end opening stalls shall be located in front of the open space adjacent to the side of the water closet.
  - 5) Door Operating Hardware:
    - a) Doors shall be self-closing (gravity hinge).
    - b) An accessible pull shall be located on each side of the door near the latch.
    - c) Operating hardware and pulls shall be located between 34 and 44 inches above the floor.
    - d) Operable hardware shall be operable with one hand and not require tight grasping, pinching, or twisting of the wrist. The force to operate hardware shall not exceed a 5 pound force.
- e. Toe Clearance: Partitions shall have toe clearance of 12 inches minimum measured from the floor to the bottom of partition panels, exclusive of support members.
- f. Accessible Route to Compartments: 44 inches.

## 2.2 SOLID POLYMER TOILET COMPARTMENTS AND SCREENS

- A. Basis-of-Design Manufacturer: Provide products indicated as manufactured by the following:
  - 1. General Partitions Mfg. Corp.
    - a. Subject to compliance with requirements, provide products indicated or equal products by one of the following:
      - 1) Accurate Partitions Corporation.
      - 2) Scranton Products (Capitol/Comtec/Santana).
- B. Toilet Enclosure Style: Floor anchored, overhead braced.
- C. Doors, Panels, and Pilasters: Solid, high-density polyethylene (HDPE) panel material, not less than 1 inch thick, seamless, and with homogenous color and pattern throughout thickness of material.
  - 1. Color and Pattern: Galaxy.
  - 2. Heat-Sink Strip: Manufacturer's standard continuous, extruded-aluminum strip fastened to exposed bottom edges of solid-polymer doors and panels to prevent burning.
- D. Pilaster Floor Anchors: Manufacturer's standard corrosion-resistant supports and leveling mechanism with stainless steel expansion anchors to suit floor conditions.
  - 1. Pilaster Shoes: Manufacturer's standard stainless steel.
- E. Wall Brackets for Compartments: Manufacturer's continuous full height aluminum or polymer wall brackets.
  - 1. Polymer Color and Pattern: Matching pilaster.
  - 2. Profile: Double-ear profile unless single-ear, U-shaped or H-shaped profile is required for project conditions.
- F. Overhead Bracing: Manufacturer's standard continuous, extruded-aluminum head rail with antigrip profile and in bright dipped anodized finish.
  - 1. Wall Brackets for Headrails: 16 gage stainless steel.
  - 2. End caps for Headrails: Manufacturer's standard aluminum caps.
- G. Floor Supports: Provide manufacturer's standard corrosion-resistant supports, leveling mechanism, and anchors at pilasters to suit floor conditions. Provide shoes at pilasters to conceal supports and leveling mechanism.



- H. Fasteners: All fasteners shall be stainless steel. Exposed fasteners shall have theft-resistant-type heads. Provide sex-type bolts for through-bolt applications.
  - 1. Fasteners for Floor and Wall Connections:
    - a. Wood Framed Walls: No. 14 wood screw by length required to penetrate 2-inches into wood framing.

## 2.3 HARDWARE AND ACCESSORIES

- A. Hardware and Accessories: Manufacturer's standard design, heavy-duty operating hardware and accessories as follows:
  - 1. Hinges: Heavy duty extruded aluminum hinges, 8-inches in length, with wrap-around flanges, through bolted to pilasters and door panels with sex bolts. Hinges shall be self-closing type (gravity hinge) that can be adjusted to hold doors open at any angle up to 90 degrees.
  - 2. Latch and Keeper: Surface-mounted heavy duty extruded aluminum latch and keeper unit designed for emergency access and with combination rubber-faced door strike and keeper secured to doors and panels with sex bolts. Strikes shall be a minimum of 6-inches long. Slide bolts shall have a black anodized finish.
    - a. Accessible Stalls: Provide units that comply with accessibility requirements of authorities having jurisdiction at compartments indicated to be accessible to persons with disabilities. Latches shall be flip-over style, sliding, or other hardware not requiring the user to grasp or twist.
  - 3. Door Bumpers and Coat Hooks:
    - a. In-Swinging Doors: Manufacturer's standard chrome plated Zamac rubber-tipped combination coat hook and bumper, sized to prevent door from hitting compartment-mounted accessories, wall, or partition; 4 inch maximum projection; provide one at each inswinging door.
    - b. Out-Swinging Doors: Coat hook only, 1-1/2 inch maximum projection, mount at 46 inches maximum above the floor on the stall side of the door; Bobrick B-233 or equivalent.
  - 4. Door Pulls: Manufacturer's standard chrome plated Zamac door pulls.
    - a. Out-swinging Doors: Provide door pulls on the pull side of out-swinging compartment doors.
    - b. Accessible Stalls and Ambulatory Accessible Stalls: Provide an accessible door pull on each side of doors near the latch at compartments indicated to be accessible to persons with disabilities. Door pulls shall be loop or U-shape complying with accessibility requirements of authorities having jurisdiction.

- B. Anchorages and Fasteners: Manufacturer's standard exposed fasteners of stainless steel or chrome-plated steel or brass, finished to match the items they are securing, with theft-resistant-type heads. Provide sex-type bolts for through-bolt applications. For concealed anchors, use stainless steel, hot-dip galvanized steel, or other rust-resistant, protective-coated steel.
- C. Material Finishes, General: Provide hardware and accessories having the finishes indicated for the following materials:
  - 1. Aluminum: Bright dipped anodized aluminum.
  - 2. Stainless Steel: Satin finish.
  - 3. Zamac: Chrome-plated, nonferrous, cast zinc alloy (zamac).
    - a. Zamac shall only be allowed for pulls, door bumpers, and combination coat hook/door bumpers.

## 2.4 FABRICATION

- A. General: Provide panels of sizes indicated and as required for project conditions. Machine edges to have radius of 1/4-inch. Exposed panel surfaces shall be free of saw marks, cuts, nicks or other damage.
- B. Overhead-Braced Units: Provide manufacturer's standard corrosion-resistant supports, leveling mechanism, and anchors at pilasters to suit floor conditions. Provide shoes at pilasters to conceal supports and leveling mechanism.
- C. Door and Panel Heights: Doors and panels shall be fabricated in 55-inch heights (Bottom of panel to top of panel).
- D. Pilaster Heights: 82-inches.
- E. Continuous Wall Brackets: Continuous wall brackets shall be cut to lengths one-inch less than panel heights.
- F. Door Size and Swing: Unless otherwise indicated, provide doors as follows:
  - 1. Standard, Non-Accessible Stalls: 24-inch wide in-swinging doors.
  - 2. Wheelchair Accessible Stalls: 36-inch wide doors with a minimum 34-inch wide clear opening; doors shall be in-swinging or out-swinging as indicated on Drawings.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine areas and conditions, with Installer present, for compliance with requirements for fastening, support, alignment, operating clearances, and other conditions affecting performance of the Work.
  - 1. Confirm location and adequacy of blocking and supports required for installation.
  - 2. Accurately measure toilet rooms receiving compartments and locations of fixtures.
- B. Proceed with installation only after unsatisfactory conditions have been corrected; commencement of work constitutes acceptance of conditions.

### 3.2 INSTALLATION

- A. General: Comply with manufacturer's written installation instructions. Install units rigid, straight, level, and plumb. Secure units in position with manufacturer's recommended anchoring devices in compliance with the specifications.
  - 1. Maximum Clearances:
    - a. Pilasters to Panels: 1/2 inch.
    - b. Panels to Walls: 1 inch.
  - 2. Comply with referenced regulatory requirements for compartments and screens to be installed at water closets and urinals indicated to be accessible.
- B. Overhead-Braced Units: Secure pilasters to floor and level, plumb, and tighten. Secure continuous head rail to each pilaster with not less than two fasteners. Head rails shall be cross braced with intersecting head rails spaced not more than 6 feet on center and aligned with the panels below. Install doors and panels with top edges level and aligned, adjust doors so tops of doors are parallel with overhead bracing when doors are in a closed position. Doors, panels and screens shall be installed with the bottom edge approximately 14-inches above the floor (approximate dimension for accommodation of floor slope).

### 3.3 ADJUSTING

- A. Hardware Adjustment: Adjust and lubricate hardware according to manufacturer's written instructions for proper operation. Set hinges on in-swinging doors to hold doors open approximately 30 degrees from closed position when unlatched.

END OF SECTION



SECTION 102800  
TOILET ROOM ACCESSORIES

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 the following:
  - 1. Toilet room accessories.
  - 2. Shower accessories.
  - 3. Underlavatory guards.
- B. Owner-Furnished Accessories: Owner-furnished Contractor installed accessories are scheduled at the end of this Section in Part 3 Article "Owner Furnished, Contractor Installed Accessories."
- C. Related Sections:
  - 1. Division 06 Section "Rough Carpentry" for backing and blocking for supports for accessories.
  - 2. Division 10 Section "Toilet Compartments" for toilet compartments.

1.3 SUBMITTALS

- A. Product Data: For each type of product indicated.
  - 1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.
  - 2. Include anchoring and mounting requirements, including requirements for cutouts in other work and substrate preparation.
- B. Product Schedule: Indicating types, quantities, sizes, and installation locations by room of each accessory required.
  - 1. Identify locations using room designations indicated on Drawings.
  - 2. Identify products using designations indicated on Drawings.
- C. Sample Warranty: For manufacturer's special warranty.
- D. Maintenance Data: For toilet and bath accessories to include in maintenance manuals.

## 1.4 QUALITY ASSURANCE

- A. Source Limitations: For products listed together in the same Part 2 articles, obtain products from single source from single manufacturer.

## 1.5 COORDINATION

- A. Coordinate accessory locations with other work to prevent interference with clearances required for access by people with disabilities, and for proper installation, adjustment, operation, cleaning, and servicing of accessories.
- B. Coordinate backing for mounting accessories with wall framing.

## 1.6 WARRANTY

- A. Special Mirror Warranty: Manufacturer's standard form in which manufacturer agrees to replace mirrors that develop visible silver spoilage defects and that fail in materials or workmanship within specified warranty period.
  - 1. Warranty Period: 25 (twenty-five) years from date of Substantial Completion.

## PART 2 - PRODUCTS

### 2.1 REGULATORY REQUIREMENTS

- A. Regulatory Requirements: Toilet room accessories and mounting heights of accessories to be used by persons with disabilities shall comply with accessibility requirements of the 2010 ADA Standards for Accessible Design and the 2019 California Building Code, Chapter 11B, "Accessibility to Public Buildings, Public Accommodations, Commercial Buildings, and Public Housing."
- B. Installation: Where accessories are to be usable by persons with disabilities, comply with regulatory requirements including, but not limited to the following:
  - 1. Where accessories are provided, at least one of each type shall be accessible.
  - 2. Accessories shall be located on an accessible route.
  - 3. The height above the floor to any operating mechanism or point of use shall not exceed 40-inches.
  - 4. Accessories shall not obstruct the use of grab bars for a minimum distance of 12 inches above and 1-1/2 inches below and at ends of grab bars.
  - 5. Accessories located below 34 inches above the floor shall not project into the clear space required for any plumbing fixture.
  - 6. Accessories with their bottom edge more than 27 inches above the floor shall not project more than 4 inches from the wall.
  - 7. Mirrors located above lavatories or counter tops shall be installed with the bottom edge of the reflecting surface 40 inches maximum above the floor, mirrors not located above lavatories or counter tops shall be installed with the bottom edge of the reflecting surface 35 inches maximum above the floor.

8. Toilet paper dispensers shall not be of a type that controls delivery or that does not allow for continuous paper flow.

## 2.2 TOILET ROOM ACCESSORIES

- A. Scheduled Accessories: Accessories are scheduled on the drawings.
  1. Basis of Design: Named manufacturers' products indicated in the accessory schedule on the drawings for each accessory type indicated are for the purpose of establishing minimum requirements. Named products are based on the following manufacturer:
    - a. General Accessory Manufacturing Co. (GAMCO).
      - 1) Subject to compliance with requirements, provide products indicated or equivalent products by one of the following:
        - a) Bobrick Washroom Equipment, Inc
        - b) American Specialties, Inc.
        - c) Bradley Corporation.
- B. Locks and Keys: Lockable accessories shall be provided with cylindrical locks and all locks shall be keyed alike. Provide each lockable accessory with not less than one key.
- C. Finish: Exposed stainless steel surfaces of accessories shall have a satin finish unless otherwise indicated.

## 2.3 UNDERLAVATORY GUARDS

- A. Underlavatory Guard:
  1. Basis-of-Design Product: Drawings and Specifications are based on the following:
    - a. Truebro, Inc., Lavguard2 series underlavatory guard.
      - 1) Subject to compliance with requirements, provide the named product or a comparable product by one of the following:
        - a) Plumberex Specialty Products, Inc.
  2. Description: Antimicrobial, white molded-plastic underlavatory guard assemblies. Underlavatory guard assemblies shall cover waste piping and hot and cold water supply piping, allow service access without removing coverings, and shall prevent contact with hot surfaces and/or sharp objects.
  3. Locations: Provide underlavatory guard assemblies at all lavatories and/or sinks in all toilet rooms, and at sinks in cabinets/counter tops that are indicated to be accessible to persons in a wheel chair.

## 2.4 MATERIALS

- A. Stainless Steel: ASTM A 666, Type 304 with satin finish, unless otherwise indicated.
- B. Brass: ASTM B 19 flat products; ASTM B 16, rods, shapes, forgings, and flat products with finished edges; or ASTM B 30, castings.
- C. Steel Sheet: ASTM A 1008/A 1008M, Designation CS (cold rolled, commercial steel).
- D. Galvanized Steel Sheet: ASTM A 653/A 653M, with G60 hot-dip zinc coating.
- E. Galvanized Steel Mounting Devices: ASTM A 153/A 153M, hot-dip galvanized after fabrication.
- F. Fasteners: Screws, bolts, and other devices of same material as accessory unit and tamper-and-theft resistant where exposed, and of galvanized steel where concealed.
- G. Chrome Plating: ASTM B 456, Service Condition Number SC 2 (moderate service).
- H. Mirrors: ASTM C 1503, Mirror Glazing Quality, clear-glass mirrors, nominal 6.0 mm thick.
- I. ABS Plastic: Acrylonitrile-butadiene-styrene resin formulation.

## 2.5 FABRICATION

- A. General: Fabricate units with tight seams and joints, and exposed edges rolled. Hang doors and access panels with full-length, continuous hinges. Equip units for concealed anchorage and with corrosion-resistant backing plates.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine areas and conditions, with Installer present, for compliance with requirements for fastening, support, operating clearances, and other conditions affecting performance of the Work.
  - 1. Confirm location and adequacy of blocking and supports required for installation.
  - 2. Confirm and coordinate mounting heights and locations of support backing for accessories that are to be accessible to persons with disabilities to insure installed accessories will comply with accessibility requirements when installed.
- B. Proceed with installation only after unsatisfactory conditions have been corrected; commencement of work constitutes acceptance of conditions.



### 3.2 INSTALLATION

- A. Install accessories according to manufacturers' written instructions and as indicated on Drawings. Use fasteners appropriate to substrate indicated and recommended by unit manufacturer. Install units level, plumb, and firmly anchored in locations and at heights indicated.
  - 1. Accessories mounted on walls within toilet compartments or within 2 feet of water closets, lavatories, sinks, urinals, or similar plumbing fixtures shall be installed with penetration of wall finishes sealed to protect structural elements within walls from moisture. Sealant shall not be visible in the finished installation. Sealant shall be mildew resistant silicone sealant as specified in Division 7 Section "Joint Sealants."
- B. Grab Bars: Install to withstand a downward load of at least 250 lbf, when tested according to method in ASTM F 446.

### 3.3 ADJUSTING AND CLEANING

- A. Adjust accessories for unencumbered, smooth operation. Replace damaged or defective items.
- B. Remove temporary labels and protective coatings.
- C. Clean and polish exposed surfaces according to manufacturer's written recommendations.

### 3.4 ACCESSORY LOCATIONS

- A. General: Accessories shall be provided at locations indicated on drawings, for locations where accessories are not indicated, provide accessories as follows:
  - 1. Paper Towel Dispensers: Provide one surface mounted paper towel dispenser for each single sink or lavatory location; where multiple sinks or lavatories occur in the same room or area, provide one towel dispenser for every 2 sinks or lavatories.
  - 2. Soap Dispensers: Provide one surface mounted soap dispenser for each sink or lavatory.
  - 3. Toilet Tissue Dispensers: Provide one surface mounted toilet tissue dispenser for each water closet.
  - 4. Seat Cover Dispensers: Provide one surface mounted seat cover dispenser for each water closet.
  - 5. Grab Bars: Provide one 42-inch grab bar at the back of the water closet and one 48-inch grab bar at the side of the water closet for all wheel chair accessible water closets.

END OF SECTION



SECTION 104313  
DEFIBRILLATORS AND CABINETS

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:
  - 1. Cabinets for automated external defibrillators (AED).
  - 2. Portable automated external defibrillator equipment.

1.3 SUBMITTALS

- A. Product Data: For each type of product indicated. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for cabinets.
  - 1. Cabinets: Include roughing-in dimensions, details showing mounting methods, relationships of box and trim to surrounding construction, door hardware, cabinet type, trim style, and door style.
- B. Maintenance Data: For equipment and cabinets to include in maintenance manuals.

1.4 QUALITY ASSURANCE

- A. Source Limitations: Obtain each type of product from a single source cabinets through a single manufacturer.

1.5 COORDINATION

- A. Coordinate size of cabinet to ensure that cabinet size will accommodate AED equipment and accessories.
- B. Coordinate sizes and locations of cabinets with wall depths, wall framing, and blocking for anchorage of cabinets.

## PART 2 - PRODUCTS

### 2.1 AUTOMATED EXTERNAL DEFIBRILLATOR (AED) EQUIPMENT

- A. Basis of Design: Drawings and Specifications are based on the following:
  - 1. Zoll; AED Plus Automatic External Defibrillator.
    - a. Subject to compliance with requirements, provide product indicated or submit a Request for Substitution.
- B. AED Description: portable, self-contained, battery powered AED.
  - 1. Size: 5.25 inches high x 9.5 inches wide x 11.5 inches deep.
  - 2. Weight: 7 lbs.
  - 3. Power: 10 Type 123A Photo Flash lithium manganese dioxide batteries.
  - 4. Device Classification: Class II and internally powered per EN60601-1.
  - 5. Design Standard: Meets applicable requirements of UL 2601, AAMI DF-39, IEC 601-2-4, EN606101, IEC60601-1-2.

### 2.2 CABINETS FOR AUTOMATED EXTERNAL DEFIBRILLATORS

- A. Basis of Design: Drawings and Specifications are based on the following:
  - 1. Zoll; Semirecessed Wall Cabinet, Part No. 8000-0814.
- B. Cabinet Type: Semi-recessed Cabinet, size suitable for AED equipment, box partially recessed in walls of sufficient depth to suit style of trim indicated; with one-piece combination trim and perimeter door frame overlapping surrounding wall surface with exposed trim face and wall return at outer edge (backbend).
  - 1. Cabinet Construction: Nonrated.
  - 2. Cabinet Material: Steel sheet.
  - 3. Wall Recess: Cabinet shall require of wall recess of no more than 4 inches.
  - 4. Projection from Wall: Cabinet, including trim and pull handles, shall not project more than 4 inches from the finished wall surface.
  - 5. Inside Dimensions: Clear inside dimensions of 14 inches wide by 14 inches high by 6-3/4 inches deep, minimum.
  - 6. Finish: Manufacturer's standard baked-enamel paint or powder coat finish for exposed and semi-exposed surfaces.
    - a. Color: White.
- C. Trim Style: Manufacturer's standard rolled edge.
  - 1. Material: Steel sheet matching cabinet.
  - 2. Finish: Same as for cabinet.

- D. Door Style: Full Glass.
  - 1. Door Material: Steel sheet.
  - 2. Finish: Same as for cabinet.
  - 3. Door Glazing: Manufacturer's standard.
  - 4. Door Hardware: Manufacturer's standard.
    - a. Pull: Manufacturer's standard.
    - b. Lock: Manufacturer's standard roller latch.
    - c. Hinge: Provide continuous hinge, of same material and finish as trim permitting door to open 180 degrees.
- E. Alarm: Standard: 85 db (audible) cabinet-mounted alarm standard (battery operated) to protect against theft or tampering; alarm deactivated when door is closed.

## 2.3 MATERIALS

- A. Cold-Rolled Steel Sheet: ASTM A 1008/A 1008M, Commercial Steel (CS), Type B.
- B. Glass: Tempered float glass, ASTM C 1048, Kind FT, Condition A, Type I, Quality q3, 3 mm thick, Class 1 (clear).

## 2.4 FABRICATION

- A. AED Cabinets: Provide manufacturer's standard box (tub) with trim, frame, door, and hardware to suit cabinet type, trim style, and door style indicated.
  - 1. Weld joints and grind smooth.
  - 2. Provide factory-drilled mounting holes.
- B. Cabinet Doors: Fabricate doors according to manufacturer's standards, from materials indicated and coordinated with cabinet types and trim styles selected.
- C. Cabinet Trim: Fabricate cabinet trim in one piece with corners mitered, welded, and ground smooth.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine walls and partitions for suitable framing depth and blocking where semi-recessed cabinets will be installed.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 PREPARATION

- A. Prepare recesses for semi-recessed AED cabinets as required by type and size of cabinet and trim style.

### 3.3 INSTALLATION

- A. General: Install cabinets at locations indicated.
- B. AED Cabinets: Fasten cabinets to structure, square and plumb.
  - 1. Mounting Height: Mount cabinets so that the top of equipment access or any operable parts will not exceed 48 inches above the finished floor.

### 3.4 CLEANING

- A. Remove temporary protective coverings and strippable films, if any, as cabinets are installed unless otherwise indicated in manufacturer's written installation instructions.
- B. Adjust cabinet doors to operate easily without binding. Verify that integral locking devices operate properly.
- C. On completion of cabinet installation, clean interior and exterior surfaces as recommended by manufacturer.
- D. Touch up marred finishes, or replace cabinets that cannot be restored to factory-finished appearance. Use only materials and procedures recommended or furnished by cabinet manufacturer.
- E. Replace cabinets that have been damaged or have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

END OF SECTION

SECTION 104415  
FIRE EXTINGUISHERS AND CABINETS

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:
  - 1. Fire extinguisher cabinets for portable fire extinguishers.
  - 2. Portable hand carried fire extinguishers.

1.3 SUBMITTALS

- A. Product Data: For each type of product indicated. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for fire protection cabinets.
  - 1. Fire Protection Cabinets: Include roughing-in dimensions, details showing mounting methods, relationships of box and trim to surrounding construction, door hardware, cabinet type, trim style, and panel style.
- B. Maintenance Data: For fire protection cabinets to include in maintenance manuals.

1.4 COORDINATION

- A. Coordinate size of fire extinguisher cabinets to ensure that type and capacity of fire extinguishers indicated are accommodated.
- B. Coordinate sizes and locations of fire protection cabinets with wall depths.
- C. Coordinate blocking and backing for wall anchorage of cabinets with wall framing.

## 1.5 WARRANTY

- A. Special Warranty for Fire Extinguishers: Manufacturer's standard form in which manufacturer agrees to repair or replace fire extinguishers that fail in materials or workmanship within specified warranty period.
  - 1. Failures include, but are not limited to, the following:
    - a. Failure of hydrostatic test according to NFPA 10 when testing interval required by NFPA 10 is within the warranty period.
    - b. Faulty operation of valves or release levers.
  - 2. Warranty Period: Six years from date of Substantial Completion.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

- A. Source Limitations: Obtain fire extinguishers, fire-protection cabinets, and accessories, from a single source from a single manufacturer.
- B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. J. L. Industries, Inc.; a division of Activar Construction Products Group.
  - 2. Larsen's Manufacturing Company.
  - 3. Potter Roemer LLC.

### 2.2 PORTABLE FIRE EXTINGUISHERS

- A. NFPA Compliance: Fabricate and label fire extinguishers to comply with NFPA 10, "Portable Fire Extinguishers."
- B. Fire Extinguishers, General: Type, size, and capacity as indicated.
  - 1. Valves: Manufacturer's standard.
  - 2. Handles and Levers: Manufacturer's standard.
  - 3. Instruction Labels: Include pictorial marking system complying with NFPA 10, Appendix B.
- C. Multipurpose Dry-Chemical Type in Steel Container: UL-rated, 3-A:40-B:C, 5-lb nominal capacity, with monoammonium phosphate-based dry chemical in enameled-steel container.
  - 1. Provide at locations where fire extinguishers or fire extinguisher cabinets are indicated except in Kitchens.



## 2.3 FIRE EXTINGUISHER CABINETS

- A. Cabinet Type: Semi-recessed cabinet with box partially recessed in walls of sufficient depth suitable for fire extinguishers indicated, with one-piece combination trim and perimeter door frame overlapping surrounding wall surface with exposed trim face and wall return at outer edge (backbend).
1. Cabinet Construction: Nonrated.
  2. Cabinet Material: Cold-rolled steel sheet.
  3. Wall Recess: Cabinet shall require of wall recess of no more than 4 inches.
- B. Doors and Trim:
1. Trim Style: Square edge trim with 1-1/2-inch depth as standard with manufacturer.
    - a. Projection from Wall: Cabinet, including trim and pull handles, shall not project more than 4 inches from the finished wall surface.
  2. Material (Doors and Trim): Cold-rolled steel sheet.
  3. Doors:
    - a. Style: Full glazing in 1-1/4-inch wide frame.
    - b. Door Glazing: Tempered float glass (clear).
    - c. Door Hardware: Manufacturer's standard door-operating hardware of proper type for cabinet type, trim style, and door material and style indicated.
      - 1) Latch and Pull: Manufacturer's standard projecting door pull and friction latch.
      - 2) Hinge: Manufacturer's standard continuous hinge, of same material and finish as trim permitting door to open 180 degrees.
- C. Mounting Brackets: Manufacturer's standard steel, designed to secure fire extinguisher to fire protection cabinet, of sizes required for types and capacities of fire extinguishers indicated, with plated or baked-enamel finish.
- D. Materials:
1. Cold-Rolled Steel Sheet: ASTM A 1008/A 1008M, Commercial Steel (CS), Type B.
    - a. Finish: Manufacturer's standard baked enamel, TGIC polyester powder coat, HAA polyester powder coat, epoxy powder coat, or polyester/epoxy hybrid powder coat, complying with AAMA 2603.
    - b. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
    - c. Color: White.
  2. Tempered Float Glass: ASTM C 1048, Kind FT, Condition A, Type I, Quality q3, 3 mm thick, Class 1 (clear).

## 2.4 FABRICATION OF FIRE PROTECTION CABINETS

- A. Fire Protection Cabinets: Provide manufacturer's standard box (tub) with trim, frame, door, and hardware to suit cabinet type, trim style, and door style indicated.
  - 1. Weld joints and grind smooth.
  - 2. Provide factory-drilled mounting holes.
- B. Cabinet Doors: Fabricate doors according to manufacturer's standards, from materials indicated and coordinated with cabinet types and trim styles selected.
  - 1. Fabricate door frames with tubular stiles and rails and hollow-metal design, minimum 1/2 inch thick.
- C. Cabinet Trim: Fabricate cabinet trim in one piece with corners mitered, welded, and ground smooth.

## 2.5 GENERAL FINISH REQUIREMENTS FOR CABINETS

- A. Comply with NAAMM's AMP 500, "Metal Finishes Manual for Architectural and Metal Products," for recommendations for applying and designating finishes.
- B. Protect mechanical finishes on exposed surfaces of fire-protection cabinets from damage by applying a strippable, temporary protective covering before shipping.
- C. Finish fire-protection cabinets after assembly.
- D. Appearance of Finished Work: Noticeable variations in same piece are unacceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine walls and partitions for suitable framing depth and blocking where semi-recessed cabinets will be installed.
- B. Examine fire extinguishers for proper charging and tagging. Remove and replace damaged, defective, or undercharged fire extinguishers.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 PREPARATION

- A. Prepare recesses for semi-recessed fire protection cabinets as required by type and size of cabinet and trim style.

### 3.3 INSTALLATION

- A. General: Install fire extinguishers, cabinets, and mounting brackets in locations indicated, and in compliance with requirements of authorities having jurisdiction.
- B. Fire Extinguisher Cabinets: Fasten cabinets to structure, square and plumb.
  - 1. Mounting Brackets: Fasten mounting brackets to inside surface of fire protection cabinets, square and plumb.
  - 2. Mounting Height: Mount cabinets and brackets so that the top of installed fire extinguishers will not exceed 48 inches above the finished floor.
- C. Bracket Mounted Fire Extinguishers: Fasten mounting brackets to surfaces, square and plumb.
  - 1. Mounting Height: Mount brackets so that the top of installed fire extinguishers will not exceed 48 inches above the finished floor, and the bottom of extinguishers will not be more than 26-1/2 inches above the floor.

### 3.4 ADJUSTING AND CLEANING

- A. Remove temporary protective coverings and strippable films, if any, as fire protection cabinets are installed unless otherwise indicated in manufacturer's written installation instructions.
- B. Adjust fire protection cabinet doors to operate easily without binding. Verify that integral locking devices operate properly.
- C. On completion of fire protection cabinet installation, clean interior and exterior surfaces as recommended by manufacturer.
- D. Touch up marred finishes, or replace fire protection cabinets that cannot be restored to factory-finished appearance. Use only materials and procedures recommended or furnished by fire protection cabinet and mounting bracket manufacturers.
- E. Replace fire protection cabinets that have been damaged or have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

END OF SECTION



SECTION 105113  
METAL LOCKERS

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. This Section includes the following:
  - 1. Knocked-down metal lockers.
  - 2. Locker benches.

1.3 SUBMITTALS

- A. Product Data: Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for each type of metal locker and bench.
- B. Shop Drawings: Include plans, elevations, sections, details, attachments to other work, and locker identification system.
- C. Samples for Initial Selection: For units with factory-applied color finishes.
- D. Samples for Verification: For metal lockers and locker benches, in manufacturer's standard sizes.
- E. Qualification Data: For Installer.
- F. Maintenance Data: For adjusting, repairing, and replacing locker doors and latching mechanisms to include in maintenance manuals.
- G. Warranty: Special warranty specified in this Section.

1.4 QUALITY ASSURANCE

- A. Installer Qualifications: An authorized representative of metal locker manufacturer for installation and maintenance of units required for this Project.

## 1.5 DELIVERY, STORAGE, AND HANDLING

- A. Do not deliver metal lockers until spaces to receive them are clean, dry, and ready for metal locker installation.

## 1.6 PROJECT CONDITIONS

- A. Field Measurements: Verify the following by field measurements before fabrication and indicate measurements on Shop Drawings:
  - 1. Concealed framing, blocking, and reinforcements that support metal lockers before they are enclosed.
  - 2. Established Dimensions: Where field measurements cannot be made without delaying the Work, establish recessed opening dimensions and proceed with fabricating metal lockers without field measurements. Coordinate wall and floor construction to ensure that actual recessed opening dimensions correspond to established dimensions.

## 1.7 COORDINATION

- A. Coordinate sizes and locations of framing, blocking, furring, reinforcements, and other related units of Work specified in other Sections to ensure that metal lockers can be supported and installed as indicated.

## 1.8 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of metal lockers that fail in materials or workmanship, excluding finish, within specified warranty period.
  - 1. Failures include, but are not limited to, the following:
    - a. Structural failures.
    - b. Faulty operation of latches and other door hardware.
  - 2. Damage from deliberate destruction and vandalism is excluded.
  - 3. Warranty Period for Knocked-Down Metal Lockers: Two years from date of Substantial Completion.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

- A. Source Limitations: Obtain metal lockers, locker benches, and accessories from single source from single locker manufacturer.

## 2.2 PERFORMANCE REQUIREMENTS

- A. Regulatory Requirements: Where metal lockers are indicated to comply with accessibility requirements, comply with the 2010 ADA Standards for Accessible Design and the 2019 California Building Code, Chapter 11B.
  - 1. Vertical Reach Range:
    - a. High Reach: The highest shelf of an accessible locker shall not be more than 48-inches above the floor surface.
    - b. Low Reach: The locker bottom or lowest shelf of an accessible locker shall not be less than 15-inches above the floor surface.
  - 2. Operating Hardware: Operating hardware shall be located within the vertical reach ranges and shall not require tight grasping, pinching, or twisting of the wrist, and shall operate with a force of not more than 5 lbf.

## 2.3 MATERIALS

- A. Cold-Rolled Steel Sheet: ASTM A 1008, Commercial Steel (CS) Type B, suitable for exposed applications.
- B. Expanded Metal: ASTM F 1267, Type II (flattened), Class I, 3/4-inch steel mesh, with at least 70 percent open area.
- C. Stainless-Steel Sheet: ASTM A 666, Type 304.
- D. Steel Tube: ASTM A 500, cold rolled.
- E. Fasteners: Zinc or nickel-plated steel, slotless-type exposed bolt heads and self-locking nuts or lock washers for nuts on moving parts.
- F. Anchors: Select material, type, size, and finish required for secure anchorage to each substrate.
  - 1. Provide nonferrous-metal or hot-dip galvanized anchors and inserts on inside face of exterior walls and elsewhere as required for corrosion resistance.
  - 2. Provide toothed-steel or lead expansion sleeves for drilled-in-place anchors.

## 2.4 KNOCKED DOWN METAL LOCKERS

- A. Basis-of-Design Product: Drawings and Specifications are based on the following:
  - 1. Penco Products, Inc.; Invincible II Lockers.
    - a. Subject to compliance with requirements, provide either the named product or a comparable product by one of the following manufacturers:
      - 1) Art Metal Products, Div. of Fort Knox Storage Co.
      - 2) DeBourgh Mfg. Co.

- 3) Lyon Workspace Products.
- 4) List Industries, Inc.

- B. Locker Arrangement: As indicated on Drawings.
- C. Material: Cold rolled steel sheet.
- D. Body: Assembled by riveting or bolting body components together. Fabricate from unperforated, steel sheet with thicknesses as follows:
1. Tops, Bottoms, Sides and Shelves: 0.060-inch (16 gage) nominal thickness.
  2. Backs: 0.048-inch (18 gage) nominal thickness.
- E. Frames: Channel shaped frames fabricated from 0.060-inch (16 gage) nominal thickness. Vertical door frame members with additional 3/8-inch flange as continuous door strike.
1. Cross Frames between Tiers: Channel formed and fabricated from same material as main frames; welded to vertical frame members.
- F. Doors: One piece; fabricated from 0.075-inch (14 gage) nominal-thickness steel sheet. Full channel formation of adequate depth to fully conceal lock bar on lock side, channel formation on hinge side, right angle formations across top and bottom, with holes for attaching number plates.
1. Door Style: Louvered doors in manufacturer's standard louver pattern.
- G. Hinges: Manufacturer's standard 2-inch high, double spun, full loop, tight pin, projections welded to door frame and securely fastened to the door with steel rivets.
1. Two 2-inch high five-knuckle hinges on all doors.
- H. Door Handle and Latches: 0.048-inch (18 gage) combination door pull, staple, and lock hole cover plate with integral friction catch.
- I. Locks: Padlocks by Owner.
- J. Steel Sheet Finish: As indicated in Part 2 Article "Steel Sheet Finish."
- K. Accessories: As indicated in Part 2 Article "Equipment and Accessories."



## 2.5 EQUIPMENT, AND ACCESSORIES

- A. Identification Plates: Equip each metal locker with Manufacturer's standard aluminum identification plate with letter/number characters not less than 3/8-inch high. Identification plates shall be located near the tops of doors and be fastened to doors with rivets.
1. Locker Identification: Rooms containing 1 to 898 lockers, identify lockers with a 3 digit numbering system starting with the number 101. The numbering sequence shall be top to bottom, left to right.
    - a. Identification of disabled Access Lockers: Locker identification plates for lockers identified to be accessible shall have numbers preceded by the letter 'H.'
- B. Accessories:
1. Continuous Sloping Tops: Continuous sloping tops fabricated from minimum 0.048-inch (18 gage) thick, cold-rolled steel sheet. Slope rise equal to 1/3 of the locker depth (18.5 degrees), plus 1-inch vertical rise at front.
  2. Finished End Panels: Minimum 0.060-inch (16 gage) steel formed to match locker depth and height, 1 inch (25 mm) edge dimension; finish to match lockers; install with concealed fasteners.
  3. Front Fillers: 0.036-inch (20 gage) steel formed in an angle shape, with 0.036-inch (20 gage) slip joint angles formed in an angle shape with double bend on one leg forming a pocket to provide adjustable mating with angle filler.
    - a. Attachment by means of concealed fasteners.
    - b. Finish to match lockers.

## 2.6 LOCKER BENCHES

- A. General: Provide locker benches fabricated by same manufacturer as metal lockers.
- B. Bench Tops: Manufacturer's standard 1-piece units, of the following material and sizes, with rounded corners and edges:
- C. Size: 24 inches wide by 1-1/4 inches thick.
- D. Accessible Benches: Benches indicated to be accessible shall comply with the following:
1. Depth: 20 inches minimum, 24 inches maximum, measured front to back.
  2. Length: 48 inches minimum.
  3. Seat Height: 17 inches minimum, 19 inches maximum.
  4. Seat Back Support: Benches shall have the long edge mounted against a wall or shall have an integral back support for the full length of the bench extending 18 inches minimum above the seat surface; back support shall be 2 inches maximum above the seat surface and the vertical face shall be 2-1/2 inches maximum from the back edge of the bench (Refer to CBC Section 11B-903.4).

- E. Bench Tops: Manufacturer's standard 1-piece units, of the following material, 24 inches wide by 1-1/4 inches thick, with rounded corners and edges:
  - 1. Laminated maple with one coat of clear sealer on all surfaces, and one coat of clear lacquer on top and sides.
- F. Fixed Pedestals: Manufacturer's standard supports, with predrilled fastener holes for attaching bench top and anchoring to floor, complete with fasteners and anchors, and as follows:
  - 1. Tubular Steel: 1-1/4-inch diameter steel tubing, with 0.1265-inch thick steel flanges welded at top and base; with baked-enamel finish; anchored with exposed fasteners.
    - a. Color: As selected by Architect from manufacturer's full range.

## 2.7 FABRICATION

- A. General: Fabricate metal lockers square, rigid, and without warp; with metal faces flat and free of dents or distortion. Make exposed metal edges free of sharp edges and burrs, and safe to touch.
  - 1. Form body panels, doors, shelves, and accessories from one-piece steel sheet, unless otherwise indicated.
  - 2. Provide fasteners, filler plates, supports, clips, and closures as required for a complete installation.
- B. Unit Principle: Fabricate each metal locker with an individual door and frame; individual top, bottom, and back; and common intermediate uprights separating compartments.
- C. Knocked-Down Construction: Fabricate metal lockers for nominal assembly at Project site using nuts, bolts, screws, or rivets. Factory weld frame members together to form a rigid, one-piece assembly.
- D. Identification Plates: Manufacturer's standard etched, embossed, or stamped aluminum plates; with numbers and letters at least 3/8 inch high.
- E. Continuous Sloping Tops: Lockers that are not built into surrounding wall construction shall have continuous sloping tops. Fabricate continuous sloping tops in lengths as long as practicable, without visible fasteners at splice locations; finished to match lockers.
  - 1. Where multiple runs of lockers meet at right angles, provide mitered sloped top corner fillers.
- F. Filler Panels: Fabricated in an unequal leg angle shape; finished to match lockers. Provide slip joint filler angle formed to receive filler panel.

- G. Boxed End Panels: Fabricated with 1-inch wide edge dimension, and designed for concealing fasteners and holes at exposed ends of nonrecessed metal lockers; finished to match lockers.

- 1. Provide one-piece panels for double-row (back-to-back) locker ends.

## 2.8 STEEL SHEET FINISHES

- A. General: Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- B. Factory finish steel surfaces and accessories except stainless-steel and chrome-plated surfaces.
- C. Surface Preparation: Clean surfaces of dirt, oil, grease, mill scale, rust, and other contaminants that could impair paint bond. Use manufacturer's standard methods.
- D. Powder-Coat Finish: Immediately after cleaning and pretreating, electrostatically apply manufacturer's standard baked-polymer thermosetting powder finish. Comply with resin manufacturer's written instructions for application, baking, and minimum dry film thickness.
  - 1. Color(s): As selected by Architect from manufacturer's full range; doors and frames of matching colors, with one color for each room or area.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine walls, floors, and support bases, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of work.
  - 1. For the record, prepare written report, endorsed by Installer, listing conditions detrimental to performance of work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 INSTALLATION

- A. General: Install level, plumb, and true; shim as required, using concealed shims.
  - 1. Anchor locker runs at ends and at intervals recommended by manufacturer, but not more than 36 inches on center. Using concealed fasteners, install anchors through backup reinforcing plates, channels, or blocking as required to prevent metal distortion,.
  - 2. Anchor single rows of metal lockers to walls near top of lockers and to floor.
  - 3. Anchor back-to-back metal lockers to floor.

- B. Knocked-Down Metal Lockers: Assemble knocked-down metal lockers with standard fasteners, with no exposed fasteners on door faces or face frames.
- C. Equipment and Accessories: Fit exposed connections of trim, fillers, and closures accurately together to form tight, hairline joints, with concealed fasteners and splice plates.
  - 1. Identification Plates: Attach plates to each locker door, near top, centered, with at least two aluminum rivets.
  - 2. Attach filler panels with concealed fasteners. Locate fillers panels where indicated on Drawings.
  - 3. Attach sloping top units to metal lockers, with closures at exposed ends.
  - 4. Attach boxed end panels with concealed fasteners to conceal exposed ends of nonrecessed metal lockers.
- D. Fixed Locker Benches: Provide not less than 2 pedestals for each bench, uniformly spaced not more than 72 inches apart. Securely fasten tops of pedestals to undersides of bench tops, and anchor bases to floor.

### 3.3 ADJUSTING, CLEANING, AND PROTECTION

- A. Clean, lubricate, and adjust hardware. Adjust doors and latches to operate easily without binding. Verify that integral locking devices operate properly.
- B. Protect metal lockers from damage, abuse, dust, dirt, stain, or paint. Do not permit metal locker use during construction.
- C. Touch up marred finishes, or replace metal lockers that cannot be restored to factory-finished appearance. Use only materials and procedures recommended or furnished by metal locker manufacturer.

END OF SECTION

## SECTION 220000

### GENERAL PLUMBING PROVISIONS

#### PART 1 - GENERAL

##### 1.1 GENERAL CONDITIONS

- A. The preceding General Conditions shall form a part of this Section with the same force and effect as though repeated here. The provisions of this Section shall also apply to Division 22 of these Specifications and shall be considered a part of that Divisions.

##### 1.2 CODES AND REGULATIONS

- A. All work and materials shall be in accordance with current rules and regulations of applicable codes. Nothing in these Drawings or Specifications is to be construed to permit work not conforming to these codes. Should the Drawings or Specifications call for material or methods of construction of a higher quality or standard than required by these codes, the Drawings and Specifications shall govern. Applicable codes and regulations include, but are not necessarily limited to, the following:

California Building Code	CCR Title 24, Part 2
California Electrical Code	CCR Title 24, Part 3
California Mechanical Code	CCR Title 24, Part 4
California Plumbing Code	CCR Title 24, Part 5
California Energy Code	CCR Title 24, Part 6
California Fire Code	CCR Title 24, Part 9
Local Codes	

##### 1.3 DEFINITIONS

- A. Provide: The term "provide" as used in these specifications or on the drawings shall mean furnish and install.
- B. Piping: The term "piping" as used in these specifications or on the drawings shall mean all pipe, fittings, valves, hangers, insulation, etc. as may be required for a complete and functional system.
- C. Ductwork: The terms "duct" or "ductwork" as used in these specifications or on the drawings shall mean all ducts, fittings, joints, dampers, hangers, insulation, etc. as may be required for a complete and functional system.
- D. Wiring: The term "wiring" as used in these specifications or on the drawings shall mean all wiring, conduit, boxes, connections, transformers, relays, switches etc. as may be required for a complete and functional system.

##### 1.4 PERMITS AND FEES

a.

- A. The Contractor shall take out all permits and arrange for all tests in connection with his work as required. All charges are to be included in the work.

## 1.5 COORDINATION OF WORK

- A. Examination: Before starting work, thoroughly examine existing and newly completed underlying and adjoining work and conditions on which the installation of this work depends. Report to the Engineer in writing all conditions which might adversely affect this work.
- B. Layout: Layout of materials, equipment and systems is generally diagrammatic unless specifically dimensioned. Some work may be shown offset for clarity. The actual locations of all materials, piping, ductwork, fixtures, equipment, supports, etc. shall be carefully planned prior to installation of any work in order to avoid all interference with each other, or with structural, electrical, architectural or other elements.
- C. Verification: If discrepancies are discovered between drawing and specification requirements, the more stringent requirement shall apply. All conflicts shall be called to the attention of the Engineer prior to the installation of any work or the ordering of any equipment. No work shall be prefabricated or installed prior to this coordination. No costs will be allowed to the Contractor for any prefabrication or installation performed prior to this coordination. Verify the proper voltage and phase of all equipment with the electrical plans.
- D. Location of Utilities Prior to Trenching or Earthwork: The Contractor shall notify the Owner a minimum of two business days prior to beginning trenching or earthwork. Prior to this notification, the Contractor shall have marked all proposed trenches with paint and shall have contacted a utility locating company and have had this company mark all found underground utilities with paint. The Contractor shall then coordinate and arrange for a site visit with the Owner to review the proposed trenching and/or earthwork areas. Trenching and/or earthwork shall not begin until the Owner agrees. Repair and/or compensation for repair of marked utilities is the responsibility of the Contractor. The Owner retains the right to either self-perform the repair or require the Contractor to complete the repair, as directed by the Owner. If while performing the work, the Contractor discovers utilities that have not been marked, the Contractor shall immediately notify the Owner verbally and in writing.

## 1.6 GUARANTEE

- A. Guarantee shall be in accordance with the General Conditions. The Contractor shall repair any defects due to faulty materials or workmanship and pay for any resulting damage to other work which appears within the guarantee period. These Specifications may extend the period of the guarantee for certain items.

Where such extensions are called for, or where items are normally provided with guarantee periods in excess of that called for in the General Conditions, the certificate of guarantee shall be furnished to the Owner through the Engineer.

#### 1.7 QUIETNESS

- A. Piping, ductwork and equipment shall be arranged and supported so that vibration is a minimum and is not transmitted to the structure.

#### 1.8 DAMAGES BY LEAKS

- A. The Contractor shall be responsible for damages caused by leaks in the temporary or permanent piping systems prior to completion of work and during the period of the guarantee, and for damages caused by disconnected pipes or fittings, and the overflow of equipment prior to completion of the work.

#### 1.9 EXAMINATION OF SITE

- A. The Contractor shall examine the site, compare it with Plans and Specifications, and shall have satisfied himself as to the conditions under which the work is to be performed. No allowance shall subsequently be made in his behalf for any extra expense to which he may be put due to failure or neglect on his part to make such an examination.

#### 1.10 COMPATIBILITY WITH EXISTING SYSTEMS

- A. Any work which is done as an addition, expansion or remodel of an existing system shall be compatible with that system.

#### 1.11 MATERIALS AND EQUIPMENT

- A. Materials and equipment shall be new unless otherwise noted. Materials and equipment of a given type shall be by the same manufacturer. Materials and equipment shall be free of dents, scratches, marks, shipping tags and all defacing features at time of project acceptance. Materials and equipment shall be covered or otherwise protected during construction as required to maintain the material and equipment in new factory condition until project acceptance.

#### 1.12 SUBMITTALS

- A. Shop Drawings: Within 30 days of contract award, the Contractor shall submit six copies of shop drawings for all materials, equipment, etc. proposed for use on this project. Material or equipment shall not be ordered or installed until written review is processed by the Engineer.

All shop drawings must comply with the following:

1. Shop drawings are required for all material and equipment items and shall include manufacturer's name and catalog numbers, dimensions, capacities, performance curves, and all other characteristics and accessories as listed in the specifications or on the drawings. Descriptive literature shall be current factory brochures and submittal sheets. Capacities shall be certified by the factory. FAX submittals are not acceptable.
  2. All shop drawings shall be submitted at one time in a neat and orderly fashion in a suitable binder with title sheet including Project, Engineer and Contractor, table of contents, and indexed tabs dividing each group of materials or item of equipment. All items shall be identified by the specification paragraph number for which they are proposed. All equipment shall also be identified by the mark number as indicated on drawings.
  3. All capacities, characteristics, and accessories called for in the specifications or on the drawings shall be high-lighted, circled or underlined on the shop drawings. Calculations and other detailed data indicating how the item was selected shall be included for items that are not scheduled. Data must be complete enough to permit detailed comparison of every significant characteristic which is specified, scheduled or detailed.
- B. Substitutions: Manufacturers and model numbers listed in the specifications or on the drawings represent the standard of quality and features desired. Proposed substitutions shall comply with the Owner's General Requirements. Calculations and other detailed data indicating how the item was selected shall be included. The Contractor shall assume full responsibility that substituted items or procedures will meet the specifications and job requirements and shall be responsible for the cost of redesign and modifications to the work caused by these items. At the Engineer's request, furnish locations where equipment similar to the substituted equipment is installed and operating along with the user's phone numbers and contact person. Satisfactory operation and service history will be considered in the acceptance or rejection of the proposed substitution.
- C. Review: Submittals will be reviewed for general conformance with the design concept, but this review does not guarantee quantity shown, nor does it supersede the responsibility of the Contractor to provide all materials, equipment and installation in accordance with the drawings and specifications. The Contractor shall agree that shop drawing submittals processed by the Engineer are not Change Orders; that the purpose of shop drawing submittals by the Contractor is to demonstrate to the Engineer that the Contractor understands the design concept, that he demonstrates his understanding by indicating which equipment and material he intends to furnish and install and by detailing the fabrication and installation methods he intends to use. The Contractor shall agree that if deviations, discrepancies or conflicts between shop drawings and design



drawings and specifications are discovered either prior to or after shop drawing submittals are processed by the Engineer, the design drawings and specifications shall control and shall be followed. If a resubmittal is required, submit a complete copy of the Engineer's review letter requiring such with the resubmittal.

#### 1.13 MANUFACTURER'S RECOMMENDATIONS

- A. All material, equipment, devices, etc., shall be installed in accordance with the recommendations of the manufacturer of the particular item. The Contractor shall be responsible for all installations contrary to the manufacturer's recommendations. The Contractor shall make all necessary changes and revisions to achieve such compliance. Manufacturer's installation instructions shall be delivered to and maintained at the job site through the construction of the project.

#### 1.14 SCHEDULING OF WORK

- A. All work shall be scheduled subject to the review of the Engineer and the Owner. No work shall interfere with the operation of the existing facilities on or adjacent to the site. The Contractor shall have at all times, as conditions permit, a sufficient force of workmen and quantity of materials to install the work contracted for as rapidly as possible consistent with good work, and shall cause no delay to other Contractors engaged upon this project or to the Owner. HVAC equipment and functions, whether existing or new, shall be maintained in operating condition whenever the facility is occupied, unless otherwise approved by the Owner.

#### 1.15 DEMOLITION

- A. Existing equipment, ducts, piping, etc. noted for removal shall be removed and delivered to the Owner at a location to be determined by the Owner. Those items determined by the Owner to be of no value shall become the property of the Contractor and shall be removed from the job site by the Contractor at the Contractor's expense. Existing piping, ducts, services, etc. requiring capping shall be capped below floors, behind walls, above ceilings or above roof unless otherwise noted. Where items are removed, patch the surfaces to match the existing surfaces.

#### 1.16 HAZARDOUS MATERIAL REMOVAL

- A. All hazardous material removal will be by the Owner. Hazardous material is to be removed before the work is started. If the Contractor discovers hazardous material which has not been removed, the Contractor shall immediately cease work in that area and promptly notify the Owner.

#### 1.17 OPENINGS, CUTTING AND PATCHING

- A. The locations and dimensions for openings through walls, floors, ceilings, foundations, footings, etc. required to accomplish the work under this

Specification Division shall be provided under this Division. Except as noted below, the actual openings and the required cutting and patching shall be provided by other Divisions. Coring through existing concrete or masonry walls, floors, ceilings, foundations, footings, etc., and saw cutting of concrete floors or asphaltic concrete required to accomplish the work under this Specification Division shall be provided under this Division. Patching of these surfaces shall be provided by other Divisions. Cutting or coring shall not impair the strength of the structure. Any damage resulting from this work shall be repaired at the Contractor's expense to the satisfaction of the Engineer.

#### 1.18 EXCAVATION AND BACKFILL

- A. General: Barrel of pipe shall have uniform support on sand bed. Sand shall be free from clay or organic material, suitable for the purpose intended and shall be of such size that 90 percent to 100 percent will pass a No. 4 sieve and not more than 5 percent will pass a No. 200 sieve. Unless otherwise noted, minimum earth cover above top of pipe or tubing outside building walls shall be 24", not including base and paving in paved areas.
- B. Excavation: Width of trench at top of pipe shall be minimum of 16", plus the outside diameter of the pipe. Provide all shoring required by site conditions. Where over excavation occurs, provide compacted sand backfill to pipe bottom. Where groundwater is encountered, remove to keep excavation dry, using well points and pumps as required.
- C. Backfill:
  - 1. 6" Below, Around, and to 12" Above Pipe: Material shall be sand. Place carefully around and on top of pipe, taking care not to disturb piping, consolidate with vibrator.
  - 2. One Foot Above Pipe to Grade: Material shall be sandy or silty loam, free of lumps, laid in 6" layers, uniformly mixed to proper moisture and compacted to required density. If backfill is determined to be suitable and required compaction is demonstrated by laboratory test, water compaction in 6" layers may be used, subject to review by Engineer.
- D. Compaction: Compact to density of 95% within building and under walkways, driveways, traffic areas, paved areas, etc. and to 90% elsewhere. Demonstrate proper compaction by testing at top, bottom and one-half of the trench depth. Perform these tests at three locations per 100' of trench.

#### 1.19 CONTINUITY OF SERVICES

- A. Existing services and systems shall be maintained except for short intervals when connections are made. The Contractor shall be responsible for interruptions of services and shall repair damage done to any existing service caused by the work. If utilities not indicated on the drawings are uncovered during excavation,

the Contractor shall notify the Engineer immediately.

#### 1.20 PROTECTIVE COATING FOR UNDERGROUND PIPING

- A. All ferrous pipe below grade (except cast iron) shall have a factory applied protective coating of extruded high density polyethylene, 35 to 70 mils total thickness, X-Tru-Coat, Scotchkote. All fittings and areas of damaged coating shall be covered with two layer double wrap of 10 mil polyvinyl tape to total thickness of 40 mils. John-Mansville. Protective coating shall be extended 6" above surrounding grade.

#### 1.21 ACCESS DOORS

- A. Provide access doors as required where equipment, piping, valves, ductwork, etc. are not otherwise accessible. Access doors shall match the wall or ceiling finish and fire rating as indicated on the Architectural drawings. 16-gage steel frame and 14-gage steel door with paintable finish, except in ceramic tile, where door shall be 16-gage stainless steel with satin finish. Continuous hinge. Deliver doors to the General Contractor for installation. Milcor. Unless otherwise noted, the minimum sizes shall be as follows:

1 valve up to 1-1/2"	12" x 12"
1 valve up to 3"	16" x 16"

#### 1.22 CONCRETE ANCHORS

- A. Steel stud with expansion wedge requiring a drilled hole – powder driven anchors are not acceptable. Minimum spacing shall be 12 diameters center to center and 10 diameters center to edge of concrete. Maximum allowable stresses for tension and shear shall be 80% of the ICC Evaluation Service Report (ESR) values. Minimum concrete embedment shall be the nominal embedment listed in the ESR table. Hilti Kwik Bolt TZ.

#### 1.23 EQUIPMENT ANCHORING AND OTHER SUPPORTS

- A. Mechanical systems (equipment, ductwork, piping, conduit, etc.) shall be anchored in accordance with the CBC. All systems mounted on concrete shall be secured with a concrete anchor at each mounting point. All air handlers shall be mounted on spring isolators. Secure base plate as indicated above. Attachment of equipment, ductwork, piping, conduit, etc. supported on curbs or platforms shall be made to the side of curbs and platforms, where possible. Where screws or lag bolts must be installed through the top of a sheet metal cap, the installation shall be as follows. Pre-drill pilot hole. Fill pilot hole with polyurethane sealant. Install screw or lag bolt with a flat washer and an EPDM washer adjacent to the sheet metal.

#### 1.24 SUPPORTS AND SEISMIC RESTRAINTS

- A. Any structural element required to hang or support piping, ducts or equipment provided under this Division and not shown on other drawings shall be provided under this Division.
- B. Mechanical systems (equipment, ductwork, piping, etc.) shall be provided with supports and seismic restraints in accordance with the CBC. Submit anchorage calculations and details stamped and signed by a structural engineer registered in the State of California. Submit shop drawings showing location, type and detail of restraints. Submit manufacturer's data for restraints. Restraint system shall be Mason West, Inc. (OSHPD OPM 0043-13).

#### 1.25 PAINTING

- A. Paint all black iron supports, hangers, anchors, etc. with two coats of rust resisting primer. Also paint all uninsulated black iron piping exposed to weather with two coats of rust resisting primer.

#### 1.26 ROOF PENETRATIONS AND PATCHING

- A. Whenever any part of the mechanical systems penetrates the roof or exterior wall, the openings shall be flashed and counter-flashed water tight with minimum 22 gauge galvanized sheet metal. Flashing shall extend not less than eight inches from the duct, pipe, or supporting member in all directions unless detailed otherwise. All roof penetrations and patching shall be in accordance with the recommendations of the National Roofing Contractor's Association and the Owner's roofing standards.

#### 1.27 SYSTEM IDENTIFICATION

- A. Above Grade Piping: Provide markers on piping which is either exposed or concealed in accessible spaces. For piping systems, other than drain and vent lines, indicate the fluid conveyed or its abbreviation, either by pre-printed markers or stenciled marking, and include arrows to show direction of flow. Pre-printed markers shall be the type that wrap completely around the pipe, requiring no other means of fastening such as tape, adhesive, etc. Comply with ANSI A13.1 for colors. Locate markers at ends of lines, near major branches and other interruptions including equipment in the line, where lines pass through floors, walls or ceilings or otherwise pass into inaccessible spaces, and at 50' maximum intervals along exposed portions of lines. Marking of short branches and repetitive branches for equipment connections is not required.
- B. Below Grade Piping: Bury a continuous, pre-printed, bright-colored, metallic ribbon marker capable of being located with a metal detector with each underground pipe. Locate directly over buried pipe, 6" to 8" below finished grade.
- C. Equipment: All equipment shall be identified with a plastic laminated, engraved nameplate which bears the unit mark number as indicated on the drawings (e.g.

AC-4). Provide 1/2" high lettering - white on black background. Nameplates shall be permanently secured to the exterior of the unit.

- D. Valves: Provide brass valve tags with brass hooks or chains on all valves of each piping system, excluding check valves, valves within equipment, faucets, stops and shut-off valves at fixtures and other repetitive terminal units. Prepare and submit a tagged-valve schedule, listing each valve by tag number, location and piping service. Deliver to Owner through the Engineer.

## 1.28 CLEANING

- A. Progressively and at completion of the job, the Contractor shall thoroughly clean all of his work, removing all debris, stain and marks resulting from his work. This includes but is not limited to building surfaces, piping, equipment and ductwork, inside and out. Surfaces shall be free of dirt, grease, labels, tags, tape, rust, and all foreign material.

## 1.29 OPERATION AND MAINTENANCE INSTRUCTIONS

- A. Printed: Three copies of Operation and Maintenance Instructions and Wiring Diagrams for all equipment and parts list for all faucets, trim, valves, etc. shall be submitted to the Engineer. All instructions shall be clearly identified by marking them with the same designation as the equipment item to which they apply (e.g. AC-3). All Wiring Diagrams shall agree with reviewed Shop Drawings and indicate the exact field installation. All instructions shall be submitted at the same time and shall be bound in a suitable binder with tabs dividing each type of equipment (e.g. Pumps, Fans, Motors, etc.). Each binder shall be labeled indicating "Operating and Maintenance Instructions, Project Title, Contractor, Date" and shall have a Table of Contents listing all items included.
- B. Verbal: The Contractor shall verbally instruct the Owner's maintenance staff in the operation and maintenance of all equipment and systems. The controls contractor shall present that portion of the instructions that apply to the control system. The Engineer's office shall be notified 48 hours prior to this meeting.
- C. Acknowledgment: The Contractor shall prepare a letter indicating that all operation and maintenance instructions (printed and verbal) have been given to the Owner, to the Owner's satisfaction. This letter shall be acknowledged (signed) by the Owner and submitted to the Engineer.

## 1.30 RECORD DRAWINGS

- A. The Contractor shall obtain one set of prints for the project, upon which a record of all construction changes shall be made. As the work progresses, the Contractor shall maintain a record of all deviations in the work from that indicated on the drawings. Final location of all underground work shall be recorded by depth from finished grade and by offset distance from permanent surface structures, i.e.

building, curbs, walks. In addition, the water, gas, sewer, under floor duct, etc. within the building shall be recorded by offset distances from building walls. An electronic copy of the original drawings will be made available to the Contractor. The Contractor shall transfer the changes, notations, etc. from the marked-up prints to the electronic copy. The record drawings (marked-up prints, electronic drawings disc and a hard copy) shall be submitted to the Engineer for review.

#### 1.31 ACCEPTANCE TESTING

- A. The Contractor shall perform, document and submit all acceptance testing as required by California Code of Regulations, Title 24, Part 6.

END OF SECTION

SECTION 22 00 50  
PLUMBING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Division.

1.2 GENERAL MECHANICAL PROVISIONS

- A. The preceding General Plumbing Provisions shall form a part of this Division with the same force and effect as though repeated here.

1.3 SCOPE

- A. Included: Provide all labor, materials and services necessary for complete, lawful and operating systems as shown or noted on the drawings or as specified here. The work includes, but is not necessarily limited to, the following:
  - 1. Sanitary sewer system.
  - 2. Domestic water system.
  - 3. Fuel gas system.
  - 4. Drain system (including condensate drain).
  - 5. All equipment as shown or noted on the drawings or as specified.
  - 6. Demolition as indicated on drawings. Where demolition is called for, remove all equipment, piping, braces, housekeeping pads, supports and related items no longer required.

PART 2 - PRODUCTS

2.1 PIPING MATERIALS

- A. Sanitary Sewer:
  - 1. Soil, Waste and Vent Piping:
    - a. Inside Building and Within Five Feet of Building Walls: Standard weight coated cast iron pipe and fittings. Plain end with neoprene gasket and stainless steel retaining sleeve, CISPI 301, or hub end with rubber gaskets, ASTM A74, ASTM C564. Couplings shall be heavy-duty shielded couplings, Type 304 stainless steel, with

neoprene gasket, ASTM C1540. Husky HD 2000, Clamp-All 80, Mission HeavyWeight MG Couplings are also acceptable. Size 2" and smaller above grade piping may be standard weight galvanized steel, ASTM A120/A53, with coated cast iron recessed drainage fittings, ANSI B16.12. 2" and smaller exposed to view shall be galvanized steel, ASTM A120/A53, with coated cast iron recessed drainage fittings, ANSI B16.12. Indirect waste drains exposed to view shall be DWV copper, recessed drainage fittings, 95-5 solder.

2. Cleanouts: Comparable models of Josam, Wade or Zurn are acceptable. Floor Cleanouts: Smith 4028 with nickel bronze top in finished areas; Smith 4228 in utility areas. Wall Cleanouts: Smith 4532 with stainless steel cover and screw. Pipe Cleanouts: Iron body with threaded brass plug.

B. Water and Gas.

1. Hot and Cold Water Piping:

- a. Inside Building, Within Five Feet of Building Walls, and All Above Grade:

- 1) Schedule 40 galvanized steel pipe, ASTM A120/A53. 150 psi galvanized malleable iron screwed fittings, ANSI B16.3.

-or-

- 2) Hard temper seamless copper, ASTM B88. Wrought copper fittings, ANSI B16.22. Type L with brazed joints (1100F, min.). 1-1/2" and smaller above grade may be soldered, 95-5 tin-antimony solder. All nipples shall be red brass (85% copper). Above grade fittings may be copper (1/2" to 2") or bronze (2-1/2" to 4") press fittings, ASME B16.18 or ASME B16.22. EPDM O-rings. Installation shall be in accordance with the manufacturer's installation instructions. Nibco, ProPress.

2. Gas Piping:

- a. Inside Building and All Above Grade: 2" and Smaller: Schedule 40 galvanized steel pipe, ASTM A120/A53. 150 psi galvanized malleable iron screwed fittings, ANSI B16.3, ANSI B31.8. Flexible connections shall be convoluted yellow brass with dielectric couplings, AGA approved.

3. Valves and Specialties:

- a. Valves:

- 1) General: Manufacturer's model numbers are listed to



complete description. Equivalent models of Crane, Grinnell, Milwaukee, Nibco, Stockham or Walworth are acceptable. All valves of a particular type or for a particular service shall be by the same manufacturer. Use full port ball valve for 2" and smaller water shutoff valves; see specification below.

- 2) Gate Valve: 2" and Smaller: All bronze. Rising stem. Screwed-in bonnet. Wedge disk. Malleable iron handwheel. 200 psi WOG. Nibco, Stockham.
- 3) Check Valve: 2" and Smaller: All bronze swing check, regrinding. 200 psi WOG. Stockham B-319.
- 4) Ball Valve: Full port. Lead free for domestic water. Bronze body, cap, stem, disk and ball. Screwed connection. Lever handle. TFE seat. O-ring seals. 300 psi WOG. Nibco, Apollo, Grinnell, Jomar.
- 5) Plug Valve: Valves in gas piping systems must be UL listed for gas distribution. 4" and Smaller: Eccentric bronze or nickel plated semi-steel plug. Semi-steel body. Bronze bushings. Buna-N-rings. 175 psi WOG. DeZurik Series 400. 1-1/2" and smaller natural gas valves may be full port ball valves. Apollo, Jomar, Grinnell.

b. Miscellaneous Specialties:

- 1) Temperature and Pressure Relief Valve: ASME rated fully automatic, reseating combination temperature and pressure relief valve sized in accordance with energy input. Sensing element immersed within upper 6" of tank. Watts.
- 2) Union: 2" and Smaller: AAR malleable iron, bronze to iron ground seat. 300 psi. Grinnell. Size 2-1/2" and Larger: Grooved pipe, synthetic gasket, malleable iron housing. Victaulic Style 77, Type "E" gasket, Grinnell.
- 3) Dielectric Coupling: Insulating union or flange rated for 250 psig. EPCO.
- 4) Shock Absorber: Multiple bellows. Seamless copper chamber approved for concealed installations. Designed and applied in accordance with PDI WH201. Sioux Chief, Watts.
- 5) Flexible Connection: Corrugated bronze core covered with high tensile bronze tubular braid. 150 psi working pressure. 2" and smaller shall have screwed connections. 2-1/2" and larger shall have flanged connections. Flexonics, Keflex.

- C. Drain Piping (including Condensate): Copper Type L as specified above for inside building cold water piping.
- D. Miscellaneous Piping Items:
  - 1. Pipe Support:
    - a. Pipe Hanger: Steel "J" hanger with side bolt for piping 4" and smaller; steel clevis hanger for piping 5" and larger. Load and jam nuts. Size and maximum load per manufacturer's recommendation. Felt liner for copper piping. Hanger and rod shall have galvanized finish. B-Line, Grinnell, Unistrut.
    - b. Isolating Shield: Galvanized steel shell and reinforcing ribs. 1/4" non-conducting hair felt pad. Pipe hanger in accordance with paragraph above. Increase hanger size per manufacturer's recommendation. B-Line, Semco, Superstrut.
    - c. Construction Channel: 12-gage, 1-5/8" x 1-5/8" galvanized steel channel. Single or multiple section. Self-locking nuts and fittings. B-Line, Grinnell, Unistrut.
  - 2. Flashing: Vent flashing shall be 4 lb/ft<sup>2</sup> lead, 16" sq. flange, length sufficient to be turned down 2" into vent. Oatey. Flashing for other piping through roof shall be prefabricated galvanized steel roof jacks with 16" sq. flange. Provide clamp-on storm collar and seal water tight with mastic. For cold process built-up roof, material shall be 4 lb/ft<sup>2</sup> lead instead of galvanized steel.

## 2.2 PIPING INSULATION MATERIALS

- A. General: All piping insulation materials shall have fire and smoke hazard ratings as tested under ASTM E-84 and UL 723 not exceeding a flame spread of 25 and smoke developed of 50.
- B. Pre-Molded Fiberglass: Heavy density sectional pre-molded fiberglass with vapor barrier laminated all service jacket and pressure sealing vapor barrier lap. Thermal conductivity shall not exceed 0.25 Btu-in/hr-ft<sup>2</sup>-F at a mean temperature of 50F. Perm rating 0.02, ASTM E96. Puncture rating 50 Beach units, ASTM D781. Provide 3" (min.) wide tape of same material as lap for butt joints. For hot water piping, thickness shall be 1" for pipe sizes 2" and less; 1-1/2" thickness for pipe sizes 2-1/2" and larger. Certainteed, Knauf, Johns-Manville, Owens-Corning.
- C. Fiberglass Blanket: Unfaced. Thermal conductivity shall not exceed 0.25 Btu-in/hr-ft<sup>2</sup>-F at a mean temperature of 50F. 1-1/2" thickness. Knauf, Johns-Manville, Owens-Corning.

- D. PVC Jacket (for pipe, fittings and valves): Pre-molded polyvinyl chloride (PVC) jackets, 0.020" thickness. Size to match application. Provide solvent weld adhesive and PVC vapor barrier pressure sealing tape by same manufacturer. Zeston.
- E. Stretchable Glass Fabric: Reinforcing mesh. 10 X 20 continuous filament glass yarns per inch. Johns-Manville.
- F. Vapor Barrier Coating: Childers CP-30, Foster 30-25.
- G. Lagging Adhesive: Childers CP-50A, Foster 30-36.
- H. Outdoor Mastic: Childers CP-21, Foster 65-05.
- I. Insulating Tape: Ground virgin cork and synthetic elastomeric. Black, odorless, and non-toxic. K factor 0.43 Btu-in/hr-ft<sup>2</sup>-F or less. Non-shrinking. For outdoor use, provide protective finish by same manufacturer. Halstead.
- J. Molded Closed Cell Vinyl (Piping Insulation Under Disabled Accessible Lavatories and Sinks): Fully molded closed cell vinyl, 3/16" thick. Internal ribs on drain insulation to provide air gap. Thermal conductivity shall not exceed 1.17 BTU-in/hr-ft<sup>2</sup>-°F at an average temperature of 73°F. Weep hole in cleanout nut enclosure. Out of sight nylon fastening system. Hinged cap over valve to allow access for servicing. Truebro Lav-guard.

## 2.3 FIXTURES

- A. General: Provide rough-in for and install all plumbing fixtures shown on drawings. Except in equipment rooms, all trim, valves and piping not concealed in wall structure, above ceiling or below floors, shall be brass with polished chrome plate finish, unless noted otherwise. All enameled fixtures shall be acid resisting. Standard color is white unless otherwise noted.
- B. Schedule: Refer to Plumbing Fixture Schedule on the drawings for list of fixtures and trim. Manufacturer's model numbers are listed to complete description. Equivalent models of Kohler, Zurn, American Standard, or Chicago are acceptable. For drainage fixtures, equivalent models of Mifab, Josam, Smith or Zurn are acceptable.
- C. Stops and P-Traps: All fixtures shall be provided with stops and P-Traps as applicable. Wall mounted faucets, valves, etc. shall have integral stops or wall mounted stops.
  - 1. Stops: All hot and cold water supplies shall be 1/2" I.P.S. inlet angle stops with stuffing box, loose key lock shield, and brass riser (3/8" for 2-1/2 gpm and less, otherwise 1/2"). McGuire, Speedway.
  - 2. P-Traps: Semi-cast brass, ground joint. 17-gage. Clean-out plug. Unobstructed waterway. California Tubular, McGuire.

## 2.4 EQUIPMENT

### A. General Requirements:

1. Capacity: Capacities shall be in accordance with schedules shown on drawings. Capacities are to be considered minimum.
2. Dimensions: Equipment must conform to space requirements and limitations as indicated on drawings and as required for operation and maintenance. Equipment will not be accepted that does not readily conform to space conditions. Prepare and submit layout drawings for all proposed equipment (different than scheduled units) showing actual job conditions, required clearances for proper operation, maintenance, etc.
3. Ratings:
  - a. Electrical: Electrical equipment shall be in accordance with NEMA standards and UL or ETL listed where applicable standards have been established.
  - b. Gas: Gas burning equipment shall be furnished with 100% safety gas shut-off, intermittent pilot ignition, and be approved by AGA.
4. Piping: Each item or assembly of items shall be furnished completely piped for connection to services. Control valves and devices shall be provided. Equipment requiring domestic water for non-potable use shall be provided with backflow preventer acceptable for intended use by local governing authorities.
5. Electrical:
  - a. General: Each item or assembly of items shall be furnished completely wired to individual terminal blocks for connection to single branch electrical circuit. All electrical accessories and controls required by equipment shall be furnished. Provide terminal blocks for controls and interlocks not included in equipment package. Controllers and other devices shall be in NEMA 1 or 3R enclosures as applicable.
  - b. Wiring: Conductors, conduit, and wiring shall be in accordance with Electrical Specifications. Individual items within assembly shall be separately protected with dead front, fused disconnect, fuse block, or circuit breaker for each ungrounded conductor, all accessible on operating side of equipment. Switches, contacts and other devices shall be in ungrounded conductors.

- c. Submittals: Included in shop drawings shall be internal wiring diagrams and manufacturer's recommended external wiring.
  
- B. Water Heater: Gas fired, Atmospheric Vent. Glass lined tank with magnesium anode protection. 150 psi working pressure. Fully insulated. Automatic temperature control. 100% safety shut-off. High limit control. Provide ASME rated temperature and pressure relief valve sized in accordance with energy input, dielectric couplings and drain cock. CSA (US) approved. A.O. Smith, Rheem, Bradford-White.
  
- C. Circulating Pump: In-line centrifugal. Aluminum housing. All parts exposed to fluid, stainless steel. Water lubricated ceramic shaft and bearings. Epoxy encapsulated windings. Grundfos. -Or- Bronze body, brass impeller. Mechanical seals. Bronze sleeve bearings. Integral thermal overload protection. Bell and Gossett, Taco, Thrush.

## PART 3 - EXECUTION

### 3.1 PIPING INSTALLATION

- A. General:
  - 1. Piping Layout: Piping shall be concealed in walls, above the ceilings, or below grade unless otherwise noted. Exposed piping shall run parallel to room surfaces; location to be approved by the Engineer. No structural member shall be weakened by cutting, notching, boring or otherwise, unless specifically allowed by structural drawings and/or specifications. Where such cutting is required, reinforcement shall be provided as specified or detailed. All piping shall be installed in a manner to ensure unrestricted flow, eliminate air pockets, prevent any unusual noise, and permit complete drainage of the system. All piping shall be installed to permit expansion and contraction without strain on piping or equipment. Vertical lines shall be installed to allow for building settlement without damage to piping. Pipe sizes indicated on the drawings are nominal sizes unless otherwise noted. Provide secondary drain piping where required.
  
  - 2. Joints:
    - a. Threaded: Pipe shall be cut square and reamed to full size. Threads shall be in accordance with ANSI B2.1. Joint compound or tape suitable for conveyed fluid shall be applied to male thread only. Joints shall be made with three threads exposed.
  
    - b. Welded or Brazed: Filler rod shall be of suitable or the same alloy as pipe. Brazing filler metal shall have a minimum melting point of 1100F. Welding or brazing shall be performed by a Certified Welder or Brazer as certified by an organization/institution that

uses standards recognized by the American Welding Society (AWS) and meets the requirements of the ASME Boiler and Pressure Vessels Code, Section 9.

- c. Open Ends: Open ends of piping shall be capped during progress of work to preclude foreign matter.
- d. Electrical Equipment: Piping shall not be run over electrical panels, motor control centers or switchboards.

3. Fittings and Valves:

- a. Standard Fittings: All joints and changes in direction shall be made with standard fittings. Close nipples shall not be used.
- b. Reducers: Pipe size reduction shall be made with bell reducer fittings. Bushings shall not be used.
- c. Unions: A union shall be installed on the leaving side of each valve, at all sides of automatic valves, at equipment connections, and elsewhere as necessary for assembly or disassembly of piping.
- d. Valves: All valves shall be full line size. Provide shut-off valve for each building and each equipment connection. Provide shut-off valve at each point of connection to existing piping. At equipment connections, valves shall be full size of upstream piping, except that gas valves within 18" of the point of connection to the equipment may be the same size as the equipment connection.
- e. Valve Accessibility: All valves shall be located so that they are easily accessible. Valves located above ceilings shall be installed within 24" of the ceiling. Refer to specification 200000 for access requirements.

4. Pipe Support:

- a. General: Hangers shall be placed to support piping without strain on joints or fittings. Maximum spacing between supports shall be as specified below. Actual spacing requirements will depend on structural system. Side beam clamps shall be provided with retaining straps to secure the clamp to the opposite side of the beam. Vertical piping shall be supported with riser clamp at 20' on center (maximum). Support pipe within 12" of all changes in direction. Support individual pipes with pipe hanger. Copper piping systems which protrude through a surface for connection to a fixture stop or other outlet shall be secured with a drop ell, Grinnell No. 9788; nipple through surface shall be threaded brass.

1) Pressure Pipe:

<u>Pipe Size (Inches)</u>	Copper	<u>Maximum Spacing* Between Supports (ft.)</u>	
		Sch. 40 steel	Plastic steel
1/2	6	6	4
3/4	6	8	4
1	6	8	4
1-1/4	6	10	4
1-1/2	6	10	4
2	10	10	4
2-1/2	10	10	4
3	10	10	4
4	10	10	4
6	10	10	4

\*Based on straight lengths of pipe with couplings only. Provide additional supports for equipment, valves or other fittings. Plastic piping shall be supported per the manufacturer's recommendations. Seismic requirements may reduce maximum spacing.

2) Gravity Drain Pipe: Piping shall be supported at each length of pipe or fitting, but in no case at greater spacing than indicated above for pressure pipe.

- b. Hot and Cold Water Piping: All hot and cold water piping shall have isolating shield; no portion of this piping shall touch the structure without an isolating shield except at anchor points for fixture rough-in.
- c. Trapeze: Trapeze hangers of construction channel and pipe clamps may be used. Submit design to Engineer for review.

5. Miscellaneous:

- a. Escutcheons: Provide chrome plated metal escutcheons where piping penetrates walls, ceilings, or floors in finished areas.
- b. Pipe Sleeves: All piping passing through concrete shall be provided with pipe sleeves. Allow 1" annular clearance between sleeve and pipe for piping 3" and smaller, otherwise 2" annular clearance. Piping through walls below grade shall be sealed with Link-Seal.
- c. Pipes Passing through Fire Rated Surfaces: Pipes passing through fire rated walls, floors, ceilings, partitions, etc. shall have

the annular space surrounding the pipe or pipe insulation sealed with fire rated materials in accordance with the requirements of the fire authority having jurisdiction.

- d. Dielectric Couplings: Dielectric couplings shall be installed wherever piping of dissimilar metals are joined, except that bronze valves may be installed in ferrous piping without dielectric couplings.
- e. Exposed Pipe at Fixtures: Piping extending from finished surfaces into a finished room shall be chrome plated brass, except under kitchen sinks in commercial kitchens.

B. Sanitary Sewer Piping:

- 1. General: Where inverts are not indicated, sanitary sewer piping shall be installed at 1/4" per foot pitch. Piping 4" and larger may be installed at 1/8" per foot pitch where structural or other limitations prevent installation at a greater pitch. Bell and spigot piping shall be installed with barrel on sand bed; excavate hole for bell.
- 2. Cleanouts: Install cleanouts at ends of lines, at changes of direction greater than 45 degrees, and at not greater than 100 foot intervals. Locate interior cleanouts in accessible locations and bring flush to finished surface.

C. Water Piping: Connections to branches and risers shall be made from top of main. Supply header in fixture battery shall be full size to last fixture, reducing in size only on individual connections to each fixture in battery. Minimum pipe size shall be 3/4", unless otherwise noted. Exposed fixture stops and flush valves shall be installed with brass nipples for copper piping and galvanized nipples for galvanized piping. Nipples are to extend from outside of wall to fitting at header or drop behind finish wall surfaces. Pipe nipples shall be same size as stop or flush valve. Provide shut off for each building and each connection to equipment. . Shock absorbers shall be installed in a vertical position per manufacturer's instructions and per PDI-WH 201 where flush valves, metering faucets or other fast acting valves are connected to the domestic piping system.

D. Gas Piping: Installation shall comply with CPC and NFPA 54 (National Fuel Gas Code). Shall be pitched to drain to dirt legs at low points. No unions shall be installed except at connections to equipment. Provide shutoff and dirt leg at each equipment connection. Only equipment mounted on vibration isolators shall be connected with flexible connectors.

E. Drain Piping (Including Condensate): Install with constant pitch to receptacle, 1/4" per foot where possible, otherwise 1/8" per foot minimum. Provide TEE with clean-out plug at all changes of direction. Provide trap at each air handling unit to prevent air leakage. Only equipment mounted on vibration isolators shall be



connected with flexible connection. Piping not concealed in wall structure, above ceilings or below floors shall be chrome plated brass.

- F. PVC Piping: Shall be cut square and assembled prior to solvent weld. Apply primer per manufacturer's recommendations. Coat male joint fully with solvent, make joint before solvent dries and wipe exterior clean.

### 3.2 PIPING INSULATION INSTALLATION:

#### A. Domestic Hot Water:

1. General: All domestic hot water piping, fittings and accessories shall be insulated.
2. Pipe: Apply pre-molded fiberglass sections to pipe using integral pressure sealing lap adhesive in accordance with manufacturer's recommendations. Stagger longitudinal joints. Seal butt joints with factory supplied pressure sealing tape.
3. Fittings and Valves:
  - a. Wrap all fittings and valves with pre-cut fiberglass blanket to thickness matching adjoining insulation. Cover blanket with PVC jacket in accordance with manufacturer's recommendations. Solvent weld. Seal all joints with factory supplied pressure sealing vapor barrier tape with 1-1/2" (min.) overlap on both sides of joint. Insulate valves to stem. Do not insulate unions, flanges or valves unless water temperature exceeds 140°F or the piping is exposed to weather.
  - b. For miscellaneous fittings and accessories for which PVC jackets are not available or where proximity of fittings precludes a neat-appearing installation, the Contractor may cover the fiberglass blanket with stretchable glass fabric, one coat of lagging adhesive and a final coat of vapor barrier coating. All exposed ends of insulation shall be adequately sealed.
4. Additional Finish for Exposed Piping and Equipment: All piping and equipment exposed to view but protected from the weather shall be given an additional finish of PVC jackets.

- B. Cold Water Piping-Freeze Protection: All cold water piping exposed to weather shall be wrapped with insulating tape, 50% overlap. Cover valves to stem. Apply at least two coats of protective finish.

- C. Piping Insulation Under Disabled Accessible Lavatories and Sinks: Hot and cold water piping, hot and cold water stop and drain piping under disabled accessible lavatories and sinks shall be insulated with 3/16" thick molded closed cell vinyl to prevent accidental injury due to contact or temperature extremes. Installation shall be in accordance with manufacturer's instructions. There shall be no sharp or

abrasive surfaces under disabled accessible lavatories and sinks.

### 3.3 FIXTURE INSTALLATION

- A. Fixture Height: Shall be as indicated on Architectural drawings.
- B. Floor Drains or Floor Sinks: Shall be placed parallel to room surfaces, set level, flush with floor, and adjusted to proper height to drain. Cover openings during construction to keep all foreign matter out of drain line.
- C. Wall Hung Fixtures: Shall be provided with proper backing and hanger plates secured to wall. Lavatories shall be supported with concealed arm supports. Fixtures mounted on carriers shall bear against stop nuts, clear of wall surface. Caulk fixtures against walls with white G.E. "Sanitary 1700" silicone sealant. Caulking shall be smooth and flush with fixture surface (not concave).
- D. Floor Mounted Fixtures: Shall be provided with proper support plates. Grout at the floor with waterproof ceramic tile grout.
- E. Other Connections: Rough-in and connection for trim or fixtures supplied by others shall be included in this specification section.

### 3.4 EQUIPMENT INSTALLATION

- A. General: It shall be the responsibility of the equipment installer to insure that no work done under other specification sections shall in any way block, or otherwise hinder the equipment. All equipment shall be securely anchored in place.
- B. Connections to Equipment: Where size changes are required for connections to equipment, they shall be made immediately adjacent to the equipment and, if possible, inside the equipment cabinet.

### 3.5 TESTS AND ADJUSTMENTS

- A. General: Unless otherwise directed, tests shall be witnessed by a representative of the Engineer. Work to be concealed shall not be enclosed until prescribed tests are made. Should any work be enclosed before such tests, the Contractor shall, at his expense, uncover, test and repair all work to original conditions. Leaks and defects shown by tests shall be repaired and entire work retested. Tests may be made in sections, however, all connections between sections previously tested and new section shall be included in the new test.
- B. Gravity Systems:
  - 1. Sanitary Sewer: All ends of the sanitary sewer system shall be capped and lines filled with water to the top of the highest vent, 10' above grade minimum. This test shall be made before any fixtures are installed. Test

shall be maintained until all joints have been inspected, but no less than 2 hours.

2. Drains (Including Condensate): Similar to Sanitary Sewer.

C. Pressure Systems:

1. General: There shall be no drop in pressure during test except that due to ambient temperature changes. All components of system not rated for test pressure shall be isolated from system before test is made.

2. Domestic Hot and Cold Water Piping: Maintain 100 psig water pressure for 4 hours.

3. Gas Piping: Maintain 100 psig air pressure for 4 hours.

### 3.6 DISINFECTION

A. Disinfect all domestic water piping systems in accordance with AWWA Standard C651, "AWWA Standard for Disinfecting Water Mains", and in accordance with administrative authority. Disinfection process shall be performed in cooperation with health department having jurisdiction and witnessed by a representative of the Engineer. During procedure signs shall be posted at each water outlet stating, "Chlorination - Do Not Drink". After disinfection, water samples shall be collected for bacteriological analysis. Certificate of Bacteriological Purity shall be obtained and delivered to the Owner through the Engineer.

END OF SECTION



SECTION 230100  
GENERAL MECHANICAL PROVISIONS

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. This section covers and applies to all work included in Divisions 21 through 25.
- B. Work in this Section includes providing labor, materials, equipment, services necessary, fabrication, installation and testing for fully operational and safe systems including all necessary materials, appurtenances and features whether specified or shown in the contract documents or not, in conformity with all applicable codes and authorities having jurisdiction for the following:
  - 1. Mechanical work covered by all sections within Divisions 21, 22, 23 and 25 of the specifications, including, but not limited to:
    - a. Heating, ventilating and air conditioning systems and equipment.
    - b. Plumbing systems and equipment.
    - c. Testing and balancing.
- C. Provide cutting and patching, for the Mechanical Work.
- D. Provide piping from plumbing terminations, 10 feet from equipment, for water, gas, sanitary sewer and waste.
- E. Provide drain piping for all equipment requiring drainage to floor drains, roof, sink, or funnel drains.

1.3 RELATED WORK AND REQUIREMENTS

- A. Carefully check the documents of each section with those of other sections and Divisions. Ascertain the requirements of any interfacing materials or equipment being furnished and/or installed by those sections and Divisions, and provide the proper installation and/or required interface.

1.4 QUALITY ASSURANCE

- A. Supply all equipment and accessories in compliance with the applicable standards listed in article 1.6 of this section and with all applicable national,

state and local codes.

- B. All items of a given type shall be the products of the same manufacturer, unless otherwise specified herein.

## 1.5 SUBMITTALS

- A. Submit shop drawings, product data, samples and certificates of compliance required by Division 01.
- B. Product Data Submittals: Submit manufacturers standard published data. Mark each copy to identify applicable products, models, options, accessories and other data. Supplement manufacturers standard data to provide information specific to this project.
- C. Organize submittals in sequence according to Specification Section. Submit in single electronic PDF document with tabs identifying each Specification Section. Provide Table of Contents identifying the Specification Sections being submitted and the contents within each tabbed section. Prepare Submittals in multiple volumes if required. Provide a complete Submittal package by Division at one time. Do not submit individual Sections piecemeal.
- D. In addition to the submittal requirements of Divisions 21, 22, 23 and 25, submit product data for the following items per the provisions Division 01:
  - 1. All Equipment and Fixtures indicated in Schedules on Drawings.
  - 2. Access panels
- E. If more than two submissions are required (initial submittal and one resubmittal) based on rejection or lack of compliance by submittal, then the Contractor shall:
  - 1. Arrange for additional reviews by the Design Engineers.
  - 2. Pay all costs for such additional reviews.
- F. Corrections or comments made on the shop drawings during review do not relieve the Contractor from compliance with requirements of the drawings and specifications. Shop drawing checking by the Engineer is only for review of general conformance with the design concept of the project and general compliance with the information given in the contract documents. The Contractor is responsible for:
  - 1. Confirming and correlating all quantities and dimensions.
  - 2. Selecting fabrication processes and techniques of construction.
  - 3. Coordinating his work with that of all other trades.

4. Performing his work in a safe and satisfactory manner.

G. Substitutions:

1. Prior to Bid shall be in accordance with Division 01.

2. After award of contract, submit separate substitution request for each substitution in accordance with the requirements hereinbelow. Support each request with:

a. Complete data substantiating compliance of proposed substitution with requirements stated in Contract documents.

b. Data relating to changes in construction schedule.

c. Any effect of substitution on other Work in this and other Divisions, and any other related contracts, and changes required in other work or products.

3. Contractor shall be responsible at no extra cost to Owner for any changes resulting from proposed substitutions which affect work of other Sections or Divisions, or related contracts.

4. Claims for additional costs caused by substitution that may subsequently become apparent shall be met by the Contractor.

5. Failure by the Contractor to order materials or equipment in a timely manner will not constitute justification for a substitution.

6. Substitutions will not be considered for acceptance when acceptance will require revision of Contract Documents, unless Contractor bears cost of redesign.

a. Arrange for required redesign by Engineer.

b. Pay all costs for such redesign.

c. All subject to Architect's approval.

7. Approval of substitutions shall not relieve Contractor from full compliance with requirements of Contract documents.

H. As-built (Record) Drawings:

1. Shall be in accordance with Division 01.

2. Provide after installation is complete. Final signoff and Client acceptance will not occur prior to submission of As-built drawings to Architect/Engineer.

3. Indicate as-built conditions and all revisions, fully illustrating all revisions made by all trades in the course of work.
  4. Dimension physical locations of ductwork, and piping with reference elevations and distances above finished floors, below beams, from wall faces, underground (invert elevations) and from column lines.
  5. Exact location, type and function of concealed valves, dampers, controllers, piping, air vents, piping drains and isolators.
  6. Indicate all equipment sizes and capacities and tag numbers.
  7. Provide drawing on reproducible bond.
  8. These drawings shall be for as-built record purposes for the Owner's use and are not considered shop drawings.
- I. Operating Instructions, Maintenance Manuals and Parts Lists:
1. Before requesting acceptance of work, submit one set for review by Architect/Engineer.
  2. After review, furnish two (2) printed and bound sets.
  3. Include:
    - a. Installers name, address, telephone number and representatives name, and website address.
    - b. Manufacturer's name, model number, service manual, spare-parts list, and descriptive literature for all components, cross referenced and numbered on Record Drawings, and in accordance with Title 24 as required.
    - c. Maintenance instructions.
    - d. Listing of possible breakdown and repairs.
    - e. Instruction for starting, operation and programming.
    - f. Detailed and simplified one line, color coded flow and wiring diagram.
    - g. Field test report, including:
      - 1) Instrument set points.
      - 2) Normal operating values.



- h. Name, address and phone number of contractors equipment suppliers and service agencies.
  - i. Assemble manufacturer's equipment manuals in chronological order, following the specification alpha-numeric system, in heavy duty 3-ring binders clearly titled on the spine and front cover with appropriate index dividers.
- J. Special Tools:
  - 1. One set of any special tools required to operate, adjust, dismantle or repair equipment furnished under any section of this Division.
  - 2. "Special tools": those not normally found in possession of mechanics or maintenance personnel.
  - 3. Tag each item and cross reference in Maintenance Manual.
  - 4. Turn over to Owner's representative or temporarily secure to unit at Architect's instruction.
- K. Quantity of Submittals Required:
  - 1. Product Data (brochures):
    - a. Submit electronic PDF copy of product data.
    - b. If comments are required, comment sheet(s) will be returned with submittal.
  - 2. Samples:
    - a. Submit as required in each specification section.

## 1.6 REFERENCE STANDARDS

- A. Reference standards of industry organizations, manufacturer associates and professional associations that publish standards of construction and/or materials that are referenced in this Division are listed in Division 01. The Standards as referenced in this Specification shall be considered as attached and binding to the requirements of the Construction Documents. The Contractor is to be considered as knowledgeable of these Standards and their requirements for the performance of the Work.

## 1.7 CODE COMPLIANCE

- A. In addition to complying with all other legal requirements, comply with current provisions of governing codes and regulations in effect during progress of the Work, and with the following:

1. Drawings and specification requirements shall govern where they exceed Code and Regulation requirements.
2. Where requirements between governing Codes and Regulations vary, the more restrictive provisions shall apply.
3. Nothing contained in Contract Documents shall be construed as authority or permission to disregard or violate legal requirements. The Contractor shall immediately draw the attention of the Architect to any such conflicts noted in the Contract Documents.

## 1.8 DESCRIPTION OF BID DOCUMENTS

### A. General:

1. Words or phrases such as "The Contractor shall," "shall be," "furnish," "provide," "connect," "a," "an," "the," and "all" etc. may be omitted for brevity.
2. The Drawings and Specifications are complimentary each to the other. Where discrepancies occur between the Drawings and Specifications, the more stringent provisions shall apply.
3. Examine all drawings and specifications prior to bidding the work. Report any discrepancies to the Engineer.

### B. Specifications:

1. Specifications, in general, describe quality and character of materials and equipment and the Standards that govern. Contractor is responsible for design and construction costs incurred for equipment and materials other than the Basis of Design, including but not limited to architectural, structural, electrical, HVAC, fire sprinkler and plumbing.
2. Specifications are of simplified form and include incomplete sentences.

### C. Drawings:

1. Drawings in general are diagrammatic and indicate scope, sizes, routing, locations, connections to equipment and methods of installation, but not necessarily offsets, obstructions or structural conditions. Drawings are not intended to show every item, fitting, transition or offset in its exact dimension or detail of equipment or proposed system layout. Locations on drawings may be distorted for purposes of clearness and legibility.
2. Contractor to provide additional offsets, fittings, hangers, supports, valves, drains as required for construction and coordination with work of

other trades.

3. Before proceeding with work, ordering or fabricating materials, check and verify all dimensions and carefully check space requirements with other Work to ensure that all equipment and materials can be installed in spaces allotted.
  4. Contractor to assume all responsibility for fitting of materials and equipment to other parts of equipment and structure.
  5. The Contractor is responsible for installing the work in such a manner that it will conform to the structure and architectural elements, avoid obstructions, maintain headroom, leave adequate clearance for proper maintenance and repairs, and provide clearances and access required by codes. Do not scale distances off of mechanical drawings. Use actual field measured building dimensions.
  6. Make adjustments that may be necessary or requested in order to resolve space problems, preserve headroom, and avoid architectural openings, structural members and work of other trades.
  7. Above items to be performed at no additional cost to the Owner.
- D. Typical details, where shown on the drawings, apply to each and every item of the project where such items are applicable. Typical details are not repeated in full on the plans, and are diagrammatic only, but with the intention that such details shall be incorporated in full.

## 1.9 DEFINITIONS

- A. "Piping": pipe, tube, fittings, flanges, valves, controls, strainers, hangers, supports, unions, traps, drains, insulation, and related items.
- B. "Motor Controllers": manual or magnetic starters (with or without switches), individual pushbuttons or hand-off-automatic (HOA) switches controlling the operation of motors.
- C. "Control" or "Actuating Devices": automatic sensing and switching devices such as thermostats, pressure, float, electro-pneumatic switches and electrodes controlling operation of equipment.

## 1.10 JOB CONDITIONS

- A. Adjoining work of other Divisions shall be examined for interferences and conditions affecting this Division.
- B. Examine site related work and surfaces before starting work of any Section.

1. Report to Architect, in writing, conditions which will prevent proper provision of this work.
2. Beginning work of any Section without reporting unsuitable conditions to Architect constitutes acceptance of conditions by Contractor.
3. Perform any required removal, repair or replacement of this work caused by unsuitable conditions at no additional cost to Owner.

C. Connections to existing work.

1. Unknown conditions will be addressed if reasonable.
2. Contractor shall field verify existing dimensions prior to ordering or fabricating materials.
3. Install new work and connect to existing work with minimum interference to existing facilities.
4. Temporary shutdowns of existing services:
  - a. At no additional charges.
  - b. At times not to interfere with normal operation of existing facilities.
  - c. Provide 48 hour notification.
5. Maintain continuous operation of existing facilities as required with necessary temporary connections between new and existing work.
6. Restore existing disturbed work to original condition.

D. Removal and relocation of existing work.

1. Disconnect, remove or relocate material, equipment, plumbing fixtures, piping and other work noted and required by removal or changes in existing construction.
2. Where existing pipes, conduits and/or ducts which are to remain prevent installation of new work as indicated, relocate, or arrange for relocation, of existing pipes, conduits and/or ducts.
3. Provide new material and equipment required for relocated equipment.
4. Plug or cap active piping or ductwork behind or below finish.
5. Do not leave long dead-end branches. Cap or plug as close as possible to active line.

6. Remove unused piping, ductwork and material.
  7. Dispose of removed fixtures and equipment as directed.
  8. Turn over removed fixtures and equipment to Owner as directed.
- E. Special Traffic Requirements:
1. Maintain emergency and service entrances useable to pedestrian, truck, and ambulance traffic at all times.
  2. Where trenches are cut, provide adequate bridging for above-mentioned traffic.

#### 1.11 TEMPORARY FACILITIES

- A. See Division 01 for temporary facilities required.

#### 1.12 SCHEDULE OF WORK

- A. Arrange work to conform to schedule of construction established or required to comply with Contract Documents.
- B. In scheduling, anticipate means of installing equipment through available openings in structure.
- C. Confirm in writing to Architect, within 30 days of signing of contract, anticipated number of days required to perform test, balance, and acceptance testing of mechanical systems:
1. This phase must occur after completion of mechanical systems, including all control calibration and adjustment, and requires substantial completion of the building, including closure, ceilings, lighting, partitioning, etc.
  2. Submit for approval at this time, names and qualifications of test and balancing agencies to be used.

#### 1.13 NOISE REDUCTION

- A. Cooperate in reducing objectionable noise or vibration caused by mechanical systems.
1. To extent of adjustments to specified and installed equipment and appurtenances.
- B. Correct noise problems caused by failure to install work in accordance with Contract Documents. Include labor and materials required as result of such failure.

## PART 2 - PRODUCTS

### 2.1 ACCESS DOORS

- A. Size for proper access, adjusting and maintenance:
  - 1. 12 in. x 12 in. minimum for valves, trap primers, shock absorbers, etc.
  - 2. 24 in. x 24 in. for man access to concealed fans, coils, etc., unless indicated otherwise.
- B. Provide as required by work in this Division.
- C. Style, Color and Finish to match adjacent construction and as approved by Architect.

## PART 3 - EXECUTION

### 3.1 MANUFACTURER'S RECOMMENDATIONS

- A. All material, equipment, devices, etc., shall be installed in accordance with the recommendations of the manufacturer of the particular item. The Contractor shall be responsible for all installations contrary to the manufacturer's recommendations. The Contractor shall make all necessary changes and revisions to achieve such compliance. Manufacturer's installation instructions shall be delivered to and maintained at the job site through the construction of the project.

### 3.2 CUTTING AND PATCHING

- A. All carpentry, cutting and patching to be done under trades doing that work. Work shall be done in accordance with Division 01.
- B. Provide all carpentry, cutting and patching required for proper installation of material and equipment specified in Divisions 21, 22, 23 and 25.
- C. Do not cut, notch or drill structural members without consent of Architect.
- D. All cutting and repairing shall conform to Title 21 of California Administrative Code.

### 3.3 CONCRETE ANCHORS

- A. Steel bolt with expansion anchor requiring a drilled hole – powder driven anchors are not acceptable.
- B. Minimum concrete embedment shall be 4-1/2 diameters unless otherwise noted

on plans.

- C. Minimum spacing shall be 12 diameters center to center and 6 diameters center to edge of concrete unless otherwise noted on plans.
- D. Maximum allowable stresses for tension and shear shall be 80% of the ICBO test report values. Hilti, Phillips, Wej-It.

#### 3.4 EQUIPMENT ANCHORING

- A. All equipment shall be securely anchored in accordance with CBC.
- B. All equipment mounted on concrete shall be secured with a concrete anchor as specified above at each mounting point.
- C. Secure base plate as indicated above.

#### 3.5 SUPPORTS AND SEISMIC RESTRAINTS

- A. All mechanical systems (all ductwork, piping, etc.) shall be provided with supports and seismic restraints in accordance with Seismic Hazard Level 'A' of the "Guidelines for Seismic Restraint Manual: Guidelines for Mechanical Systems", current issue, as published by the Sheet Metal and Air Conditioning Contractors National Association, Inc. (SMACNA), Chantilly, Virginia and in accordance with CBC.

#### 3.6 WATER PROOFING

- A. Under General Construction Work.
- B. Where any work pierces waterproofing, installation shall be subject to review.
  - 1. Provide all necessary sleeves, caulking, flashing and flashing fittings required to make openings absolutely watertight.
- C. Flashing:
  - 1. Mechanical Contractor shall provide flashing for all work in this Division, unless otherwise provided by roofing installer, as required to accommodate roof slope, roofing material, and roof installation method. No additional costs will be paid for lack of familiarity of Contractor with roofing type or slope.
  - 2. Mechanical Contractor shall be responsible for coordinating size of penetrations and locations with roofing contractor.
  - 3. Mechanical Contractor shall be responsible for scheduling installation of piping and other penetrations through roof structural system to exterior that they are complete and secure for the orderly installation of the

roofing system.

4. 4 lb. lead.
5. 16 oz. lead coated copper.
6. No.22 USSG aluminum.
7. Fittings for piping through roof:
  - a. Galvanized cast iron bottom recess roof type.
  - b. Similar to Josam No. 26440 or No. 26450.

D. Provide weather protection canopies, hoods or enclosures over out-of-door equipment which could be damaged by exposure to weather.

1. This requirement applies to:
  - a. Motors and drives.
  - b. Controls.
  - c. Instruments.
2. Identify items under such covers if entirely enclosed.

### 3.7 ACCESS TO VALVES AND EQUIPMENT

A. Access shall be possible where valves, expansion joints, fire dampers, motors, filters, control devices, and any other equipment requiring access for servicing, repairs, or maintenance are located in walls, soffits, chases, and/or above ceilings.

B. Definition of Accessible:

1. Valves and dampers may be operated.
2. Control devices may be adjusted.
3. Fire dampers may be reset.
4. Equipment access panels may be opened.
5. Normal maintenance work such as replacement of filters, lubrication of bearings, etc., may be performed readily within arm's reach of access opening.
6. It shall not be necessary to crawl through furred ceiling space to perform



such operations.

- C. Install piping, equipment and accessories to permit easy access for maintenance.
- D. Group concealed valves, expansion joints, controls, dampers and equipment requiring service access, so as to be freely accessible through access doors and to minimize the number of access doors required.
- E. Relocate piping equipment and accessories as required, at no extra cost to afford proper maintenance access.
- F. Coordinate location of access panels with applicable trades installing walls or ceiling.
  - 1. Coordinate panel locations with lights and other architectural features.
  - 2. Submit proposed panel locations to Architect for review.
- G. Arrange for location and marking of removable tiles in splined ceilings where access panels are not installed.
- H. Existing Structures:
  - 1. When installation requires access openings through existing construction, coordinate location of necessary access panels, and arrange for respective trades to provide openings and framing which may be required.
  - 2. Restore adjoining existing surfaces to original condition after new access panels have been installed.

### 3.8 CLEANING AND ADJUSTING

- A. Work to be painted: Brush and clean work prior to concealing, painting and acceptance. Perform in stages if directed.
- B. Painted or exposed work soiled or damaged: Clean, repair and paint to match adjoining work before final acceptance.
- C. Remove debris from inside and outside of materials and equipment.
- D. Flush out piping after installation.
- E. Adjust valves and automatic control devices.
- F. Traps, wastes and supplies: unobstructed.

### 3.9 FIELD QUALITY CONTROL

- A. Refer to Division 01.
- B. Tests:
  - 1. Perform as specified in individual Divisions, and as required by authorities having jurisdiction.
- C. Furnish written report and certification that tests have been satisfactorily completed.
- D. Repair or replace defective work, as directed.
- E. Pay for restoring or replacing damaged work due to tests, as directed.
- F. Pay for restoring or replacing damaged work of others, due to tests, as directed.

### 3.10 TRAINING

- A. Provide training by qualified manufacturers' representatives for equipment as specified in this Division.
- B. Training to include:
  - 1. Site-specific training.
  - 2. Minimum hours as specified in each Section.
  - 3. Training materials (minimum six sets).
  - 4. Electronic media available from the manufacturer [two (2) copies].
- C. Each training session to be scheduled with Owner at least 30 days in advance.

END OF SECTION

SECTION 230500  
COMMON WORK RESULTS FOR HVAC

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. This Section includes the following:
1. Piping materials and installation instructions common to most piping systems.
  2. Mechanical sleeve seals.
  3. Sleeves.
  4. Escutcheons.
  5. Equipment installation requirements common to equipment sections.
  6. Painting and finishing.
  7. Supports and anchorages.

1.3 DEFINITIONS

- A. Finished Spaces: Spaces other than mechanical and electrical equipment rooms, furred spaces, pipe and duct chases, unheated spaces immediately below roof, spaces above ceilings, unexcavated spaces, crawlspaces, and tunnels.
- B. Exposed, Interior Installations: Exposed to view indoors. Examples include finished occupied spaces and mechanical equipment rooms.
- C. Exposed, Exterior Installations: Exposed to view outdoors or subject to outdoor ambient temperatures and weather conditions. Examples include rooftop locations.
- D. Concealed, Interior Installations: Concealed from view and protected from physical contact by building occupants. Examples include above ceilings and chases.
- E. Concealed, Exterior Installations: Concealed from view and protected from weather conditions and physical contact by building occupants but subject to outdoor ambient temperatures. Examples include installations within unheated shelters.
- F. The following are industry abbreviations for plastic materials:
1. CPVC: Chlorinated polyvinyl chloride plastic.
  2. PE: Polyethylene plastic.

3. PVC: Polyvinyl chloride plastic.

G. The following are industry abbreviations for rubber materials:

1. EPDM: Ethylene-propylene-diene terpolymer rubber.

#### 1.4 SUBMITTALS

A. Product Data: For the following:

1. Mechanical sleeve seals.
2. Access doors

B. Welding certificates.

#### 1.5 QUALITY ASSURANCE

A. Steel Support Welding: Qualify processes and operators according to AWS D1.1, "Structural Welding Code--Steel."

B. Steel Pipe Welding: Qualify processes and operators according to ASME Boiler and Pressure Vessel Code: Section IX, "Welding and Brazing Qualifications."

1. Comply with provisions in ASME B31 Series, "Code for Pressure Piping."
2. Certify that each welder has passed AWS qualification tests for welding processes involved and that certification is current.

C. Electrical Characteristics for HVAC Equipment: Equipment of higher electrical characteristics may be furnished provided such proposed equipment is approved in writing and connecting electrical services, circuit breakers, and conduit sizes are appropriately modified. If minimum energy ratings or efficiencies are specified, equipment shall comply with requirements.

#### 1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver pipes and tubes with factory-applied end caps. Maintain end caps through shipping, storage, and handling to prevent pipe end damage and to prevent entrance of dirt, debris, and moisture.

B. Store plastic pipes protected from direct sunlight. Support to prevent sagging and bending.

#### 1.7 COORDINATION

A. Arrange for pipe spaces, chases, slots, and openings in building structure during progress of construction, to allow for HVAC installations.

- B. Coordinate installation of required supporting devices and set sleeves in poured-in-place concrete and other structural components as they are constructed.
- C. Coordinate requirements for access panels and doors for HVAC items requiring access that are concealed behind finished surfaces.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

- A. In other Part 2 articles where subparagraph titles below introduce lists, the following requirements apply for product selection:
  - 1. Manufacturers: Subject to compliance with requirements, provide products by the manufacturers specified.

### 2.2 PIPE, TUBE, AND FITTINGS

- A. Refer to individual Division 23 piping Sections for pipe, tube, and fitting materials and joining methods.
- B. Pipe Threads: ASME B1.20.1 for factory-threaded pipe and pipe fittings.

### 2.3 JOINING MATERIALS

- A. Refer to individual Division 23 piping Sections for special joining materials not listed below.
- B. Solder Filler Metals: ASTM B 32, lead-free alloys. Include water-flushable flux according to ASTM B 813.
- C. Brazing Filler Metals: AWS A5.8, BCuP Series, copper-phosphorus alloys for general-duty brazing, unless otherwise indicated; and AWS A5.8, BAg1, silver alloy for refrigerant piping, unless otherwise indicated.

### 2.4 MECHANICAL SLEEVE SEALS

- A. Description: Modular sealing element unit, designed for field assembly, to fill annular space between pipe and sleeve.
- B. Sealing Elements: EPDM interlocking links shaped to fit surface of pipe. Include type and number required for pipe material and size of pipe.
- C. Pressure Plates: Carbon steel or Stainless steel. Include two for each sealing element.

- D. Connecting Bolts and Nuts: Carbon steel with corrosion-resistant coating of length required to secure pressure plates to sealing elements. Include one for each sealing element.

## 2.5 SLEEVES

- A. Steel Pipe: ASTM A 53, Type E, Grade B, Schedule 40, galvanized, plain ends.
- B. Cast Iron: Cast or fabricated "wall pipe" equivalent to ductile-iron pressure pipe, with plain ends and integral water-stop, unless otherwise indicated.
- C. PVC Pipe: ASTM D 1785, Schedule 40.

## 2.6 ESCUTCHEONS

- A. Description: Manufactured wall and ceiling escutcheons and floor plates, with an ID to closely fit around pipe, tube, and insulation of insulated piping and an OD that completely covers opening.
- B. One-Piece, Deep-Pattern Type: Deep-drawn, box-shaped brass with polished chrome-plated finish.
- C. One-Piece, Cast-Brass Type: With set screw.
  - 1. Finish: Polished chrome-plated.
- D. Split-Casting, Cast-Brass Type: With concealed hinge and set screw.
  - 1. Finish: Polished chrome-plated.

## 2.7 ACCESS DOORS

- A. Size for proper access, adjusting and maintenance:
  - 1. 12 in. x 12 in. minimum for valves, volume dampers, etc.
  - 2. 24 in. x 24 in. for man access to concealed fans, coils, fire/smoke dampers, etc., unless indicated otherwise.
- B. Provide as required by work in Division 21, 22, 23, and 25.
- C. Style, color, and finish to match adjacent construction and as approved by Architect.

## PART 3 - EXECUTION

### 3.1 PIPING SYSTEMS - COMMON REQUIREMENTS

- A. Install piping according to the following requirements and Division 23 Sections specifying piping systems.
- B. Drawing plans, schematics, and diagrams indicate general location and arrangement of piping systems. Indicated locations and arrangements were used to size pipe and calculate friction loss, expansion, pump sizing, and other design considerations. Install piping as indicated unless deviations to layout are approved on Coordination Drawings.
- C. Install piping in concealed locations, unless otherwise indicated and except in equipment rooms and service areas.
- D. Install piping indicated to be exposed and piping in equipment rooms and service areas at right angles or parallel to building walls. Diagonal runs are prohibited unless specifically indicated otherwise.
- E. Install piping above accessible ceilings to allow sufficient space for ceiling panel removal.
- F. Install piping to permit valve servicing.
- G. Install piping at indicated slopes.
- H. Install piping free of sags and bends.
- I. Install fittings for changes in direction and branch connections.
- J. Install piping to allow application of insulation.
- K. Select system components with pressure rating equal to or greater than system operating pressure.
- L. Install escutcheons for penetrations of walls, ceilings, and floors.
- M. Sleeves are not required for core-drilled holes.
- N. Install sleeves for pipes passing through concrete and masonry walls and concrete floor and roof slabs.
  - 1. Cut sleeves to length for mounting flush with both surfaces.
    - a. Exception: Extend sleeves installed in floors of mechanical equipment areas or other wet areas 2 inches above finished floor level.
  - 2. Install sleeves in new walls and slabs as new walls and slabs are constructed.
  - 3. Install sleeves that are large enough to provide 1/4-inch annular clear space between sleeve and pipe or pipe insulation. Use the following sleeve materials:

- a. PVC or Steel Pipe Sleeves: For pipes smaller than NPS 6.
  - 1) Seal space outside of sleeve fittings with grout.
- 4. Except for underground wall penetrations, seal annular space between sleeve and pipe or pipe insulation, using joint sealants appropriate for size, depth, and location of joint.
- O. Aboveground, Exterior-Wall Pipe Penetrations: Seal penetrations using sleeves and mechanical sleeve seals. Select sleeve size to allow for 1-inch annular clear space between pipe and sleeve for installing mechanical sleeve seals.
  - 1. Install steel pipe for sleeves smaller than 6 inches in diameter.
  - 2. Mechanical Sleeve Seal Installation: Select type and number of sealing elements required for pipe material and size. Position pipe in center of sleeve. Assemble mechanical sleeve seals and install in annular space between pipe and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make watertight seal.
- P. Fire-Barrier Penetrations: Maintain indicated fire rating of walls, partitions, ceilings, and floors at pipe penetrations. Seal pipe penetrations with firestop materials. Refer to Division 07 Section "Penetration Firestopping" for materials.
- Q. Verify final equipment locations for roughing-in.
- R. Refer to equipment specifications in other Sections of these Specifications for roughing-in requirements.

### 3.2 PIPING JOINT CONSTRUCTION

- A. Join pipe and fittings according to the following requirements and Division 23 Sections specifying piping systems.
- B. Ream ends of pipes and tubes and remove burrs. Bevel plain ends of steel pipe.
- C. Remove scale, slag, dirt, and debris from inside and outside of pipe and fittings before assembly.
- D. Soldered Joints: Apply ASTM B 813, water-flushable flux, unless otherwise indicated, to tube end. Construct joints according to ASTM B 828 or CDA's "Copper Tube Handbook," using lead-free solder alloy complying with ASTM B 32.
- E. Brazed Joints: Construct joints according to AWS's "Brazing Handbook," "Pipe and Tube" Chapter, using copper-phosphorus brazing filler metal complying with AWS A5.8.



### 3.3 PIPING CONNECTIONS

- A. Make connections according to the following, unless otherwise indicated:
  - 1. Install unions, in piping NPS 2-1/2 and smaller, adjacent to each valve and at final connection to each piece of equipment.

### 3.4 EQUIPMENT INSTALLATION - COMMON REQUIREMENTS

- A. Install equipment to allow maximum possible headroom unless specific mounting heights are not indicated.
- B. Install equipment level and plumb, parallel and perpendicular to other building systems and components in exposed interior spaces, unless otherwise indicated.
- C. Install HVAC equipment to facilitate service, maintenance, and repair or replacement of components. Connect equipment for ease of disconnecting, with minimum interference to other installations. Extend grease fittings to accessible locations.
- D. Install equipment to allow right of way for piping installed at required slope.

### 3.5 ACCESS TO VALVE AND EQUIPMENT

- A. Access shall be possible where valves, expansion joints, fire dampers, motors, filters, control devices, and any other equipment requiring access for servicing, repairs, or maintenance are located in walls, soffits, chases, and/or above ceilings.
- B. Definition of Accessible:
  - 1. Valves and dampers may be operated.
  - 2. Control devices may be adjusted.
  - 3. Fire dampers may be reset.
  - 4. Equipment access panels may be opened.
  - 5. Normal maintenance work such as replacement of filters, lubrication of bearings, etc., may be performed readily within arm's reach of access opening.
  - 6. It shall not be necessary to crawl through furred ceiling space to perform such operations.
- C. Install piping, equipment and accessories to permit easy access for maintenance.
- D. Group concealed valves, expansion joints, controls, dampers and equipment requiring service access, so as to be freely accessible through access doors and to minimize the number of access doors required.
- E. Relocate piping equipment and accessories as required, at no extra cost to afford proper maintenance access.

- F. Coordinate location of access panels with applicable trades installing walls or ceiling.
  - 1. Coordinate panel locations with lights and other architectural features.
  - 2. Submit proposed panel locations to Architect for review.
- G. Arrange for location and marking of removable tiles in splined ceilings where access panels are not installed.

### 3.6 PAINTING

- A. Damage and Touchup: Repair marred and damaged factory-painted finishes with materials and procedures to match original factory finish.

### 3.7 ERECTION OF METAL SUPPORTS AND ANCHORAGES

- A. Cut, fit, and place miscellaneous metal supports accurately in location, alignment, and elevation to support and anchor HVAC materials and equipment.
- B. Field Welding: Comply with AWS D1.1.

### 3.8 ERECTION OF WOOD SUPPORTS AND ANCHORAGES

- A. Cut, fit, and place wood grounds, nailers, blocking, and anchorages to support, and anchor HVAC materials and equipment.
- B. Select fastener sizes that will not penetrate members if opposite side will be exposed to view or will receive finish materials. Tighten connections between members. Install fasteners without splitting wood members.
- C. Attach to substrates as required to support applied loads.

END OF SECTION

SECTION 230513  
COMMON MOTOR REQUIREMENTS FOR HVAC EQUIPMENT

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 general requirements for single-phase and polyphase, general-purpose, horizontal, small and medium, squirrel-cage induction motors for use on ac power systems up to 600 V and installed at equipment manufacturer's factory or shipped separately by equipment manufacturer for field installation.

1.3 COORDINATION

- A. Coordinate features of motors, installed units, and accessory devices to be compatible with the following:
  - 1. Motor controllers.
  - 2. Torque, speed, and horsepower requirements of the load.
  - 3. Ratings and characteristics of supply circuit and required control sequence.
  - 4. Ambient and environmental conditions of installation location.

PART 2 - PRODUCTS

2.1 GENERAL MOTOR REQUIREMENTS

- A. Comply with requirements in this Section except when stricter requirements are specified in HVAC equipment schedules or Sections.
- B. Comply with NEMA MG 1 unless otherwise indicated.
- C. Comply with IEEE 841 for severe-duty motors.

2.2 MOTOR CHARACTERISTICS

- A. Duty: Continuous duty at ambient temperature of 40 deg C and at altitude of 3300 feet above sea level.

- B. Capacity and Torque Characteristics: Sufficient to start, accelerate, and operate connected loads at designated speeds, at installed altitude and environment, with indicated operating sequence, and without exceeding nameplate ratings or considering service factor.

## 2.3 POLYPHASE MOTORS

- A. Description: NEMA MG 1, Design B, medium induction motor.
- B. Efficiency: Energy efficient, as defined in NEMA MG 1.
- C. Service Factor: 1.15.
- D. Multispeed Motors: Variable torque.
  - 1. For motors with 2:1 speed ratio, consequent pole, single winding.
  - 2. For motors with other than 2:1 speed ratio, separate winding for each speed.
- E. Multispeed Motors: Separate winding for each speed.
- F. Rotor: Random-wound, squirrel cage.
- G. Bearings: Re-greasable, shielded, antifriction ball bearings suitable for radial and thrust loading.
- H. Temperature Rise: Match insulation rating.
- A. Insulation: Class F.
- B. Code Letter Designation:
  - 1. Motors 15 HP and Larger: NEMA starting Code F or Code G.
  - 2. Motors Smaller than 15 HP: Manufacturer's standard starting characteristic.
- C. Enclosure Material: Cast iron for motor frame sizes 324T and larger; rolled steel for motor frame sizes smaller than 324T.

## 2.4 POLYPHASE MOTORS WITH ADDITIONAL REQUIREMENTS

- A. Motors Used with Reduced-Voltage and Multispeed Controllers: Match wiring connection requirements for controller with required motor leads. Provide terminals in motor terminal box, suited to control method.
- B. Motors Used with Variable Frequency Controllers: Ratings, characteristics, and features coordinated with and approved by controller manufacturer.
  - 1. Windings: Copper magnet wire with moisture-resistant insulation varnish, designed and tested to resist transient spikes, high frequencies, and short time rise pulses produced by pulse-width modulated inverters.

2. Energy- and Premium-Efficient Motors: Class B temperature rise; Class F insulation.
  3. Inverter-Duty Motors: Class F temperature rise; Class H insulation.
  4. Thermal Protection: Comply with NEMA MG 1 requirements for thermally protected motors.
- C. Severe-Duty Motors: Comply with IEEE 841, with 1.15 minimum service factor.

## 2.5 SINGLE-PHASE MOTORS

- A. Motors larger than 1/20 hp shall be DC electronic commutation type (ECM) specifically designed for fan applications. Prewired to the specific voltage and phase. Internal motor shall convert AC supplied to the fan to DC power to operate the motor. Motor shall be controllable down to 20% of full speed. Speed shall be controlled by either potentiometer dial mounted on the motor or by a 0-10 VDC signal. Motor shall be a minimum of 85% efficient at all speeds.
- B. Bearings: Permanently lubricated, heavy duty ball bearings suitable for radial and thrust loading.
- C. Motors 1/20 HP and Smaller: Shaded-pole type.
- D. Thermal Protection: Internal protection to automatically open power supply circuit to motor when winding temperature exceeds a safe value calibrated to temperature rating of motor insulation. Thermal-protection device shall automatically reset when motor temperature returns to normal range.

## PART 3 - EXECUTION (Not Applicable)

END OF SECTION



SECTION 230529  
HANGERS AND SUPPORTS FOR HVAC PIPING AND EQUIPMENT

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Metal pipe hangers and supports.
2. Trapeze pipe hangers.
3. Thermal-hanger shield inserts.
4. Fastener systems.
5. Equipment supports.

1.2 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Design trapeze pipe hangers and equipment supports, including comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated.
- B. Structural Performance: Hangers and supports for HVAC piping and equipment shall withstand the effects of gravity loads and stresses within limits and under conditions indicated according to ASCE/SEI 7-16.
1. Design supports for multiple pipes capable of supporting combined weight of supported systems, system contents, and test water.
  2. Design equipment supports capable of supporting combined operating weight of supported equipment and connected systems and components.
  3. Design seismic-restraint hangers and supports for piping and equipment and obtain approval from authorities having jurisdiction.

1.3 SUBMITTALS

- A. Product Data: For each type of product indicated.

1.4 QUALITY ASSURANCE

- A. Structural Steel Welding Qualifications: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."
- B. Pipe Welding Qualifications: Qualify procedures and operators according to ASME Boiler and Pressure Vessel Code.

## PART 2 - PRODUCTS

### 2.1 METAL PIPE HANGERS AND SUPPORTS

#### A. Carbon-Steel Pipe Hangers and Supports:

1. Description: MSS SP-58, Types 1 through 58, factory-fabricated components.
2. Galvanized Metallic Coatings: Pre-galvanized or hot dipped.
3. Nonmetallic Coatings: Plastic coating, jacket, or liner.
4. Padded Hangers: Hanger with fiberglass or other pipe insulation pad or cushion to support bearing surface of piping.
5. Hanger Rods: Continuous-thread rod, nuts, and washer made of carbon steel.

#### B. Stainless-Steel Pipe Hangers and Supports:

1. Description: MSS SP-58, Types 1 through 58, factory-fabricated components.
2. Padded Hangers: Hanger with fiberglass or other pipe insulation pad or cushion to support bearing surface of piping.
3. Hanger Rods: Continuous-thread rod, nuts, and washer made of stainless steel.

### 2.2 TRAPEZE PIPE HANGERS

- #### A. Description: MSS SP-69, Type 59, shop- or field-fabricated pipe-support assembly made from structural carbon-steel shapes with MSS SP-58 carbon-steel hanger rods, nuts, saddles, and U-bolts.

### 2.3 THERMAL-HANGER SHIELD INSERTS

- #### A. Insulation-Insert Material for Cold Piping: ASTM C 552, Type II cellular glass with 100-psig (688-kPa) or ASTM C 591, Type VI, Grade 1 polyisocyanurate with 125-psig (862-kPa) minimum compressive strength and vapor barrier.
- #### B. Insulation-Insert Material for Hot Piping: ASTM C 552, Type II cellular glass with 100-psig (688-kPa) or ASTM C 591, Type VI, Grade 1 polyisocyanurate with 125-psig (862-kPa) minimum compressive strength.
- #### C. For Trapeze or Clamped Systems: Insert and shield shall cover entire circumference of pipe.
- #### D. For Clevis or Band Hangers: Insert and shield shall cover lower 180 degrees of pipe.
- #### E. Insert Length: Extend 2 inches (50 mm) beyond sheet metal shield for piping operating below ambient air temperature.



## 2.4 FASTENER SYSTEMS

- A. Mechanical-Expansion Anchors: Insert-wedge-type, zinc-coated steel anchors, for use in hardened portland cement concrete; with pull-out, tension, and shear capacities appropriate for supported loads and building materials where used.

## 2.5 EQUIPMENT SUPPORTS

- A. Description: Welded, shop- or field-fabricated equipment support made from structural carbon-steel shapes.

## 2.6 MISCELLANEOUS MATERIALS

- A. Structural Steel: ASTM A 36/A 36M, carbon-steel plates, shapes, and bars; black and galvanized.
- B. Grout: ASTM C 1107, factory-mixed and -packaged, dry, hydraulic-cement, non-shrink and nonmetallic grout; suitable for interior and exterior applications.
  - 1. Properties: Non-staining, noncorrosive, and nongaseous.
  - 2. Design Mix: 5000-psi (34.5-MPa), 28-day compressive strength.

# PART 3 - EXECUTION

## 3.1 HANGER AND SUPPORT INSTALLATION

- A. Metal Pipe-Hanger Installation: Comply with MSS SP-69 and MSS SP-89. Install hangers, supports, clamps, and attachments as required to properly support piping from the building structure.
- B. Metal Trapeze Pipe-Hanger Installation: Comply with MSS SP-69 and MSS SP-89. Arrange for grouping of parallel runs of horizontal piping, and support together on field-fabricated trapeze pipe hangers.
  - 1. Pipes of Various Sizes: Support together and space trapezes for smallest pipe size or install intermediate supports for smaller diameter pipes as specified for individual pipe hangers.
  - 2. Field fabricate from ASTM A 36/A 36M, carbon-steel shapes selected for loads being supported. Weld steel according to AWS D1.1/D1.1M.
- C. Thermal-Hanger Shield Installation: Install in pipe hanger or shield for insulated piping.
- D. Fastener System Installation:
  - 1. Install mechanical-expansion anchors in concrete after concrete is placed and completely cured. Install fasteners according to manufacturer's written instructions.

- E. Install hangers and supports complete with necessary attachments, inserts, bolts, rods, nuts, washers, and other accessories.
- F. Equipment Support Installation: Fabricate from welded-structural-steel shapes.
- G. Install hangers and supports to allow controlled thermal and seismic movement of piping systems, to permit freedom of movement between pipe anchors, and to facilitate action of expansion joints, expansion loops, expansion bends, and similar units.
- H. Install lateral bracing with pipe hangers and supports to prevent swaying.
- I. Install building attachments within concrete slabs or attach to structural steel. Install additional attachments at concentrated loads, including valves, flanges, and strainers, NPS 2-1/2 (DN 65) and larger and at changes in direction of piping. Install concrete inserts before concrete is placed; fasten inserts to forms and install reinforcing bars through openings at top of inserts.
- J. Load Distribution: Install hangers and supports so that piping live and dead loads and stresses from movement will not be transmitted to connected equipment.
- K. Pipe Slopes: Install hangers and supports to provide indicated pipe slopes and to not exceed maximum pipe deflections allowed by ASME B31.9 for building services piping.
- L. Insulated Piping:
  - 1. Attach clamps and spacers to piping.
    - a. Piping Operating above Ambient Air Temperature: Clamp may project through insulation.
    - b. Piping Operating below Ambient Air Temperature: Use thermal-hanger shield insert with clamp sized to match OD of insert.
    - c. Do not exceed pipe stress limits allowed by ASME B31.9 for building services piping.
  - 2. Install MSS SP-58, Type 39, protection saddles if insulation without vapor barrier is indicated. Fill interior voids with insulation that matches adjoining insulation.
  - 3. Install MSS SP-58, Type 40, protective shields on cold piping with vapor barrier. Shields shall span an arc of 180 degrees.
    - a. Option: Thermal-hanger shield inserts may be used. Include steel weight-distribution plate for pipe NPS 4 (DN 100) and larger if pipe is installed on rollers.
  - 4. Shield Dimensions for Pipe: Not less than the following:
    - a. NPS 1/4 to NPS 3-1/2 (DN 8 to DN 90): 12 inches (305 mm) long and 0.048 inch (1.22 mm) thick.
    - b. NPS 4 (DN 100): 12 inches (305 mm) long and 0.06 inch (1.52 mm) thick.

5. Thermal-Hanger Shields: Install with insulation same thickness as piping insulation.

### 3.2 EQUIPMENT SUPPORTS

- A. Fabricate structural-steel stands to suspend equipment from structure overhead or to support equipment above floor.
- B. Grouting: Place grout under supports for equipment and make bearing surface smooth.
- C. Provide lateral bracing, to prevent swaying, for equipment supports.

### 3.3 METAL FABRICATIONS

- A. Cut, drill, and fit miscellaneous metal fabrications for trapeze pipe hangers and equipment supports.
- B. Fit exposed connections together to form hairline joints. Field weld connections that cannot be shop welded because of shipping size limitations.
- C. Field Welding: Comply with AWS D1.1/D1.1M procedures for shielded, metal arc welding; appearance and quality of welds; and methods used in correcting welding work; and with the following:
  1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
  2. Obtain fusion without undercut or overlap.
  3. Remove welding flux immediately.
  4. Finish welds at exposed connections so no roughness shows after finishing and so contours of welded surfaces match adjacent contours.

### 3.4 ADJUSTING

- A. Hanger Adjustments: Adjust hangers to distribute loads equally on attachments and to achieve indicated slope of pipe.
- B. Trim excess length of continuous-thread hanger and support rods to 1-1/2 inches (40 mm).

### 3.5 PAINTING

- A. Touchup: Clean field welds and abraded areas of shop paint. Paint exposed areas immediately after erecting hangers and supports. Use same materials as used for shop painting. Comply with SSPC-PA 1 requirements for touching up field-painted surfaces.
  1. Apply paint by brush or spray to provide a minimum dry film thickness of 2.0 mils.

- B. Galvanized Surfaces: Clean welds, bolted connections, and abraded areas and apply galvanizing-repair paint to comply with ASTM A 780.

### 3.6 HANGER AND SUPPORT SCHEDULE

- A. Specific hanger and support requirements are in Sections specifying piping systems and equipment.
- B. Comply with MSS SP-69 for pipe-hanger selections and applications that are not specified in piping system Sections.
- C. Use hangers and supports with galvanized metallic coatings for piping and equipment that will not have field-applied finish.
- D. Use nonmetallic coatings on attachments for electrolytic protection where attachments are in direct contact with copper tubing.
- E. Use carbon-steel pipe hangers and supports and metal trapeze pipe hangers and attachments for general service applications.
- F. Use stainless-steel pipe hangers and stainless-steel attachments for hostile environment applications.
- G. Use padded hangers for piping that is subject to scratching.
- H. Use thermal-hanger shield inserts for insulated piping and tubing.
- I. Horizontal-Piping Hangers and Supports: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
  - 1. Adjustable, Steel Clevis Hangers (MSS Type 1): For suspension of noninsulated or insulated, stationary pipes NPS 1/2 to NPS 30 (DN 15 to DN 750).
  - 2. Carbon- or Alloy-Steel, Double-Bolt Pipe Clamps (MSS Type 3): For suspension of pipes NPS 3/4 to NPS 36 (DN 20 to DN 900), requiring clamp flexibility and up to 4 inches (100 mm) of insulation.
  - 3. U-Bolts (MSS Type 24): For support of heavy pipes NPS 1/2 to NPS 30 (DN 15 to DN 750).
  - 4. Pipe Stanchion Saddles (MSS Type 37): For support of pipes NPS 4 to NPS 36 (DN 100 to DN 900), with steel-pipe base stanchion support and cast-iron floor flange or carbon-steel plate, and with U-bolt to retain pipe.
  - 5. Single-Pipe Rolls (MSS Type 41): For suspension of pipes NPS 1 to NPS 30 (DN 25 to DN 750), from two rods if longitudinal movement caused by expansion and contraction might occur.
- J. Vertical-Piping Clamps: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
  - 1. Extension Pipe or Riser Clamps (MSS Type 8): For support of pipe risers NPS 3/4 to NPS 24 (DN 24 to DN 600).

- K. Hanger-Rod Attachments: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
1. Steel Turnbuckles (MSS Type 13): For adjustment up to 6 inches (150 mm) for heavy loads.
  2. Steel Clevises (MSS Type 14): For 120 to 450 deg F (49 to 232 deg C) piping installations.
- L. Building Attachments: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
1. Steel or Malleable Concrete Inserts (MSS Type 18): For upper attachment to suspend pipe hangers from concrete ceiling.
  2. Side-Beam or Channel Clamps (MSS Type 20): For attaching to bottom flange of beams, channels, or angles.
  3. Center-Beam Clamps (MSS Type 21): For attaching to center of bottom flange of beams.
  4. C-Clamps (MSS Type 23): For structural shapes.
  5. Side-Beam Brackets (MSS Type 34): For sides of steel or wooden beams.
- M. Saddles and Shields: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
1. Steel-Pipe-Covering Protection Saddles (MSS Type 39): To fill interior voids with insulation that matches adjoining insulation.
  2. Protection Shields (MSS Type 40): Of length recommended in writing by manufacturer to prevent crushing insulation.
  3. Thermal-Hanger Shield Inserts: For supporting insulated pipe.
- N. Use mechanical-expansion anchors instead of building attachments where required in concrete construction.

END OF SECTION



SECTION 230548  
VIBRATION AND SEISMIC CONTROLS FOR HVAC PIPING AND EQUIPMENT

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes the following
  - 1. Elastomeric hangers.
  - 2. Restraining braces and cables.

1.2 PERFORMANCE REQUIREMENTS

- A. As Indicated on the Construction Drawings:

1.3 SUBMITTALS

- A. Product Data: For each product indicated.
- B. Delegated-Design Submittal: For vibration isolation and seismic-restraint calculations and details indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1.4 QUALITY ASSURANCE

- A. Comply with seismic-restraint requirements in the CBC unless requirements in this Section are more stringent.
- B. Welding: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."

PART 2 - PRODUCTS

2.1 SEISMIC-RESTRAINT DEVICES

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. Amber/Booth Company, Inc.
  - 2. California Dynamics Corporation.
  - 3. Cooper B-Line, Inc.; a division of Cooper Industries.
  - 4. Mason Industries.

5. TOLCO Incorporated; a brand of NIBCO INC.
  6. Unistrut; Tyco International, Ltd.
- B. General Requirements for Restraint Components: Rated strengths, features, and applications shall be as defined in reports by an agency acceptable to authorities having jurisdiction.
1. Structural Safety Factor: Allowable strength in tension, shear, and pullout force of components shall be at least four times the maximum seismic forces to which they will be subjected.
- C. Channel Support System: MFMA-3, shop- or field-fabricated support assembly made of slotted steel channels with accessories for attachment to braced component at one end and to building structure at the other end and other matching components and with corrosion-resistant coating; and rated in tension, compression, and torsion forces.
- D. Restraint Cables: ASTM A 603 galvanized-steel cables with end connections made of steel assemblies with thimbles, brackets, swivel, and bolts designed for restraining cable service; and with a minimum of two clamping bolts for cable engagement.
- E. Hanger Rod Stiffener: Reinforcing steel angle clamped to hanger rod.
- F. Bushings for Floor-Mounted Equipment Anchor Bolts: Neoprene bushings designed for rigid equipment mountings, and matched to type and size of anchor bolts and studs.
- G. Resilient Isolation Washers and Bushings: One-piece, molded, oil- and water-resistant neoprene, with a flat washer face.
- H. Mechanical Anchor Bolts: Drilled-in and stud-wedge or female-wedge type in zinc-coated steel for interior applications and stainless steel for exterior applications. Select anchor bolts with strength required for anchor and as tested according to ASTM E 488. Minimum length of eight times diameter.

## PART 3 - EXECUTION

### 3.1 APPLICATIONS

- A. Multiple Pipe Supports: Secure pipes to trapeze member with clamps approved for application by an agency acceptable to authorities having jurisdiction.
- B. Hanger Rod Stiffeners: Install hanger rod stiffeners where indicated or scheduled on Drawings to receive them and where required to prevent buckling of hanger rods due to seismic forces.
- C. Strength of Support and Seismic-Restraint Assemblies: Where not indicated, select sizes of components so strength will be adequate to carry present and future static and seismic loads within specified loading limits.



### 3.2 VIBRATION-CONTROL AND SEISMIC-RESTRAINT DEVICE INSTALLATION

A. Not Used

B. Equipment Restraints:

1. Install resilient bolt isolation washers on equipment anchor bolts where clearance between anchor and adjacent surface exceeds 0.125 inch (3.2 mm).
2. Install seismic-restraint devices using methods approved by an agency acceptable to authorities having jurisdiction providing required submittals for component.

C. Piping Restraints:

1. Comply with requirements in MSS SP-127.
2. Space lateral supports a maximum of 40 feet (12 m) o.c., and longitudinal supports a maximum of 80 feet (24 m) o.c.
3. Brace a change of direction longer than 12 feet (3.7 m).

D. Install cables so they do not bend across edges of adjacent equipment or building structure.

E. Install seismic-restraint devices using methods approved by an agency acceptable to authorities having jurisdiction providing required submittals for component.

F. Install bushing assemblies for anchor bolts for floor-mounted equipment, arranged to provide resilient media between anchor bolt and mounting hole in concrete base.

G. Attachment to Structure: If specific attachment is not indicated, anchor bracing to structure at flanges of beams, at upper truss chords of bar joists, or at concrete members.

H. Drilled-in Anchors:

1. Identify position of reinforcing steel and other embedded items prior to drilling holes for anchors. Do not damage existing reinforcing or embedded items during coring or drilling. Notify the structural engineer if reinforcing steel or other embedded items are encountered during drilling. Locate and avoid prestressed tendons, electrical and telecommunications conduit, and gas lines.
2. Do not drill holes in concrete or masonry until concrete, mortar, or grout has achieved full design strength.
3. Wedge Anchors: Protect threads from damage during anchor installation. Heavy-duty sleeve anchors shall be installed with sleeve fully engaged in the structural element to which anchor is to be fastened.
4. Set anchors to manufacturer's recommended torque, using a torque wrench.
5. Install zinc-coated steel anchors for interior and stainless-steel anchors for exterior applications.

### 3.3 ACCOMMODATION OF DIFFERENTIAL SEISMIC MOTION

- A. Install flexible connections in piping where they cross seismic joints, where adjacent sections or branches are supported by different structural elements, and where the connections terminate with connection to equipment that is anchored to a different structural element from the one supporting the connections as they approach equipment. Comply with requirements in Division 23 Section "Hydronic Piping" for piping flexible connections.

### 3.4 FIELD QUALITY CONTROL

- A. Perform tests and inspections.
- B. Tests and Inspections:
  - 1. Test each type and size of installed anchors and fasteners as indicated on the drawings.
  - 2. Test to 90 percent of rated proof load of device.
  - 3. Measure isolator restraint clearance.
  - 4. Measure isolator deflection.
  - 5. If a device fails test, modify all installations of same type and retest until satisfactory results are achieved.
- C. Remove and replace malfunctioning units and retest as specified above.
- D. Prepare test and inspection reports.

### 3.5 ADJUSTING

- A. Adjust isolators after piping system is at operating weight.
- B. Adjust limit stops on restrained spring isolators to mount equipment at normal operating height. After equipment installation is complete, adjust limit stops so they are out of contact during normal operation.
- C. Adjust active height of spring isolators.
- D. Adjust restraints to permit free movement of equipment within normal mode of operation.

END OF SECTION

SECTION 230553  
IDENTIFICATION FOR HVAC PIPING AND EQUIPMENT

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
1. Equipment labels.
  2. Warning signs and labels.
  3. Pipe labels.

1.2 SUBMITTAL

- A. Product Data: For each type of product indicated.

PART 2 - PRODUCTS

2.1 EQUIPMENT LABELS

- A. Metal Labels for Equipment:
1. Material and Thickness: Brass, 0.032-inch (0.8-mm) or anodized aluminum, 0.032-inch (0.8-mm) minimum thickness, and having predrilled or stamped holes for attachment hardware.
  2. Minimum Label Size: Length and width vary for required label content, but not less than 2-1/2 by 3/4 inch (64 by 19 mm).
  3. Minimum Letter Size: 1/2 inch (13 mm). Include secondary lettering two-thirds to three-fourths the size of principal lettering.
  4. Fasteners: Stainless-steel rivets or self-tapping screws.
- B. Plastic Labels for Equipment:
1. Material and Thickness: Multilayer, multicolor, plastic labels for mechanical engraving, 1/8 inch (3.2 mm) thick, and having predrilled holes for attachment hardware.
  2. Letter Color: Black.
  3. Background Color: White.
  4. Maximum Temperature: Able to withstand temperatures up to 160 deg F (71 deg C).
  5. Minimum Label Size: Length and width vary for required label content, but not less than 2-1/2 by 3/4 inch (64 by 19 mm).
  6. Minimum Letter Size: 1/2 inch (13 mm). Include secondary lettering two-thirds to three-fourths the size of principal lettering.
  7. Fasteners: Stainless-steel rivets or self-tapping screws.

- C. Label Content: Include equipment's Drawing designation or unique equipment number, and Room number of primary space served (where thermostat is located). Coordinate with District to match final installed room numbering.
- D. Equipment Label Schedule: For each item of equipment to be labeled, on 8-1/2-by-11-inch (A4) bond paper. Tabulate equipment identification number and identify Drawing numbers where equipment is indicated (plans, details, and schedules), plus the Specification Section number and title where equipment is specified. Equipment schedule shall be included in operation and maintenance data.

## 2.2 WARNING SIGNS AND LABELS

- A. Material and Thickness: Multilayer, multicolor, plastic labels for mechanical engraving, 1/8 inch (3.2 mm) thick, and having predrilled holes for attachment hardware.
- B. Letter Color: Red.
- C. Background Color: White.
- D. Maximum Temperature: Able to withstand temperatures up to 160 deg F (71 deg C).
- E. Minimum Label Size: Length and width vary for required label content, but not less than 2-1/2 by 3/4 inch (64 by 19 mm).
- F. Minimum Letter Size: 1/4 inch (6.4 mm) for name of units if viewing distance is less than 24 inches (600 mm), 1/2 inch (13 mm) for viewing distances up to 72 inches (1830 mm), and proportionately larger lettering for greater viewing distances. Include secondary lettering two-thirds to three-fourths the size of principal lettering.
- G. Fasteners: Stainless-steel rivets or self-tapping screws.
- H. Adhesive: Contact-type permanent adhesive, compatible with label and with substrate.
- I. Label Content: Include caution and warning information, plus emergency notification instructions.

## 2.3 PIPE LABELS

- A. General Requirements for Manufactured Pipe Labels: Preprinted, color-coded, with lettering indicating service, and showing flow direction.
- B. Pretensioned Pipe Labels: Pre-coiled, semirigid plastic formed to cover full circumference of pipe and to attach to pipe without fasteners or adhesive.
- C. Pipe Label Contents: Include identification of piping service using same designations or abbreviations as used on Drawings, and pipe size.
  - 1. Lettering Size: At least 1-1/2 inches (38 mm) high.

## PART 3 - EXECUTION

### 3.1 PREPARATION

- A. Clean piping and equipment surfaces of substances that could impair bond of identification devices, including dirt, oil, grease, release agents, and incompatible primers, paints, and encapsulants.

### 3.2 EQUIPMENT LABEL INSTALLATION

- A. Install or permanently fasten labels on each major item of mechanical equipment.
- B. Locate equipment labels where accessible and visible.

### 3.3 PIPE LABEL INSTALLATION

- A. Piping Color-Coding: Painting of piping is specified in Division 09 Section "Interior Painting."
- B. Locate pipe labels where piping is exposed or above accessible ceilings in finished spaces; machine rooms; accessible maintenance spaces such as shafts, tunnels, and plenums; and exterior exposed locations as follows:
  - 1. Near each valve and control device.
  - 2. Near each branch connection, excluding short takeoffs for fixtures and terminal units. Where flow pattern is not obvious, mark each pipe at branch.
  - 3. Near penetrations through walls, floors, ceilings, and inaccessible enclosures.
  - 4. At access doors, manholes, and similar access points that permit view of concealed piping.
  - 5. Near major equipment items and other points of origination and termination.
  - 6. Spaced at maximum intervals of 20 feet along each run. Reduce intervals to 10 feet in areas of congested piping and equipment.
- C. Pipe Label Color Schedule:
  - 1. Refrigerant Piping:
    - a. Background Color: Yellow.
    - b. Letter Color: Black.

END OF SECTION



SECTION 230593  
TESTING, ADJUSTING, AND BALANCING FOR HVAC

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
  - 1. Balancing Air Systems:
    - a. Variable-air-volume air systems.
    - b. Constant-volume systems.
  - 2. Building Flush-Out Requirements

1.2 DEFINITIONS

- A. AABC: Associated Air Balance Council.
- B. NEBB: National Environmental Balancing Bureau.
- C. TAB: Testing, adjusting, and balancing.
- D. TABB: Testing, Adjusting, and Balancing Bureau.
- E. TAB Specialist: An entity engaged to perform TAB Work.

1.3 SUBMITTALS

- A. Certified TAB reports.

1.4 QUALITY ASSURANCE

- A. TAB Contractor Qualifications: Engage a TAB entity certified by AABC NEBB or TABB with a minimum of 15 years of successful testing, adjusting, and balancing experience.
  - 1. TAB Field Supervisor: Employee of the TAB contractor and certified by AABC NEBB or TABB.
  - 2. TAB Technician: Employee of the TAB contractor and who is certified by AABC NEBB or TABB as a TAB technician.
- B. Certify TAB field data reports and perform the following:
  - 1. Review field data reports to validate accuracy of data and to prepare certified TAB reports.

2. Certify that the TAB team complied with the approved TAB plan and the procedures specified and referenced in this Specification.
- C. TAB Report Forms: Use standard TAB contractor's forms approved by Architect.
- D. Instrumentation Type, Quantity, Accuracy, and Calibration: As described in ASHRAE 111, Section 5, "Instrumentation."

#### 1.5 PROJECT CONDITIONS

- A. Full Owner Occupancy: Owner will occupy the site and existing building during entire TAB period. Cooperate with Owner during TAB operations to minimize conflicts with Owner's operations.

#### 1.6 COORDINATION

- A. Notice: Provide seven days' advance notice for each test. Include scheduled test dates and times.
- B. Perform TAB after leakage and pressure tests on air and water distribution systems have been satisfactorily completed.

### PART 2 - PRODUCTS (Not Applicable)

### PART 3 - EXECUTION

#### 3.1 EXAMINATION

- A. Examine the Contract Documents to become familiar with Project requirements and to discover conditions in systems' designs that may preclude proper TAB of systems and equipment.
- B. Examine systems for installed balancing devices, such as test ports, gage cocks, thermometer wells, flow-control devices, balancing valves and fittings, and manual volume dampers. Verify that locations of these balancing devices are accessible.
- C. Examine the approved submittals for HVAC systems and equipment.
- D. Examine design data including HVAC system descriptions, statements of design assumptions for environmental conditions and systems' output, and statements of philosophies and assumptions about HVAC system and equipment controls.
- E. Examine equipment performance data including fan and pump curves.
  1. Relate performance data to Project conditions and requirements, including system effects that can create undesired or unpredicted conditions that cause reduced capacities in all or part of a system.



2. Calculate system-effect factors to reduce performance ratings of HVAC equipment when installed under conditions different from the conditions used to rate equipment performance. To calculate system effects for air systems, use tables and charts found in AMCA 201, "Fans and Systems," or in SMACNA's "HVAC Systems - Duct Design." Compare results with the design data and installed conditions.
- F. Examine system and equipment installations and verify that field quality-control testing, cleaning, and adjusting specified in individual Sections have been performed.
  - G. Examine test reports specified in individual system and equipment Sections.
  - H. Examine HVAC equipment and filters and verify that bearings are greased, belts are aligned and tight, and equipment with functioning controls is ready for operation.
  - I. Examine terminal units, such as variable-air-volume boxes, and verify that they are accessible and their controls are connected and functioning.
  - J. Examine heat-transfer coils for correct piping connections and for clean and straight fins.
  - K. Examine operating safety interlocks and controls on HVAC equipment.
  - L. Report deficiencies discovered before and during performance of TAB procedures. Observe and record system reactions to changes in conditions. Record default set points if different from indicated values.

### 3.2 PREPARATION

- A. Prepare a TAB plan that includes strategies and step-by-step procedures.
- B. Complete system-readiness checks and prepare reports. Verify the following:
  1. Permanent electrical-power wiring is complete.
  2. Automatic temperature-control systems are operational.
  3. Equipment and duct access doors are securely closed.
  4. Balance, smoke, and fire dampers are open.
  5. Ceilings are installed in critical areas where air-pattern adjustments are required and access to balancing devices is provided.
  6. Windows and doors can be closed so indicated conditions for system operations can be met.

### 3.3 GENERAL PROCEDURES FOR TESTING AND BALANCING

- A. Perform testing and balancing procedures on each system according to the procedures contained in ASHRAE 111 and in this Section.
  1. Comply with requirements in ASHRAE 62.1-2004, Section 7.2.2, "Air Balancing."

- B. Cut insulation, ducts, pipes, and equipment cabinets for installation of test probes to the minimum extent necessary for TAB procedures.
  - 1. After testing and balancing, patch probe holes in ducts with same material and thickness as used to construct ducts.
  - 2. Install and join new insulation that matches removed materials. Restore insulation, coverings, vapor barrier, and finish according to Division 23 Section "HVAC Insulation."
- C. Mark equipment and balancing devices, including damper-control positions, valve position indicators, fan-speed-control levers, and similar controls and devices, with paint or other suitable, permanent identification material to show final settings.
- D. Take and report testing and balancing measurements in inch-pound (IP) units.

#### 3.4 GENERAL PROCEDURES FOR BALANCING AIR SYSTEMS

- A. Prepare test reports for both fans and outlets. Obtain manufacturer's outlet factors and recommended testing procedures. Crosscheck the summation of required outlet volumes with required fan volumes.
- B. Prepare schematic diagrams of systems' "as-built" duct layouts.
- C. Determine the best locations in main and branch ducts for accurate duct-airflow measurements.
- D. Check airflow patterns from the outdoor-air louvers and dampers and the return- and exhaust-air dampers through the supply-fan discharge and mixing dampers.
- E. Locate start-stop and disconnect switches, electrical interlocks, and motor starters.
- F. Verify that motor starters are equipped with properly sized thermal protection.
- G. Check dampers for proper position to achieve desired airflow path.
- H. Check for airflow blockages.
- I. Check condensate drains for proper connections and functioning.
- J. Check for proper sealing of air-handling-unit components.
- K. Verify that air duct system is sealed as specified in Division 23 Section "Metal Ducts."

#### 3.5 PROCEDURES FOR CONSTANT-VOLUME AIR SYSTEMS

- A. Adjust fans to deliver total indicated airflows within the maximum allowable fan speed listed by fan manufacturer.
  - 1. Measure total airflow.

- a. Where sufficient space in ducts is unavailable for Pitot-tube traverse measurements, measure airflow at terminal outlets and inlets and calculate the total airflow.
  2. Measure fan static pressures as follows to determine actual static pressure:
    - a. Measure outlet static pressure as far downstream from the fan as practical and upstream from restrictions in ducts such as elbows and transitions.
    - b. Measure static pressure directly at the fan outlet or through the flexible connection.
    - c. Measure inlet static pressure of single-inlet fans in the inlet duct as near the fan as possible, upstream from the flexible connection, and downstream from duct restrictions.
    - d. Measure inlet static pressure of double-inlet fans through the wall of the plenum that houses the fan.
  3. Measure static pressure across each component that makes up an air-handling unit, rooftop unit, and other air-handling and -treating equipment.
    - a. Report the cleanliness status of filters and the time static pressures are measured.
  4. Measure static pressures entering and leaving other devices, such as sound traps, heat-recovery equipment, and air washers, under final balanced conditions.
  5. Review Record Documents to determine variations in design static pressures versus actual static pressures. Calculate actual system-effect factors. Recommend adjustments to accommodate actual conditions.
  6. See Evaluations for discussion of fan-speed adjustments.
  7. Obtain approval from Architect for adjustment of fan speed higher or lower than indicated speed. Comply with requirements in Division 23 Sections for air-handling units for adjustment of fans, belts, and pulley sizes to achieve indicated air-handling-unit performance.
  8. Do not make fan-speed adjustments that result in motor overload. Consult equipment manufacturers about fan-speed safety factors. Modulate dampers and measure fan-motor amperage to ensure that no overload will occur. Measure amperage in full-cooling, full-heating, economizer, and any other operating mode to determine the maximum required brake horsepower.
- B. Adjust volume dampers for main duct, submain ducts, and major branch ducts to indicated airflows within specified tolerances.
1. Measure airflow of submain and branch ducts.
    - a. Where sufficient space in submain and branch ducts is unavailable for Pitot-tube traverse measurements, measure airflow at terminal outlets and inlets and calculate the total airflow for that zone.
  2. Measure static pressure at a point downstream from the balancing damper, and adjust volume dampers until the proper static pressure is achieved.

3. Remeasure each submain and branch duct after all have been adjusted. Continue to adjust submain and branch ducts to indicated airflows within specified tolerances.
- C. Measure air outlets and inlets without making adjustments.
1. Measure terminal outlets using a direct-reading hood or outlet manufacturer's written instructions and calculating factors.
- D. Adjust air outlets and inlets for each space to indicated airflows within specified tolerances of indicated values. Make adjustments using branch volume dampers rather than extractors and the dampers at air terminals.
1. Adjust each outlet in same room or space to within specified tolerances of indicated quantities without generating noise levels above the limitations prescribed by the Contract Documents.
  2. Adjust patterns of adjustable outlets for proper distribution without drafts.

### 3.6 PROCEDURES FOR MOTORS

- A. Motors, 1/2 HP and Larger: Test at final balanced conditions and record the following data:
1. Manufacturer's name, model number, and serial number.
  2. Motor horsepower rating.
  3. Motor rpm.
  4. Efficiency rating.
  5. Nameplate and measured voltage, each phase.
  6. Nameplate and measured amperage, each phase.
  7. Starter thermal-protection-element rating.
- B. Motors Driven by Variable-Frequency Controllers: Test for proper operation at speeds varying from minimum to maximum. Test the manual bypass of the controller to prove proper operation. Record observations including name of controller manufacturer, model number, serial number, and nameplate data.

### 3.7 PROCEDURES FOR CONDENSING UNITS

- A. Verify proper rotation of fans.
- B. Measure entering- and leaving-air temperatures.
- C. Record compressor data.

### 3.8 PROCEDURES FOR HEAT-TRANSFER COILS

- A. Measure, adjust, and record the following data for each refrigerant coil:
1. Dry-bulb temperature of entering and leaving air.

2. Wet-bulb temperature of entering and leaving air.
3. Airflow.
4. Air pressure drop.
5. Refrigerant suction pressure and temperature.

### 3.9 PROCEDURES FOR BUILDING FLUSH-OUT

- A. Refer to Section 230500 Common Work Results for HVAC for building flush-out requirements.
- B. Building flush-out must be complete after completion of Test and Balance procedures.

### 3.10 TOLERANCES

- A. Set HVAC system's air flow rates within the following tolerances:
  1. Supply, Return, and Exhaust Fans and Equipment with Fans: Plus or minus 10 percent.
  2. Air Outlets and Inlets: Plus or minus 10 percent.
  3. Outside Air Rates: Plus or minus 10 percent.

### 3.11 REPORTING

- A. Initial Construction-Phase Report: Based on examination of the Contract Documents as specified in "Examination" Article, prepare a report on the adequacy of design for systems' balancing devices. Recommend changes and additions to systems' balancing devices to facilitate proper performance measuring and balancing. Recommend changes and additions to HVAC systems and general construction to allow access for performance measuring and balancing devices.

### 3.12 FINAL REPORT

- A. General: Prepare a certified written report; tabulate and divide the report into separate sections for tested systems and balanced systems.
  1. Include a certification sheet at the front of the report's binder, signed and sealed by the certified testing and balancing engineer.
  2. Include a list of instruments used for procedures, along with proof of calibration.
- B. Final Report Contents: In addition to certified field-report data, include the following:
  1. Fan curves.
  2. Manufacturers' test data.
  3. Field test reports prepared by system and equipment installers.
  4. Other information relative to equipment performance; do not include Shop Drawings and product data.

- C. General Report Data: In addition to form titles and entries, include the following data:
1. Title page.
  2. Name and address of the TAB contractor.
  3. Project name.
  4. Project location.
  5. Architect's name and address.
  6. Engineer's name and address.
  7. Contractor's name and address.
  8. Report date.
  9. Signature of TAB supervisor who certifies the report.
  10. Table of Contents with the total number of pages defined for each section of the report. Number each page in the report.
  11. Summary of contents including the following:
    - a. Indicated versus final performance.
    - b. Notable characteristics of systems.
    - c. Description of system operation sequence if it varies from the Contract Documents.
  12. Nomenclature sheets for each item of equipment.
  13. Data for terminal units, including manufacturer's name, type, size, and fittings.
  14. Notes to explain why certain final data in the body of reports vary from indicated values.
  15. Test conditions for fans and pump performance forms including the following:
    - a. Settings for outdoor-, return-, and exhaust-air dampers.
    - b. Conditions of filters.
    - c. Cooling coil, wet- and dry-bulb conditions.
    - d. Face and bypass damper settings at coils.
    - e. Fan drive settings including settings and percentage of maximum pitch diameter.
    - f. Inlet vane settings for variable-air-volume systems.
    - g. Settings for supply-air, static-pressure controller.
    - h. Other system operating conditions that affect performance.
- D. System Diagrams: Include schematic layouts of air distribution systems. Present each system with single-line diagram and include the following:
1. Quantities of outdoor, supply, return, and exhaust airflows.
  2. Duct, outlet, and inlet sizes.
  3. Terminal units.
  4. Balancing stations.
  5. Position of balancing devices.

END OF SECTION

SECTION 230700  
HVAC INSULATION

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Insulation Materials:
  - a. Flexible elastomeric.
  - b. Mineral fiber.
2. Adhesives.
3. Mastics.
4. Sealants.
5. Factory-applied jackets.
6. Field-applied jackets.
7. Tapes.
8. Securements.
9. Corner angles.

B. Related Sections:

1. Division 22 Section "Plumbing Insulation."
2. Division 23 Section "Metal Ducts" for duct liners.

1.2 SUBMITTALS

- A. Product Data: For each type of product indicated.

1.3 QUALITY ASSURANCE

- A. Fire-Test-Response Characteristics: Insulation and related materials shall have fire-test-response characteristics indicated, as determined by testing identical products per ASTM E 84, by a testing and inspecting agency acceptable to authorities having jurisdiction. Factory label insulation and jacket materials and adhesive, mastic, tapes, and cement material containers, with appropriate markings of applicable testing and inspecting agency.

1. Insulation Installed Indoors: Flame-spread index of 25 or less, and smoke-developed index of 50 or less.

## PART 2 - PRODUCTS

### 2.1 INSULATION MATERIALS

- A. Comply with requirements in Part 3 schedule articles for where insulating materials shall be applied.
- B. Products shall not contain asbestos, lead, mercury, or mercury compounds.
- C. Products that come in contact with stainless steel shall have a leachable chloride content of less than 50 ppm when tested according to ASTM C 871.
- D. Insulation materials for use on austenitic stainless steel shall be qualified as acceptable according to ASTM C 795.
- E. Foam insulation materials shall not use CFC or HCFC blowing agents in the manufacturing process.
- F. Flexible Elastomeric: Closed-cell, sponge- or expanded-rubber materials. Comply with ASTM C 534, Type I for tubular materials and Type II for sheet materials.
  - 1. Products: Subject to compliance with requirements, provide one of the following:
    - a. Aeroflex USA Inc.; Aerocel.
    - b. Armacell LLC; AP Armaflex.
    - c. RBX Corporation; Insul-Sheet 1800 and Insul-Tube 180.
- G. Mineral-Fiber Blanket Insulation: Mineral or glass fibers bonded with a thermosetting resin. Comply with ASTM C 553, Type II and ASTM C 1290, Type III with factory-applied FSK jacket. Factory-applied jacket requirements are specified in "Factory-Applied Jackets" Article.
  - 1. Products: Subject to compliance with requirements, provide one of the following:
    - a. CertainTeed Corp.; Duct Wrap.
    - b. Johns Manville; Microlite.
    - c. Knauf Insulation; Duct Wrap.
    - d. Owens Corning; All-Service Duct Wrap.

### 2.2 ADHESIVES

- A. Materials shall be compatible with insulation materials, jackets, and substrates and for bonding insulation to itself and to surfaces to be insulated, unless otherwise indicated.
- B. Flexible Elastomeric Adhesive: Comply with MIL-A-24179A, Type II, Class I.
  - 1. Products: Subject to compliance with requirements, provide one of the following:
    - a. Aeroflex USA Inc.; Aero seal.
    - b. Armacell LCC; 520 Adhesive.



- c. Foster Products Corporation, H. B. Fuller Company; 85-75.
  - d. RBX Corporation; Rubatex Contact Adhesive.
- 2. For indoor applications, use adhesive that has a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
- C. Mineral-Fiber Adhesive: Comply with MIL-A-3316C, Class 2, Grade A.
  - 1. Products: Subject to compliance with requirements, provide one of the following
    - a. Childers Products, Division of ITW; CP-82.
    - b. Foster Products Corporation, H. B. Fuller Company; 85-20.
    - c. ITW TACC, Division of Illinois Tool Works; S-90/80.
    - d. Marathon Industries, Inc.; 225.
    - e. Mon-Eco Industries, Inc.; 22-25.
  - 2. For indoor applications, use adhesive that has a VOC content of 80 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
- D. ASJ Adhesive: Comply with MIL-A-3316C, Class 2, Grade A for bonding insulation jacket lap seams and joints.
  - 1. Products: Subject to compliance with requirements, provide one of the following:
    - a. Childers Products, Division of ITW; CP-82.
    - b. Foster Products Corporation, H. B. Fuller Company; 85-20.
    - c. ITW TACC, Division of Illinois Tool Works; S-90/80.
    - d. Marathon Industries, Inc.; 225.
    - e. Mon-Eco Industries, Inc.; 22-25.
  - 2. For indoor applications, use adhesive that has a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
- E. PVC Jacket Adhesive: Compatible with PVC jacket.
  - 1. Products: Subject to compliance with requirements, provide one of the following:
    - a. Dow Chemical Company (The); 739, Dow Silicone.
    - b. Johns-Manville; Zeston Perma-Weld, CEEL-TITE Solvent Welding Adhesive.
    - c. P.I.C. Plastics, Inc.; Welding Adhesive.
    - d. Speedline Corporation; Speedline Vinyl Adhesive.
  - 2. For indoor applications, use adhesive that has a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

## 2.3 MASTICS

- A. Materials shall be compatible with insulation materials, jackets, and substrates; comply with MIL-C-19565C, Type II.

1. For indoor applications, use mastics that have a VOC content of 500 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
- B. Vapor-Barrier Mastic: Water based; suitable for indoor and outdoor use on below ambient services.
1. Products: Subject to compliance with requirements, provide one of the following:
    - a. Childers Products, Division of ITW; CP-35.
    - b. Foster Products Corporation, H. B. Fuller Company; 30-90.
    - c. ITW TACC, Division of Illinois Tool Works; CB-50.
    - d. Marathon Industries, Inc.; 590.
    - e. Mon-Eco Industries, Inc.; 55-40.
    - f. Vimasco Corporation; 749.
  2. Water-Vapor Permeance: ASTM E 96, Procedure B, 0.013 perm (0.009 metric perm) at 43-mil (1.09-mm) dry film thickness.
  3. Service Temperature Range: Minus 20 to plus 180 deg F (Minus 29 to plus 82 deg C).
  4. Solids Content: ASTM D 1644, 59 percent by volume and 71 percent by weight.
  5. Color: White.
- C. Breather Mastic: Water based; suitable for indoor and outdoor use on above ambient services.
1. Products: Subject to compliance with requirements, provide one of the following:
    - a. Childers Products, Division of ITW; CP-10.
    - b. Foster Products Corporation, H. B. Fuller Company; 35-00.
    - c. ITW TACC, Division of Illinois Tool Works; CB-05/15.
    - d. Marathon Industries, Inc.; 550.
    - e. Mon-Eco Industries, Inc.; 55-50.
    - f. Vimasco Corporation; WC-1/WC-5.
  2. Water-Vapor Permeance: ASTM F 1249, 3 perms (2 metric perms) at 0.0625-inch (1.6-mm) dry film thickness.
  3. Service Temperature Range: Minus 20 to plus 200 deg F (Minus 29 to plus 93 deg C).
  4. Solids Content: 63 percent by volume and 73 percent by weight.
  5. Color: White.

## 2.4 SEALANTS

### A. Joint Sealants:

1. Joint Sealants for Cellular-Glass Products: Subject to compliance with requirements, provide one of the following:
  - a. Childers Products, Division of ITW; CP-76.
  - b. Foster Products Corporation, H. B. Fuller Company; 30-45.

- c. Marathon Industries, Inc.; 405.
- d. Mon-Eco Industries, Inc.; 44-05.
- e. Pittsburgh Corning Corporation; Pittseal 444.

B. FSK and Metal Jacket Flashing Sealants:

1. Products: Subject to compliance with requirements, provide one of the following:
  - a. Childers Products, Division of ITW; CP-76-8.
  - b. Foster Products Corporation, H. B. Fuller Company; 95-44.
  - c. Marathon Industries, Inc.; 405.
  - d. Mon-Eco Industries, Inc.; 44-05.
  - e. Vimasco Corporation; 750.
2. Materials shall be compatible with insulation materials, jackets, and substrates.
3. Fire- and water-resistant, flexible, elastomeric sealant.
4. Service Temperature Range: Minus 40 to plus 250 deg F (Minus 40 to plus 121 deg C).
5. Color: Aluminum.
6. For indoor applications, use sealants that have a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

C. ASJ Flashing Sealants and PVC Jacket Flashing Sealants:

1. Products: Subject to compliance with requirements, provide one of the following:
  - a. Childers Products, Division of ITW; CP-76.
2. Materials shall be compatible with insulation materials, jackets, and substrates.
3. Fire- and water-resistant, flexible, elastomeric sealant.
4. Service Temperature Range: Minus 40 to plus 250 deg F (Minus 40 to plus 121 deg C).
5. Color: White.
6. For indoor applications, use sealants that have a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

## 2.5 FACTORY-APPLIED JACKETS

A. Insulation system schedules indicate factory-applied jackets on various applications. When factory-applied jackets are indicated, comply with the following:

1. ASJ: White, kraft-paper, fiberglass-reinforced scrim with aluminum-foil backing; complying with ASTM C 1136, Type I.
2. ASJ-SSL: ASJ with self-sealing, pressure-sensitive, acrylic-based adhesive covered by a removable protective strip; complying with ASTM C 1136, Type I.
3. FSK Jacket: Aluminum-foil, fiberglass-reinforced scrim with kraft-paper backing; complying with ASTM C 1136, Type II.

## 2.6 FIELD-APPLIED JACKETS

- A. Field-applied jackets shall comply with ASTM C 921, Type I, unless otherwise indicated.
- B. PVC Jacket: High-impact-resistant, UV-resistant PVC complying with ASTM D 1784, Class 16354-C; thickness as scheduled; roll stock ready for shop or field cutting and forming. Thickness is indicated in field-applied jacket schedules.
  - 1. Products: Subject to compliance with requirements, provide one of the following:
    - a. Johns Manville; Zeston.
    - b. P.I.C. Plastics, Inc.; FG Series.
    - c. Proto PVC Corporation; LoSmoke.
    - d. Speedline Corporation; SmokeSafe.
  - 2. Adhesive: As recommended by jacket material manufacturer.
  - 3. Color: White.
  - 4. Factory-fabricated fitting covers to match jacket if available; otherwise, field fabricate.
    - a. Shapes: 45- and 90-degree, short- and long-radius elbows, tees, valves, flanges, unions, reducers, end caps, soil-pipe hubs, traps, mechanical joints, and P-trap and supply covers for lavatories.
  - 5. Factory-fabricated tank heads and tank side panels.
- C. Aluminum Jacket: Comply with ASTM B 209 (ASTM B 209M), Alloy 3003, 3005, 3105 or 5005, Temper H-14.
  - 1. Products: Subject to compliance with requirements, provide one of the following:
    - a. Childers Products, Division of ITW; Metal Jacketing Systems.
    - b. PABCO Metals Corporation; Surefit.
    - c. RPR Products, Inc.; Insul-Mate.
  - 2. Sheet and roll stock ready for shop or field sizing.
  - 3. Finish and thickness are indicated in field-applied jacket schedules.
  - 4. Moisture Barrier for Indoor Applications: 1-mil- (0.025-mm-) thick, heat-bonded polyethylene and kraft paper.
  - 5. Moisture Barrier for Outdoor Applications: 3-mil- (0.075-mm-) thick, heat-bonded polyethylene and kraft paper.
  - 6. Factory-Fabricated Fitting Covers:
    - a. Same material, finish, and thickness as jacket.
    - b. Preformed 2-piece or gore, 45- and 90-degree, short- and long-radius elbows.
    - c. Tee covers.
    - d. Flange and union covers.
    - e. End caps.
    - f. Beveled collars.

- g. Valve covers.
- h. Field fabricate fitting covers only if factory-fabricated fitting covers are not available.

## 2.7 TAPES

- A. ASJ Tape: White vapor-retarder tape matching factory-applied jacket with acrylic adhesive, complying with ASTM C 1136.
  - 1. Products: Subject to compliance with requirements, provide one of the following:
    - a. Avery Dennison Corporation, Specialty Tapes Division; Fasson 0835.
    - b. Compac Corp.; 104 and 105.
    - c. Ideal Tape Co., Inc., an American Biltrite Company; 428 AWF ASJ.
    - d. Venture Tape; 1540 CW Plus, 1542 CW Plus, and 1542 CW Plus/SQ.
  - 2. Width: 3 inches (75 mm).
  - 3. Thickness: 11.5 mils (0.29 mm).
  - 4. Adhesion: 90 ounces force/inch (1.0 N/mm) in width.
  - 5. Elongation: 2 percent.
  - 6. Tensile Strength: 40 lbf/inch (7.2 N/mm) in width.
  - 7. ASJ Tape Disks and Squares: Precut disks or squares of ASJ tape.
- B. FSK Tape: Foil-face, vapor-retarder tape matching factory-applied jacket with acrylic adhesive; complying with ASTM C 1136.
  - 1. Products: Subject to compliance with requirements, provide one of the following:
    - a. Avery Dennison Corporation, Specialty Tapes Division; Fasson 0827.
    - b. Compac Corp.; 110 and 111.
    - c. Ideal Tape Co., Inc., an American Biltrite Company; 491 AWF FSK.
    - d. Venture Tape; 1525 CW, 1528 CW, and 1528 CW/SQ.
  - 2. Width: 3 inches (75 mm).
  - 3. Thickness: 6.5 mils (0.16 mm).
  - 4. Adhesion: 90 ounces force/inch (1.0 N/mm) in width.
  - 5. Elongation: 2 percent.
  - 6. Tensile Strength: 40 lbf/inch (7.2 N/mm) in width.
  - 7. FSK Tape Disks and Squares: Precut disks or squares of FSK tape.
- C. PVC Tape: White vapor-retarder tape matching field-applied PVC jacket with acrylic adhesive. Suitable for indoor and outdoor applications.
  - 1. Products: Subject to compliance with requirements, provide one of the following:
    - a. Avery Dennison Corporation, Specialty Tapes Division; Fasson 0555.
    - b. Compac Corp.; 130.
    - c. Ideal Tape Co., Inc., an American Biltrite Company; 370 White PVC tape.
    - d. Venture Tape; 1506 CW NS.

2. Width: 2 inches (50 mm).
3. Thickness: 6 mils (0.15 mm).
4. Adhesion: 64 ounces force/inch (0.7 N/mm) in width.
5. Elongation: 500 percent.
6. Tensile Strength: 18 lbf/inch (3.3 N/mm) in width.

D. Aluminum-Foil Tape: Vapor-retarder tape with acrylic adhesive.

1. Products: Subject to compliance with requirements, provide one of the following:
  - a. Avery Dennison Corporation, Specialty Tapes Division; Fasson 0800.
  - b. Compac Corp.; 120.
  - c. Ideal Tape Co., Inc., an American Biltrite Company; 488 AWF.
  - d. Venture Tape; 3520 CW.
2. Width: 2 inches (50 mm).
3. Thickness: 3.7 mils (0.093 mm).
4. Adhesion: 100 ounces force/inch (1.1 N/mm) in width.
5. Elongation: 5 percent.
6. Tensile Strength: 34 lbf/inch (6.2 N/mm) in width.

## 2.8 SECUREMENTS

A. Insulation Pins and Hangers:

1. Metal, Adhesively Attached, Perforated-Base Insulation Hangers: Baseplate welded to projecting spindle that is capable of holding insulation, of thickness indicated, securely in position indicated when self-locking washer is in place. Comply with the following requirements:
  - a. Products: Subject to compliance with requirements, provide one of the following:
    - 1) AGM Industries, Inc.; Tactoo Insul-Hangers, Series T.
    - 2) GEMCO; Perforated Base.
    - 3) Midwest Fasteners, Inc.; Spindle.
  - b. Baseplate: Perforated, galvanized carbon-steel sheet, 0.030 inch (0.76 mm) thick by 2 inches (50 mm) square.
  - c. Spindle: Copper- or zinc-coated, low carbon steel, fully annealed, 0.106-inch- (2.6-mm-) diameter shank, length to suit depth of insulation indicated.
  - d. Adhesive: Recommended by hanger manufacturer. Product with demonstrated capability to bond insulation hanger securely to substrates indicated without damaging insulation, hangers, and substrates.
2. Insulation-Retaining Washers: Self-locking washers formed from 0.016-inch- (0.41-mm-) thick, galvanized-steel sheet, with beveled edge sized as required to hold insulation securely in place but not less than 1-1/2 inches (38 mm) in diameter.

- a. Products: Subject to compliance with requirements, provide one of the following:
    - 1) AGM Industries, Inc.; RC-150.
    - 2) GEMCO; R-150.
    - 3) Midwest Fasteners, Inc.; WA-150.
    - 4) Nelson Stud Welding; Speed Clips.
  - b. Protect ends with capped self-locking washers incorporating a spring steel insert to ensure permanent retention of cap in exposed locations.
3. Nonmetal Insulation-Retaining Washers: Self-locking washers formed from 0.016-inch- (0.41-mm-) thick nylon sheet, with beveled edge sized as required to hold insulation securely in place but not less than 1-1/2 inches (38 mm) in diameter.
- a. Products: Subject to compliance with requirements, provide one of the following:
    - 1) GEMCO.
    - 2) Midwest Fasteners, Inc.
- B. Staples: Outward-clinching insulation staples, nominal 3/4-inch- (19-mm-) wide, stainless steel or Monel.
- C. Wire: 0.062-inch (1.6-mm) soft-annealed, galvanized steel.
- 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. C & F Wire.
    - b. Childers Products.
    - c. PABCO Metals Corporation.
    - d. RPR Products, Inc.

## 2.9 CORNER ANGLES

- A. PVC Corner Angles: 30 mils (0.8 mm) thick, minimum 1 by 1 inch (25 by 25 mm), PVC according to ASTM D 1784, Class 16354-C. White or color-coded to match adjacent surface.
- B. Aluminum Corner Angles: 0.040 inch (1.0 mm) thick, minimum 1 by 1 inch (25 by 25 mm), aluminum according to ASTM B 209 (ASTM B 209M), Alloy 3003, 3005, 3105 or 5005; Temper H-14.

## PART 3 - EXECUTION

### 3.1 PREPARATION

- A. Surface Preparation: Clean and dry surfaces to receive insulation. Remove materials that will adversely affect insulation application.
- B. Coordinate insulation installation with the trade installing heat tracing. Comply with requirements for heat tracing that apply to insulation.
- C. Mix insulating cements with clean potable water; if insulating cements are to be in contact with stainless-steel surfaces, use demineralized water.

### 3.2 GENERAL INSTALLATION REQUIREMENTS

- A. Install insulation materials, accessories, and finishes with smooth, straight, and even surfaces; free of voids throughout the length of equipment, ducts and fittings, and piping including fittings, valves, and specialties.
- B. Install insulation materials, forms, vapor barriers or retarders, jackets, and thicknesses required for each item of equipment, duct system, and pipe system as specified in insulation system schedules.
- C. Install accessories compatible with insulation materials and suitable for the service. Install accessories that do not corrode, soften, or otherwise attack insulation or jacket in either wet or dry state.
- D. Install insulation with longitudinal seams at top and bottom of horizontal runs.
- E. Install multiple layers of insulation with longitudinal and end seams staggered.
- F. Do not weld brackets, clips, or other attachment devices to piping, fittings, and specialties.
- G. Keep insulation materials dry during application and finishing.
- H. Install insulation with tight longitudinal seams and end joints. Bond seams and joints with adhesive recommended by insulation material manufacturer.
- I. Install insulation with least number of joints practical.
- J. Where vapor barrier is indicated, seal joints, seams, and penetrations in insulation at hangers, supports, anchors, and other projections with vapor-barrier mastic.
  - 1. Install insulation continuously through hangers and around anchor attachments.
  - 2. For insulation application where vapor barriers are indicated, extend insulation on anchor legs from point of attachment to supported item to point of attachment to structure. Taper and seal ends at attachment to structure with vapor-barrier mastic.



3. Install insert materials and install insulation to tightly join the insert. Seal insulation to insulation inserts with adhesive or sealing compound recommended by insulation material manufacturer.
  4. Cover inserts with jacket material matching adjacent pipe insulation. Install shields over jacket, arranged to protect jacket from tear or puncture by hanger, support, and shield.
- K. Apply adhesives, mastics, and sealants at manufacturer's recommended coverage rate and wet and dry film thicknesses.
- L. Install insulation with factory-applied jackets as follows:
1. Draw jacket tight and smooth.
  2. Cover circumferential joints with 3-inch- (75-mm-) wide strips, of same material as insulation jacket. Secure strips with adhesive and outward clinching staples along both edges of strip, spaced 4 inches (100 mm) o.c.
  3. Overlap jacket longitudinal seams at least 1-1/2 inches (38 mm). Install insulation with longitudinal seams at bottom of pipe. Clean and dry surface to receive self-sealing lap. Staple laps with outward clinching staples along edge at 4 inches (100 mm) o.c.
    - a. For below ambient services, apply vapor-barrier mastic over staples.
  4. Cover joints and seams with tape as recommended by insulation material manufacturer to maintain vapor seal.
  5. Where vapor barriers are indicated, apply vapor-barrier mastic on seams and joints and at ends adjacent to duct and pipe flanges and fittings.
- M. Cut insulation in a manner to avoid compressing insulation more than 75 percent of its nominal thickness.
- N. Finish installation with systems at operating conditions. Repair joint separations and cracking due to thermal movement.
- O. Repair damaged insulation facings by applying same facing material over damaged areas. Extend patches at least 4 inches (100 mm) beyond damaged areas. Adhere, staple, and seal patches similar to butt joints.
- P. For above ambient services, do not install insulation to the following:
1. Vibration-control devices.
  2. Testing agency labels and stamps.
  3. Nameplates and data plates.
  4. Manholes.
  5. Handholes.
  6. Cleanouts.

### 3.3 PENETRATIONS

- A. Insulation Installation at Roof Penetrations: Install insulation continuously through roof penetrations.
  - 1. Seal penetrations with flashing sealant.
  - 2. For applications requiring only indoor insulation, terminate insulation above roof surface and seal with joint sealant. For applications requiring indoor and outdoor insulation, install insulation for outdoor applications tightly joined to indoor insulation ends. Seal joint with joint sealant.
  - 3. Extend jacket of outdoor insulation outside roof flashing at least 2 inches (50 mm) below top of roof flashing.
  - 4. Seal jacket to roof flashing with flashing sealant.
  
- B. Insulation Installation at Aboveground Exterior Wall Penetrations: Install insulation continuously through wall penetrations.
  - 1. Seal penetrations with flashing sealant.
  - 2. For applications requiring only indoor insulation, terminate insulation inside wall surface and seal with joint sealant. For applications requiring indoor and outdoor insulation, install insulation for outdoor applications tightly joined to indoor insulation ends. Seal joint with joint sealant.
  - 3. Extend jacket of outdoor insulation outside wall flashing and overlap wall flashing at least 2 inches (50 mm).
  - 4. Seal jacket to wall flashing with flashing sealant.
  
- C. Insulation Installation at Interior Wall and Partition Penetrations (That Are Not Fire Rated): Install insulation continuously through walls and partitions.
  
- D. Insulation Installation at Fire-Rated Wall and Partition Penetrations: Install insulation continuously through penetrations of fire-rated walls and partitions. Terminate insulation at fire damper sleeves for fire-rated wall and partition penetrations. Externally insulate damper sleeves to match adjacent insulation and overlap duct insulation at least 2 inches (50 mm).
  - 1. Comply with requirements in Division 07 Section "Penetration Firestopping" for firestopping and fire-resistive joint sealers.
  
- E. Insulation Installation at Floor Penetrations:
  - 1. Duct: Install insulation continuously through floor penetrations that are not fire rated. For penetrations through fire-rated assemblies, terminate insulation at fire damper sleeves and externally insulate damper sleeve beyond floor to match adjacent duct insulation. Overlap damper sleeve and duct insulation at least 2 inches (50 mm).
  - 2. Pipe: Install insulation continuously through floor penetrations.
  - 3. Seal penetrations through fire-rated assemblies. Comply with requirements in Division 07 Section "Penetration Firestopping."

### 3.4 GENERAL PIPE INSULATION INSTALLATION

- A. Requirements in this article generally apply to all insulation materials except where more specific requirements are specified in various pipe insulation material installation articles.
- B. Insulation Installation on Fittings, Valves, Strainers, Flanges, and Unions:
1. Install insulation over fittings, valves, strainers, flanges, unions, and other specialties with continuous thermal and vapor-retarder integrity, unless otherwise indicated.
  2. Insulate pipe elbows using preformed fitting insulation or mitered fittings made from same material and density as adjacent pipe insulation. Each piece shall be butted tightly against adjoining piece and bonded with adhesive. Fill joints, seams, voids, and irregular surfaces with insulating cement finished to a smooth, hard, and uniform contour that is uniform with adjoining pipe insulation.
  3. Insulate tee fittings with preformed fitting insulation or sectional pipe insulation of same material and thickness as used for adjacent pipe. Cut sectional pipe insulation to fit. Butt each section closely to the next and hold in place with tie wire. Bond pieces with adhesive.
  4. Insulate valves using preformed fitting insulation or sectional pipe insulation of same material, density, and thickness as used for adjacent pipe. Overlap adjoining pipe insulation by not less than two times the thickness of pipe insulation, or one pipe diameter, whichever is thicker. For valves, insulate up to and including the bonnets, valve stuffing-box studs, bolts, and nuts. Fill joints, seams, and irregular surfaces with insulating cement.
  5. Insulate strainers using preformed fitting insulation or sectional pipe insulation of same material, density, and thickness as used for adjacent pipe. Overlap adjoining pipe insulation by not less than two times the thickness of pipe insulation, or one pipe diameter, whichever is thicker. Fill joints, seams, and irregular surfaces with insulating cement. Insulate strainers so strainer basket flange or plug can be easily removed and replaced without damaging the insulation and jacket. Provide a removable reusable insulation cover. For below ambient services, provide a design that maintains vapor barrier.
  6. Insulate flanges and unions using a section of oversized preformed pipe insulation. Overlap adjoining pipe insulation by not less than two times the thickness of pipe insulation, or one pipe diameter, whichever is thicker.
  7. Cover segmented insulated surfaces with a layer of finishing cement and coat with a mastic. Install vapor-barrier mastic for below ambient services and a breather mastic for above ambient services. Reinforce the mastic with fabric-reinforcing mesh. Trowel the mastic to a smooth and well-shaped contour.
  8. For services not specified to receive a field-applied jacket except for flexible elastomeric and polyolefin, install fitted PVC cover over elbows, tees, strainers, valves, flanges, and unions. Terminate ends with PVC end caps. Tape PVC covers to adjoining insulation facing using PVC tape.
  9. Stencil or label the outside insulation jacket of each union with the word "UNION." Match size and color of pipe labels.
- C. Insulate instrument connections for thermometers, pressure gages, pressure temperature taps, test connections, flow meters, sensors, switches, and transmitters on insulated pipes, vessels, and equipment. Shape insulation at these connections by

tapering it to and around the connection with insulating cement and finish with finishing cement, mastic, and flashing sealant.

- D. Install removable insulation covers at locations indicated. Installation shall conform to the following:
1. Make removable flange and union insulation from sectional pipe insulation of same thickness as that on adjoining pipe. Install same insulation jacket as adjoining pipe insulation.
  2. When flange and union covers are made from sectional pipe insulation, extend insulation from flanges or union long at least two times the insulation thickness over adjacent pipe insulation on each side of flange or union. Secure flange cover in place with stainless-steel or aluminum bands. Select band material compatible with insulation and jacket.
  3. Construct removable valve insulation covers in same manner as for flanges except divide the two-part section on the vertical center line of valve body.
  4. When covers are made from block insulation, make two halves, each consisting of mitered blocks wired to stainless-steel fabric. Secure this wire frame, with its attached insulation, to flanges with tie wire. Extend insulation at least 2 inches (50 mm) over adjacent pipe insulation on each side of valve. Fill space between flange or union cover and pipe insulation with insulating cement. Finish cover assembly with insulating cement applied in two coats. After first coat is dry, apply and trowel second coat to a smooth finish.
  5. Unless a PVC jacket is indicated in field-applied jacket schedules, finish exposed surfaces with a metal jacket.

### 3.5 FLEXIBLE ELASTOMERIC INSULATION INSTALLATION

- A. Seal longitudinal seams and end joints with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.
- B. Insulation Installation on Pipe Flanges:
1. Install pipe insulation to outer diameter of pipe flange.
  2. Make width of insulation section same as overall width of flange and bolts, plus twice the thickness of pipe insulation.
  3. Fill voids between inner circumference of flange insulation and outer circumference of adjacent straight pipe segments with cut sections of sheet insulation of same thickness as pipe insulation.
  4. Secure insulation to flanges and seal seams with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.
- C. Insulation Installation on Pipe Fittings and Elbows:
1. Install mitered sections of pipe insulation.
  2. Secure insulation materials and seal seams with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.

D. Insulation Installation on Valves and Pipe Specialties:

1. Install preformed valve covers manufactured of same material as pipe insulation when available.
2. When preformed valve covers are not available, install cut sections of pipe and sheet insulation to valve body. Arrange insulation to permit access to packing and to allow valve operation without disturbing insulation.
3. Install insulation to flanges as specified for flange insulation application.
4. Secure insulation to valves and specialties and seal seams with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.

3.6 MINERAL-FIBER INSULATION INSTALLATION

A. Blanket Insulation Installation on Ducts and Plenums: Secure with adhesive and insulation pins.

1. Apply adhesives according to manufacturer's recommended coverage rates per unit area, for 100 percent coverage of duct and plenum surfaces.
2. Apply adhesive to entire circumference of ducts and to all surfaces of fittings and transitions.
3. Install either capacitor-discharge-weld pins and speed washers or cupped-head, capacitor-discharge-weld pins on sides and bottom of horizontal ducts and sides of vertical ducts as follows:
  - a. On duct sides with dimensions 18 inches (450 mm) and smaller, place pins along longitudinal centerline of duct. Space 3 inches (75 mm) maximum from insulation end joints, and 16 inches (400 mm) o.c.
  - b. On duct sides with dimensions larger than 18 inches (450 mm), place pins 16 inches (400 mm) o.c. each way, and 3 inches (75 mm) maximum from insulation joints. Install additional pins to hold insulation tightly against surface at cross bracing.
  - c. Pins may be omitted from top surface of horizontal, rectangular ducts and plenums.
  - d. Do not overcompress insulation during installation.
  - e. Impale insulation over pins and attach speed washers.
  - f. Cut excess portion of pins extending beyond speed washers or bend parallel with insulation surface. Cover exposed pins and washers with tape matching insulation facing.
4. For ducts and plenums with surface temperatures below ambient, install a continuous unbroken vapor barrier. Create a facing lap for longitudinal seams and end joints with insulation by removing 2 inches (50 mm) from 1 edge and 1 end of insulation segment. Secure laps to adjacent insulation section with 1/2-inch (13-mm) outward-clinching staples, 1 inch (25 mm) o.c. Install vapor barrier consisting of factory- or field-applied jacket, adhesive, vapor-barrier mastic, and sealant at joints, seams, and protrusions.
  - a. Repair punctures, tears, and penetrations with tape or mastic to maintain vapor-barrier seal.

- b. Install vapor stops for ductwork and plenums operating below 50 deg F (10 deg C) at 18-foot (5.5-m) intervals. Vapor stops shall consist of vapor-barrier mastic applied in a Z-shaped pattern over insulation face, along butt end of insulation, and over the surface. Cover insulation face and surface to be insulated a width equal to 2 times the insulation thickness but not less than 3 inches (75 mm).
  5. Overlap unfaced blankets a minimum of 2 inches (50 mm) on longitudinal seams and end joints. At end joints, secure with steel bands spaced a maximum of 18 inches (450 mm) o.c.
  6. Install insulation on rectangular duct elbows and transitions with a full insulation section for each surface. Install insulation on round and flat-oval duct elbows with individually mitered gores cut to fit the elbow.
  7. Insulate duct stiffeners, hangers, and flanges that protrude beyond insulation surface with 6-inch- (150-mm-) wide strips of same material used to insulate duct. Secure on alternating sides of stiffener, hanger, and flange with pins spaced 6 inches (150 mm) o.c.
- B. Board Insulation Installation on Ducts and Plenums: Secure with adhesive and insulation pins.
1. Apply adhesives according to manufacturer's recommended coverage rates per unit area, for 100 percent coverage of duct and plenum surfaces.
  2. Apply adhesive to entire circumference of ducts and to all surfaces of fittings and transitions.
  3. Install either capacitor-discharge-weld pins and speed washers or cupped-head, capacitor-discharge-weld pins on sides and bottom of horizontal ducts and sides of vertical ducts as follows:
    - a. On duct sides with dimensions 18 inches (450 mm) and smaller, place pins along longitudinal centerline of duct. Space 3 inches (75 mm) maximum from insulation end joints, and 16 inches (400 mm) o.c.
    - b. On duct sides with dimensions larger than 18 inches (450 mm), space pins 16 inches (400 mm) o.c. each way, and 3 inches (75 mm) maximum from insulation joints. Install additional pins to hold insulation tightly against surface at cross bracing.
    - c. Pins may be omitted from top surface of horizontal, rectangular ducts and plenums.
    - d. Do not overcompress insulation during installation.
    - e. Cut excess portion of pins extending beyond speed washers or bend parallel with insulation surface. Cover exposed pins and washers with tape matching insulation facing.
  4. For ducts and plenums with surface temperatures below ambient, install a continuous unbroken vapor barrier. Create a facing lap for longitudinal seams and end joints with insulation by removing 2 inches (50 mm) from 1 edge and 1 end of insulation segment. Secure laps to adjacent insulation section with 1/2-inch (13-mm) outward-clinching staples, 1 inch (25 mm) o.c. Install vapor barrier consisting of factory- or field-applied jacket, adhesive, vapor-barrier mastic, and sealant at joints, seams, and protrusions.

- a. Repair punctures, tears, and penetrations with tape or mastic to maintain vapor-barrier seal.
  - b. Install vapor stops for ductwork and plenums operating below 50 deg F (10 deg C) at 18-foot (5.5-m) intervals. Vapor stops shall consist of vapor-barrier mastic applied in a Z-shaped pattern over insulation face, along butt end of insulation, and over the surface. Cover insulation face and surface to be insulated a width equal to 2 times the insulation thickness but not less than 3 inches (75 mm).
5. Install insulation on rectangular duct elbows and transitions with a full insulation section for each surface. Groove and score insulation to fit as closely as possible to outside and inside radius of elbows. Install insulation on round and flat-oval duct elbows with individually mitered gores cut to fit the elbow.
  6. Insulate duct stiffeners, hangers, and flanges that protrude beyond insulation surface with 6-inch- (150-mm-) wide strips of same material used to insulate duct. Secure on alternating sides of stiffener, hanger, and flange with pins spaced 6 inches (150 mm) o.c.

### 3.7 FIELD-APPLIED JACKET INSTALLATION

- A. Where PVC jackets are indicated, install with 1-inch (25-mm) overlap at longitudinal seams and end joints; for horizontal applications, install with longitudinal seams along top and bottom of tanks and vessels. Seal with manufacturer's recommended adhesive.
  1. Apply two continuous beads of adhesive to seams and joints, one bead under lap and the finish bead along seam and joint edge.
- B. Where metal jackets are indicated, install with 2-inch (50-mm) overlap at longitudinal seams and end joints. Overlap longitudinal seams arranged to shed water. Seal end joints with weatherproof sealant recommended by insulation manufacturer. Secure jacket with stainless-steel bands 12 inches (300 mm) o.c. and at end joints.

### 3.8 FIRE-RATED INSULATION SYSTEM INSTALLATION

- A. Where fire-rated insulation system is indicated, secure system to ducts and duct hangers and supports to maintain a continuous fire rating.
- B. Insulate duct access panels and doors to achieve same fire rating as duct.
- C. Install firestopping at penetrations through fire-rated assemblies. Fire-stop systems are specified in Division 07 Section "Penetration Firestopping."

### 3.9 DUCT INSULATION SCHEDULE, GENERAL

- A. Plenums and Ducts Requiring Insulation:
  1. Indoor, concealed supply and outdoor air.

2. Indoor, concealed return located in nonconditioned space.
3. Indoor, concealed, Type I, commercial, kitchen hood exhaust.
4. Indoor, exposed, Type I, commercial, kitchen hood exhaust.
5. Outdoor, concealed supply and return.
6. Outdoor, exposed supply and return.

B. Items Not Insulated:

1. Metal ducts with duct liner of sufficient thickness to comply with energy code and ASHRAE/IESNA 90.1.
2. Factory-insulated flexible ducts.
3. Factory-insulated plenums and casings.
4. Flexible connectors.
5. Vibration-control devices.
6. Factory-insulated access panels and doors.

### 3.10 INDOOR DUCT AND PLENUM INSULATION SCHEDULE

- A. Concealed, Supply-Air Duct and Plenum Insulation: Mineral-fiber blanket, 1-1/2 inches (38 mm) thick and 0.75-lb/cu. ft. (12-kg/cu. m) nominal density (R-4.2 minimum).
- B. Concealed, Return-Air Duct and Plenum Insulation: Mineral-fiber blanket, 1-1/2 inches (38 mm) thick and 0.75-lb/cu. ft. (12-kg/cu. m) nominal density (R-4.2 minimum).
- C. Concealed, Outdoor-Air Duct and Plenum Insulation: Mineral-fiber blanket, 1-1/2 inches (38 mm) thick and 0.75-lb/cu. ft. (12-kg/cu. m) nominal density (R-4.2 minimum).
- D. Exposed, Supply-Air Duct Insulation: Mineral-Fiber Board 1 inch thick and minimum 2-lb/cu. ft. nominal density.

### 3.11 PIPING INSULATION SCHEDULE, GENERAL

- A. Acceptable preformed pipe and tubular insulation materials and thicknesses are identified for each piping system and pipe size range. If more than one material is listed for a piping system, selection from materials listed is Contractor's option.
- B. Items Not Insulated: Unless otherwise indicated, do not install insulation on the following:
  1. Drainage piping located in crawl spaces.
  2. Underground piping.
  3. Chrome-plated pipes and fittings unless there is a potential for personnel injury.

### 3.12 INDOOR PIPING INSULATION SCHEDULE

- A. Refrigerant Suction and Hot-Gas Piping: Flexible elastomeric, 1 inch (25 mm) thick.



### 3.13 OUTDOOR, ABOVEGROUND PIPING INSULATION SCHEDULE

A. Refrigerant Suction and Hot-Gas Piping: Insulation shall be one of the following:

1. Flexible Elastomeric: 1-1/2 inches (38 mm) thick.

### 3.14 INDOOR, FIELD-APPLIED JACKET SCHEDULE

A. Install jacket over insulation material. For insulation with factory-applied jacket, install the field-applied jacket over the factory-applied jacket.

B. If more than one material is listed, selection from materials listed is Contractor's option.

C. Ducts and Plenums, Exposed:

1. None.

D. Piping, Exposed:

1. PVC: 20 mils (0.5 mm) thick.

### 3.15 OUTDOOR, FIELD-APPLIED JACKET SCHEDULE

A. Install jacket over insulation material. For insulation with factory-applied jacket, install the field-applied jacket over the factory-applied jacket.

B. If more than one material is listed, selection from materials listed is Contractor's option.

C. Ducts and Plenums, Concealed:

1. None.

D. Piping, Exposed:

1. Aluminum, corrugated: 0.024 inches thick.

END OF SECTION



SECTION 230800  
COMMISSIONING OF HVAC

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes commissioning process requirements for HVAC&R systems, assemblies, and equipment.
- B. Related Sections:
  - 1. Division 01 Section "General Commissioning Requirements" for general commissioning process requirements.

1.3 DEFINITIONS

- A. Commissioning Plan: A document that outlines the organization, schedule, allocation of resources, and documentation requirements of the commissioning process.
- B. CxA: Commissioning Authority.
- C. HVAC&R: Heating, Ventilating, Air Conditioning, and Refrigeration.
- D. Systems, Subsystems, Equipment, and Components: Where these terms are used together or separately, they shall mean "as-built" systems, subsystems, equipment, and components.

1.4 ALLOWANCES

- A. Labor, instrumentation, tools, and equipment costs for technicians for the performance of commissioning testing shall be covered by the Commissioning Authority.

1.5 CONTRACTOR'S RESPONSIBILITIES

- A. Perform commissioning tests at the direction of the CxA.
- B. Attend construction phase controls coordination meeting.
- C. Attend testing, adjusting, and balancing review and coordination meeting.

- D. Participate in HVAC&R systems, assemblies, equipment, and component maintenance orientation and inspection as directed by the CxA.
- E. Provide information requested by the CxA for final commissioning documentation.
- F. Provide measuring instruments and logging devices to record test data, and provide data acquisition equipment to record data for the complete range of testing for the required test period.

#### 1.6 CxA'S RESPONSIBILITIES

- A. Provide Project-specific construction checklists and commissioning process test procedures for actual HVAC&R systems, assemblies, equipment, and components to be furnished and installed as part of the construction contract.
- B. Direct commissioning testing.
- C. Verify testing, adjusting, and balancing of Work are complete.
- D. Provide test data, inspection reports, and certificates in Systems Manual.

#### 1.7 COMMISSIONING DOCUMENTATION

- A. Provide the following information to the CxA for inclusion in the commissioning plan:
  - 1. Plan for delivery and review of submittals, systems manuals, and other documents and reports.
  - 2. Identification of installed systems, assemblies, equipment, and components including design changes that occurred during the construction phase.
  - 3. Process and schedule for completing construction checklists and manufacturer's prestart and startup checklists for HVAC&R systems, assemblies, equipment, and components to be verified and tested.
  - 4. Certificate of completion certifying that installation, prestart checks, and startup procedures have been completed.
  - 5. Certificate of readiness certifying that HVAC&R systems, subsystems, equipment, and associated controls are ready for testing.
  - 6. Test and inspection reports and certificates.
  - 7. Corrective action documents.
  - 8. Verification of testing, adjusting, and balancing reports.

#### 1.8 SUBMITTALS

- A. Certificates of readiness.
- B. Certificates of completion of installation, prestart, and startup activities.

## PART 2 - PRODUCTS (Not Used)

## PART 3 - EXECUTION

### 3.1 TESTING PREPARATION

- A. Certify that HVAC&R systems, subsystems, and equipment have been installed, calibrated, and started and are operating according to the Contract Documents.
- B. Certify that HVAC&R instrumentation and control systems have been completed and calibrated, that they are operating according to the Contract Documents, and that pretest set points have been recorded.
- C. Certify that testing, adjusting, and balancing procedures have been completed and that testing, adjusting, and balancing reports have been submitted, discrepancies corrected, and corrective work approved.
- D. Set systems, subsystems, and equipment into operating mode to be tested (e.g., normal shutdown, normal auto position, normal manual position, unoccupied cycle, emergency power, and alarm conditions).
- E. Inspect and verify the position of each device and interlock identified on checklists.
- F. Check safety cutouts, alarms, and interlocks with smoke control and life-safety systems during each mode of operation.
- G. Testing Instrumentation: Install measuring instruments and logging devices to record test data as directed by the CxA.

### 3.2 TESTING AND BALANCING VERIFICATION

- A. Prior to performance of testing and balancing Work, provide copies of reports, sample forms, checklists, and certificates to the CxA.
- B. Notify the CxA at least 10 days in advance of testing and balancing Work, and provide access for the CxA to witness testing and balancing Work.
- C. Provide technicians, instrumentation, and tools to verify testing and balancing of HVAC&R systems at the direction of the CxA.
  - 1. The CxA will notify testing and balancing Contractor 10 days in advance of the date of field verification. Notice will not include data points to be verified.
  - 2. The testing and balancing Contractor shall use the same instruments (by model and serial number) that were used when original data were collected.
  - 3. Failure of an item includes, other than sound, a deviation of more than 10 percent. Failure of more than 10 percent of selected items shall result in rejection of final testing, adjusting, and balancing report. For sound pressure readings, a deviation of 3 dB shall result in rejection of final testing. Variations in background noise must be considered.

4. Remedy the deficiency and notify the CxA so verification of failed portions can be performed.

### 3.3 GENERAL TESTING REQUIREMENTS

- A. Provide technicians, instrumentation, and tools to perform commissioning test at the direction of the CxA.
- B. Scope of HVAC&R testing shall include entire HVAC&R installation, from central equipment for heat generation and refrigeration through distribution systems to each conditioned space. Testing shall include measuring capacities and effectiveness of operational and control functions.
- C. Test all operating modes, interlocks, control responses, and responses to abnormal or emergency conditions, and verify proper response of building automation system controllers and sensors.
- D. The CxA along with the HVAC&R Contractor, testing and balancing Contractor and HVAC&R Instrumentation and Control Contractor shall prepare detailed testing plans, procedures, and checklists for HVAC&R systems, subsystems, and equipment.
- E. Tests will be performed using design conditions whenever possible.
- F. Simulated conditions may need to be imposed using an artificial load when it is not practical to test under design conditions. Before simulating conditions, calibrate testing instruments. Provide equipment to simulate loads. Set simulated conditions as directed by the CxA and document simulated conditions and methods of simulation. After tests, return settings to normal operating conditions.
- G. The CxA may direct that set points be altered when simulating conditions is not practical.
- H. The CxA may direct that sensor values be altered with a signal generator when design or simulating conditions and altering set points are not practical.
- I. If tests cannot be completed because of a deficiency outside the scope of the HVAC&R system, document the deficiency and report it to the Owner. After deficiencies are resolved, reschedule tests.
- J. If the testing plan indicates specific seasonal testing, complete appropriate initial performance tests and documentation and schedule seasonal tests.

### 3.4 HVAC&R SYSTEMS, SUBSYSTEMS, AND EQUIPMENT TESTING PROCEDURES

- A. HVAC&R Instrumentation and Control System Testing: Field testing plans and testing requirements are specified in Division 25 Sections "Instrumentation and Control for HVAC" and "Sequence of Operations for HVAC Controls." Assist the CxA with preparation of testing plans.

- B. Refrigeration System Testing: Provide technicians, instrumentation, tools, and equipment to test performance of refrigerant compressors and condensers, heat pumps, and other refrigeration systems. The CxA shall determine the sequence of testing and testing procedures for each equipment item and pipe section to be tested.
- C. HVAC&R Distribution System Testing: Provide technicians, instrumentation, tools, and equipment to test performance of air distribution systems; special exhaust; and other distribution systems, including HVAC&R terminal equipment and unitary equipment.

END OF SECTION





SECTION 232300  
REFRIGERANT PIPING

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes refrigerant piping used for air-conditioning applications.

1.2 PERFORMANCE REQUIREMENTS

- A. Line Test Pressure for Refrigerant R-410A:
  - 1. Suction Lines for Air-Conditioning Applications: 185 psig (1276 kPa).
  - 2. Suction Lines for Heat-Pump Applications: 325 psig (2241 kPa).
  - 3. Hot-Gas and Liquid Lines: 325 psig (2241 kPa).

1.3 SUBMITTALS

- A. Product Data: For each type of valve and refrigerant piping specialty indicated. Include pressure drop based on manufacturer's test data.
  - 1. Refrigerant piping indicated on Drawings is schematic only. Size piping and design actual piping layout, including oil traps, double risers, specialties, and pipe and tube sizes to accommodate, as a minimum, equipment provided, elevation difference between compressor and evaporator, and length of piping to ensure proper operation and compliance with warranties of connected equipment.

1.4 QUALITY ASSURANCE

- A. Comply with ASHRAE 15, "Safety Code for Refrigeration Systems."
- B. Comply with ASME B31.5, "Refrigeration Piping and Heat Transfer Components."

PART 2 - PRODUCTS

2.1 COPPER TUBE AND FITTINGS

- A. Copper Tube: ASTM B 88, Type K or L (ASTM B 88M, Type A or B).
- B. Wrought-Copper Fittings: ASME B16.22.
- C. Wrought-Copper Unions: ASME B16.22.

- D. Solder Filler Metals: ASTM B 32. Use 95-5 tin antimony or alloy HB solder to join copper socket fittings on copper pipe.
- E. Brazing Filler Metals: AWS A5.8.
- F. Flexible Connectors:
  - 1. Body: Tin-bronze bellows with woven, flexible, tinned-bronze-wire-reinforced protective jacket.
  - 2. End Connections: Socket ends.
  - 3. Offset Performance: Capable of minimum 3/4-inch (20-mm) misalignment in minimum 7-inch- (180-mm-) long assembly.
  - 4. Pressure Rating: Factory test at minimum 500 psig (3450 kPa).
  - 5. Maximum Operating Temperature: 250 deg F (121 deg C).

## 2.2 VALVES AND SPECIALTIES

- A. Diaphragm Packless Valves:
  - 1. Body and Bonnet: Forged brass or cast bronze; globe design with straight-through or angle pattern.
  - 2. Diaphragm: Phosphor bronze and stainless steel with stainless-steel spring.
  - 3. Operator: Rising stem and hand wheel.
  - 4. Seat: Nylon.
  - 5. End Connections: Socket, union, or flanged.
  - 6. Working Pressure Rating: 500 psig (3450 kPa).
  - 7. Maximum Operating Temperature: 275 deg F (135 deg C).
- B. Service Valves:
  - 1. Body: Forged brass with brass cap including key end to remove core.
  - 2. Core: Removable ball-type check valve with stainless-steel spring.
  - 3. Seat: Polytetrafluoroethylene.
  - 4. End Connections: Copper spring.
  - 5. Working Pressure Rating: 500 psig (3450 kPa).
- C. Safety Relief Valves: Comply with ASME Boiler and Pressure Vessel Code; listed and labeled by an NRTL.
  - 1. Body and Bonnet: Ductile iron and steel, with neoprene O-ring seal.
  - 2. Piston, Closing Spring, and Seat Insert: Stainless steel.
  - 3. Seat Disc: Polytetrafluoroethylene.
  - 4. End Connections: Threaded.
  - 5. Working Pressure Rating: 400 psig (2760 kPa).
  - 6. Maximum Operating Temperature: 240 deg F (116 deg C).
- D. Thermostatic Expansion Valves: Comply with ARI 750.
  - 1. Body, Bonnet, and Seal Cap: Forged brass or steel.
  - 2. Diaphragm, Piston, Closing Spring, and Seat Insert: Stainless steel.

3. Packing and Gaskets: Non-asbestos.
4. Capillary and Bulb: Copper tubing filled with refrigerant charge.
5. Suction Temperature: 40 deg F (4.4 deg C).
6. Superheat: Nonadjustable.
7. Reverse-flow option (for heat-pump applications).
8. End Connections: Socket, flare, or threaded union.
9. Working Pressure Rating: 450 psig (3100 kPa).

E. Straight-Type Strainers:

1. Body: Welded steel with corrosion-resistant coating.
2. Screen: 100-mesh stainless steel.
3. End Connections: Socket or flare.
4. Working Pressure Rating: 500 psig (3450 kPa).
5. Maximum Operating Temperature: 275 deg F (135 deg C).

F. Angle-Type Strainers:

1. Body: Forged brass or cast bronze.
2. Drain Plug: Brass hex plug.
3. Screen: 100-mesh monel.
4. End Connections: Socket or flare.
5. Working Pressure Rating: 500 psig (3450 kPa).
6. Maximum Operating Temperature: 275 deg F (135 deg C).

G. Moisture/Liquid Indicators:

1. Body: Forged brass.
2. Window: Replaceable, clear, fused glass window with indicating element protected by filter screen.
3. Indicator: Color coded to show moisture content in ppm.
4. Minimum Moisture Indicator Sensitivity: Indicate moisture above 60 ppm.
5. End Connections: Socket or flare.
6. Working Pressure Rating: 500 psig (3450 kPa).
7. Maximum Operating Temperature: 240 deg F (116 deg C).

H. Replaceable-Core Filter Dryers: Comply with ARI 730.

1. Body and Cover: Painted-steel shell with ductile-iron cover, stainless-steel screws, and neoprene gaskets.
2. Filter Media: 10 micron, pleated with integral end rings; stainless-steel support.
3. Desiccant Media: Activated alumina.
4. Designed for reverse flow (for heat-pump applications).
5. End Connections: Socket.
6. Access Ports: NPS 1/4 (DN 8) connections at entering and leaving sides for pressure differential measurement.
7. Maximum Pressure Loss: 2 psig (14 kPa).
8. Working Pressure Rating: 500 psig (3450 kPa).
9. Maximum Operating Temperature: 240 deg F (116 deg C).

## 2.3 REFRIGERANTS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. Atofina Chemicals, Inc.
  - 2. DuPont Company; Fluorochemicals Div.
  - 3. Honeywell, Inc.; Genetron Refrigerants.
  - 4. INEOS Fluor Americas LLC.
- B. ASHRAE 34, R-410A: Difluoromethane and Pentafluoroethane.

## PART 3 - EXECUTION

### 3.1 PIPING APPLICATIONS

- A. Suction Lines NPS 1-1/2 (DN 40) and Smaller for Conventional Air-Conditioning Applications: Copper, Type ACR, annealed-temper tubing and wrought-copper fittings with brazed or soldered joints.
- B. Suction Lines NPS 2 to NPS 4 (DN 50 to DN 100) for Conventional Air-Conditioning Applications: Copper, Type ACR, drawn-temper tubing and wrought-copper fittings with brazed or soldered joints.
- C. Hot-Gas and Liquid Lines, and Suction Lines for Heat-Pump Applications: Copper, Type ACR, annealed-temper tubing and wrought-copper fittings with brazed or soldered joints.
- D. Safety-Relief-Valve Discharge Piping: Copper, Type ACR, drawn-temper tubing and wrought-copper fittings with soldered joints.

### 3.2 VALVE AND SPECIALTY APPLICATIONS

- A. Install diaphragm packless valves in suction and discharge lines of compressor.
- B. Install service valves for gage taps at strainers if they are not an integral part of strainers.
- C. Except as otherwise indicated, install diaphragm packless valves on inlet and outlet side of filter dryers.
- D. Install a full-sized, three-valve bypass around filter dryers.
- E. Install thermostatic expansion valves as close as possible to distributors on evaporators.
  - 1. Install valve so diaphragm case is warmer than bulb.
  - 2. Secure bulb to clean, straight, horizontal section of suction line using two bulb straps. Do not mount bulb in a trap or at bottom of the line.

3. If external equalizer lines are required, make connection where it will reflect suction-line pressure at bulb location.
- F. Install safety relief valves where required by ASME Boiler and Pressure Vessel Code. Pipe safety-relief-valve discharge line to outside according to ASHRAE 15.
- G. Install moisture/liquid indicators in liquid line at the inlet of the thermostatic expansion valve or at the inlet of the evaporator coil capillary tube.
- H. Install strainers upstream from and adjacent to the following unless they are furnished as an integral assembly for device being protected:
  1. Solenoid valves.
  2. Thermostatic expansion valves.
  3. Compressor.
- I. Install filter dryers in liquid line between compressor and thermostatic expansion valve, and in the suction line at the compressor.
- J. Install flexible connectors at compressors.

### 3.3 PIPING INSTALLATION

- A. Drawing plans, schematics, and diagrams indicate general location and arrangement of piping systems; indicated locations and arrangements were used to size pipe and calculate friction loss, expansion, pump sizing, and other design considerations. Install piping as indicated unless deviations to layout are approved on Shop Drawings.
- B. Install refrigerant piping according to ASHRAE 15.
- C. Install piping in concealed locations unless otherwise indicated and except in equipment rooms and service areas.
- D. Install piping indicated to be exposed and piping in equipment rooms and service areas at right angles or parallel to building walls. Diagonal runs are prohibited unless specifically indicated otherwise.
- E. Install piping above accessible ceilings to allow sufficient space for ceiling panel removal.
- F. Install piping adjacent to machines to allow service and maintenance.
- G. Install piping free of sags and bends.
- H. Install fittings for changes in direction and branch connections.
- I. Select system components with pressure rating equal to or greater than system operating pressure.
- J. Install piping as short and direct as possible, with a minimum number of joints, elbows, and fittings.

- K. Arrange piping to allow inspection and service of refrigeration equipment. Install valves and specialties in accessible locations to allow for service and inspection. Install access doors or panels as specified in Division 08 Section "Access Doors and Frames" if valves or equipment requiring maintenance is concealed behind finished surfaces.
- L. Install piping per equipment manufacturers requirements and guidelines for slope, distance, changes in direction, changes in elevation and branching.
- M. Install refrigerant piping in rigid or flexible conduit in locations where exposed to mechanical injury.
- N. Slope refrigerant piping as follows:
  1. Install horizontal hot-gas discharge piping with a uniform slope downward away from compressor.
  2. Install horizontal suction lines with a uniform slope downward to compressor.
  3. Install traps and double risers to entrain oil in vertical runs.
  4. Liquid lines may be installed level.
- O. When brazing or soldering, remove solenoid-valve coils and sight glasses; also remove valve stems, seats, and packing, and accessible internal parts of refrigerant specialties. Do not apply heat near expansion-valve bulb.
- P. Install pipe sleeves at penetrations in exterior walls and floor assemblies.
- Q. Seal penetrations through fire and smoke barriers according to Division 07 Section "Penetration Firestopping."
- R. Install piping with adequate clearance between pipe and adjacent walls and hangers or between pipes for insulation installation.
- S. Install sleeves through floors, walls, or ceilings, sized to permit installation of full-thickness insulation.
- T. Seal pipe penetrations through exterior walls according to Division 07 Section "Joint Sealants" for materials and methods.
- U. Identify refrigerant piping and valves according to Division 23 Section "Identification for HVAC Piping and Equipment."

### 3.4 PIPE JOINT CONSTRUCTION

- A. Soldered Joints: Construct joints according to ASTM B 828 or CDA's "Copper Tube Handbook."
- B. Brazed Joints: Construct joints according to AWS's "Brazing Handbook," Chapter "Pipe and Tube."
  1. Use Type BcuP, copper-phosphorus alloy for joining copper socket fittings with copper pipe.
  2. Use Type BAg, cadmium-free silver alloy for joining copper with bronze or steel.

### 3.5 HANGERS AND SUPPORTS

- A. Hanger, support, and anchor products are specified in Division 23 Section "Hangers and Supports for HVAC Piping and Equipment."
- B. Install the following pipe attachments:
  - 1. Adjustable steel clevis hangers for individual horizontal runs less than 20 feet (6 m) long.
  - 2. Roller hangers and spring hangers for individual horizontal runs 20 feet (6 m) or longer.
  - 3. Pipe Roller: MSS SP-58, Type 44 for multiple horizontal piping 20 feet (6 m) or longer, supported on a trapeze.
  - 4. Spring hangers to support vertical runs.
  - 5. Copper-clad hangers and supports for hangers and supports in direct contact with copper pipe.
- C. Install hangers for copper tubing with the following maximum spacing and minimum rod sizes:
  - 1. NPS 1/2 thru 5/8 (DN 15 thru DN 18): Maximum span, 60 inches (1500 mm); minimum rod size, 1/4 inch (6.4 mm).
  - 2. NPS 1 (DN 25): Maximum span, 72 inches (1800 mm); minimum rod size, 1/4 inch (6.4 mm).
  - 3. NPS 1-1/4 thru 1-1/2 (DN 32 thru DN 40): Maximum span, 96 inches (2400 mm); minimum rod size, 3/8 inch (9.5 mm).
  - 4. All sizes, provide supports within 12 inches of all changes in direction.

### 3.6 FIELD QUALITY CONTROL

- A. Perform tests and inspections and prepare test reports.
- B. Tests and Inspections:
  - 1. Comply with ASME B31.5, Chapter VI.
  - 2. Test refrigerant piping and specialties. Isolate compressor, condenser, evaporator, and safety devices from test pressure if they are not rated above the test pressure.
  - 3. Test high- and low-pressure side piping of each system separately at not less than the pressures indicated in Part 1 "Performance Requirements" Article.
    - a. Fill system with nitrogen to the required test pressure.
    - b. System shall maintain test pressure at the manifold gage throughout duration of test.
    - c. Test joints and fittings with electronic leak detector or by brushing a small amount of soap and glycerin solution over joints.
    - d. Remake leaking joints using new materials, and retest until satisfactory results are achieved.

### 3.7 SYSTEM CHARGING

- A. Charge system using the following procedures and per equipment manufacturers instructions:
  - 1. Install core in filter dryers after leak test but before evacuation.
  - 2. Evacuate entire refrigerant system with a vacuum pump to 500 micrometers (67 Pa). If vacuum holds for 12 hours, system is ready for charging.
  - 3. Break vacuum with refrigerant gas, allowing pressure to build up to 2 psig (14 kPa).
  - 4. Charge system with a new filter-dryer core in charging line.

### 3.8 ADJUSTING

- A. Adjust thermostatic expansion valve to obtain proper evaporator superheat.
- B. Adjust high- and low-pressure switch settings to avoid short cycling in response to fluctuating suction pressure.
- C. Adjust set-point temperature of air-conditioning or chilled-water controllers to the system design temperature.
- D. Perform the following adjustments before operating the refrigeration system, according to manufacturer's written instructions:
  - 1. Verify that compressor oil level is correct.
  - 2. Open compressor suction and discharge valves.
  - 3. Open refrigerant valves except bypass valves that are used for other purposes.
  - 4. Check open compressor-motor alignment and verify lubrication for motors and bearings.
- E. Replace core of replaceable filter dryer after system has been adjusted and after design flow rates and pressures are established.

END OF SECTION



SECTION 233113  
METAL DUCTS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Rectangular ducts and fittings.
2. Round ducts and fittings.
3. Sheet metal materials.
4. Duct liner.
5. Sealants and gaskets.
6. Hangers and supports.
7. Seismic-restraint devices.

B. Related Sections:

1. Division 23 Section "Testing, Adjusting, and Balancing for HVAC" for testing, adjusting, and balancing requirements for metal ducts.
2. Division 23 Section "Air Duct Accessories" for dampers, sound-control devices, duct-mounting access doors and panels, turning vanes, and flexible ducts.

1.2 PERFORMANCE REQUIREMENTS

- A. Delegated Duct Design: Duct construction, including sheet metal thicknesses, seam and joint construction, reinforcements, and hangers and supports, shall comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" and performance requirements and design criteria indicated in "Duct Schedule" Article.
- B. Structural Performance: Duct hangers and supports and seismic restraints shall withstand the effects of gravity and seismic loads and stresses within limits and under conditions described in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" and ASCE/SEI 7.
- C. Airstream Surfaces: Surfaces in contact with the airstream shall comply with requirements in ASHRAE 62.1-2004.

1.3 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Delegated-Design Submittal:
1. Sheet metal thicknesses.
  2. Joint and seam construction and sealing.

3. Reinforcement details and spacing.
4. Materials, fabrication, assembly, and spacing of hangers and supports.

#### 1.4 QUALITY ASSURANCE

- A. ASHRAE Compliance: Applicable requirements in ASHRAE 62.1-2004, Section 5 - "Systems and Equipment" and Section 7 - "Construction and System Start-Up."
- B. ASHRAE/IESNA Compliance: Applicable requirements in ASHRAE/IESNA 90.1-2004, Section 6.4.4 - "HVAC System Construction and Insulation."

### PART 2 - PRODUCTS

#### 2.1 RECTANGULAR DUCTS AND FITTINGS

- A. General Fabrication Requirements: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" based on indicated static-pressure class unless otherwise indicated.
- B. Transverse Joints: Select joint types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 1-4, "Transverse (Girth) Joints," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible." Provide Drive Slip or Hemmed "S" Slip or approved equal.
- C. Longitudinal Seams: Select seam types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 1-5, "Longitudinal Seams - Rectangular Ducts," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible." Provide Drive Slip or Hemmed "S" Slip or approved equal.
- D. Elbows, Transitions, Offsets, Branch Connections, and Other Duct Construction: Select types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Chapter 2, "Fittings and Other Construction," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."

#### 2.2 ROUND DUCTS AND FITTINGS

- A. General Fabrication Requirements: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Chapter 3, "Round, Oval, and Flexible Duct," based on indicated static-pressure class unless otherwise indicated.
  1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

- a. McGill AirFlow LLC.
  - b. SEMCO Incorporated.
  - c. Sheet Metal Connectors, Inc.
  - d. Spiral Manufacturing Co., Inc.
- B. Transverse Joints: Select joint types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 3-2, "Transverse Joints - Round Duct," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."
- C. Longitudinal Seams: Select seam types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 3-1, "Seams - Round Duct and Fittings," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."
- D. Tees and Laterals: Select types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 3-4, "90 Degree Tees and Laterals," and Figure 3-5, "Conical Tees," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."

## 2.3 SHEET METAL MATERIALS

- A. General Material Requirements: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" for acceptable materials, material thicknesses, and duct construction methods unless otherwise indicated. Sheet metal materials shall be free of pitting, seam marks, roller marks, stains, discolorations, and other imperfections.
- B. Galvanized Sheet Steel: Comply with ASTM A 653/A 653M.
- 1. Galvanized Coating Designation: G60 (Z180).
  - 2. Finishes for Surfaces Exposed to View: Mill phosphatized.
- C. Stainless-Steel Sheets: Comply with ASTM A 480/A 480M, Type 304 or 316, as indicated in the "Duct Schedule" Article; cold rolled, annealed, sheet. Exposed surface finish shall be No. 2B, No. 2D, No. 3, or No. 4 as indicated in the "Duct Schedule" Article.
- D. Reinforcement Shapes and Plates: ASTM A 36/A 36M, steel plates, shapes, and bars; black and galvanized.
- 1. Where black- and galvanized-steel shapes and plates are used to reinforce aluminum ducts, isolate the different metals with butyl rubber, neoprene, or EPDM gasket materials.

- E. Tie Rods: Galvanized steel, 1/4-inch (6-mm) minimum diameter for lengths 36 inches (900 mm) or less; 3/8-inch (10-mm) minimum diameter for lengths longer than 36 inches (900 mm).

## 2.4 DUCT LINER

- A. Fibrous-Glass Duct Liner: Comply with ASTM C 1071, NFPA 90A, or NFPA 90B; and with NAIMA AH124, "Fibrous Glass Duct Liner Standard."
  - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 2. Maximum Thermal Conductivity:
    - a. Type II, Rigid: 0.23 Btu x in./h x sq. ft. x deg F (0.033 W/m x K) at 75 deg F (24 deg C) mean temperature.
  - 3. Antimicrobial Erosion-Resistant Coating: Apply to the surface of the liner that will form the interior surface of the duct to act as a moisture repellent and erosion-resistant coating. Antimicrobial compound shall be tested for efficacy by an NRTL and registered by the EPA for use in HVAC systems.
  - 4. Water-Based Liner Adhesive: Comply with NFPA 90A or NFPA 90B and with ASTM C 916.
    - a. For indoor applications, use adhesive that has a VOC content of 80 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
- B. Insulation Pins and Washers:
  - 1. Cupped-Head, Capacitor-Discharge-Weld Pins: Copper- or zinc-coated steel pin, fully annealed for capacitor-discharge welding, 0.106-inch- (2.6-mm-) diameter shank, length to suit depth of insulation indicated with integral 1-1/2-inch (38-mm) galvanized carbon-steel washer.
  - 2. Insulation-Retaining Washers: Self-locking washers formed from 0.016-inch- (0.41-mm-) thick galvanized steel; with beveled edge sized as required to hold insulation securely in place but not less than 1-1/2 inches (38 mm) in diameter.

## 2.5 SEALANT AND GASKETS

- A. General Sealant and Gasket Requirements: Surface-burning characteristics for sealants and gaskets shall be a maximum flame-spread index of 25 and a maximum smoke-developed index of 50 when tested according to UL 723; certified by an NRTL.
- B. Water-Based Joint and Seam Sealant:
  - 1. Application Method: Brush on.
  - 2. Solids Content: Minimum 65 percent.
  - 3. Shore A Hardness: Minimum 20.
  - 4. Water resistant.

5. Mold and mildew resistant.
6. VOC: Maximum 75 g/L (less water).
7. Maximum Static-Pressure Class: 10-inch wg (2500 Pa), positive and negative.
8. Service: Indoor or outdoor.
9. Substrate: Compatible with galvanized sheet steel (both PVC coated and bare), stainless steel, or aluminum sheets.

C. Flanged Joint Sealant: Comply with ASTM C 920.

1. General: Single-component, acid-curing, silicone, elastomeric.
2. Type: S.
3. Grade: NS.
4. Class: 25.
5. Use: O.
6. For indoor applications, use sealant that has a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

D. Flange Gaskets: Butyl rubber, neoprene, or EPDM polymer with polyisobutylene plasticizer.

E. Round Duct Joint O-Ring Seals:

1. Seal shall provide maximum leakage class of 3 cfm/100 sq. ft. at 1-inch wg (0.14 L/s per sq. m at 250 Pa) and shall be rated for 10-inch wg (2500-Pa) static-pressure class, positive or negative.
2. EPDM O-ring to seal in concave bead in coupling or fitting spigot.
3. Double-lipped, EPDM O-ring seal, mechanically fastened to factory-fabricated couplings and fitting spigots.

## 2.6 HANGERS AND SUPPORTS

A. Hanger Rods for Noncorrosive Environments: Cadmium-plated steel rods and nuts.

B. Hanger Rods for Corrosive Environments: Electrogalvanized, all-thread rods or galvanized rods with threads painted with zinc-chromate primer after installation.

C. Strap and Rod Sizes: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Table 4-1 (Table 4-1M), "Rectangular Duct Hangers Minimum Size," and Table 4-2, "Minimum Hanger Sizes for Round Duct."

D. Steel Cables for Galvanized-Steel Ducts: Galvanized steel complying with ASTM A 603.

E. Steel Cables for Stainless-Steel Ducts: Stainless steel complying with ASTM A 492.

F. Steel Cable End Connections: Cadmium-plated steel assemblies with brackets, swivel, and bolts designed for duct hanger service; with an automatic-locking and clamping device.

- G. Duct Attachments: Sheet metal screws, blind rivets, or self-tapping metal screws; compatible with duct materials.
- H. Trapeze and Riser Supports:
  - 1. Supports for Galvanized-Steel Ducts: Galvanized-steel shapes and plates.
  - 2. Supports for Stainless-Steel Ducts: Stainless-steel shapes and plates.
  - 3. Supports for Aluminum Ducts: Aluminum or galvanized steel coated with zinc chromate.

## 2.7 SEISMIC-RESTRAINT DEVICES

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. Cooper B-Line, Inc.; a division of Cooper Industries.
  - 2. Kinetics Noise Control.
  - 3. Mason Industries.
  - 4. TOLCO; a brand of NIBCO INC.
  - 5. Unistrut Corporation; Tyco International, Ltd.
- B. General Requirements for Restraint Components: Rated strengths, features, and applications shall be as defined in reports by an agency acceptable to authorities having jurisdiction.
  - 1. Structural Safety Factor: Allowable strength in tension, shear, and pullout force of components shall be at least four times the maximum seismic forces to which they will be subjected.
- C. Channel Support System: Shop- or field-fabricated support assembly made of slotted steel channels rated in tension, compression, and torsion forces and with accessories for attachment to braced component at one end and to building structure at the other end. Include matching components and corrosion-resistant coating.
- D. Restraint Cables: ASTM A 603, galvanized or ASTM A 492, stainless-steel cables with end connections made of cadmium-plated steel assemblies with brackets, swivel, and bolts designed for restraining cable service; and with an automatic-locking and clamping device or double-cable clips.
- E. Hanger Rod Stiffener: Reinforcing steel angle clamped to hanger rod.
- F. Mechanical Anchor Bolts: Drilled-in and stud-wedge or female-wedge type. Select anchor bolts with strength required for anchor and as tested according to ASTM E 488.

## PART 3 - EXECUTION

### 3.1 DUCT INSTALLATION

- A. Drawing plans, schematics, and diagrams indicate general location and arrangement of duct system. Indicated duct locations, configurations, and arrangements were used to size ducts and calculate friction loss for air-handling equipment sizing and for other design considerations. Install duct systems as indicated unless deviations to layout are approved on Shop Drawings and Coordination Drawings.
- B. Install ducts according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" unless otherwise indicated.
- C. Install round ducts in maximum practical lengths.
- D. Install ducts with fewest possible joints.
- E. Install factory- or shop-fabricated fittings for changes in direction, size, and shape and for branch connections.
- F. Unless otherwise indicated, install ducts vertically and horizontally, and parallel and perpendicular to building lines.
- G. Install ducts close to walls, overhead construction, columns, and other structural and permanent enclosure elements of building.
- H. Install ducts with a clearance of 1 inch (25 mm), plus allowance for insulation thickness.
- I. Route ducts to avoid passing through transformer vaults and electrical equipment rooms and enclosures.
- J. Where ducts pass through non-fire-rated interior partitions and exterior walls and are exposed to view, cover the opening between the partition and duct or duct insulation with sheet metal flanges of same metal thickness as the duct. Overlap openings on four sides by at least 1-1/2 inches (38 mm).
- K. Where ducts pass through fire-rated interior partitions and exterior walls, install fire dampers. Comply with requirements in Division 23 Section "Air Duct Accessories" for fire and smoke dampers.
- L. Protect duct interiors installed and/or stored on site from moisture, construction debris and dust, and other foreign materials.
  - 1. Cover and seal open ends of ducts with plastic wrap and duct tape.
  - 2. Turn off ventilation system and protect duct interiors from dust infiltration during dust producing activities (e.g. demolition, drywall installation, finishing).
  - 3. At the end of each workday, cover and seal open ends or openings of installed ducts with plastic wrap and duct tape.

### 3.2 DUCT SEALING

- A. Seal ducts for duct static-pressure, seal classes, and leakage classes specified in "Duct Schedule" Article according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."
- B. Seal ducts according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."

### 3.3 HANGER AND SUPPORT INSTALLATION

- A. Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Chapter 4, "Hangers and Supports."
- B. Hanger Spacing: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Table 4-1 (Table 4-1M), "Rectangular Duct Hangers Minimum Size," and Table 4-2, "Minimum Hanger Sizes for Round Duct," for maximum hanger spacing; install hangers and supports within 24 inches (610 mm) of each elbow and within 48 inches (1200 mm) of each branch intersection.
- C. Hangers Exposed to View: Threaded rod and angle or channel supports.
- D. Support vertical ducts with steel angles or channel secured to the sides of the duct with welds, bolts, sheet metal screws, or blind rivets; support at each floor and at a maximum interval of 16 feet (5 m).
- E. Install upper attachments to structures. Select and size upper attachments with pull-out, tension, and shear capacities appropriate for supported loads and building materials where used.

### 3.4 SEISMIC-RESTRAINT-DEVICE INSTALLATION

- A. Install ducts with hangers and braces designed to support the duct and to restrain against seismic forces required by applicable building codes. Comply with ASCE/SEI 7.
- B. Select seismic-restraint devices with capacities adequate to carry present and future static and seismic loads.
- C. Install cables so they do not bend across edges of adjacent equipment or building structure.
- D. Install cable restraints on ducts that are suspended with vibration isolators.
- E. Install seismic-restraint devices using methods approved by an agency acceptable to authorities having jurisdiction.
- F. Attachment to Structure: If specific attachment is not indicated, anchor bracing and restraints to structure, to flanges of beams, to upper truss chords of bar joists, or to concrete members.



G. Drilling for and Setting Anchors:

1. Identify position of reinforcing steel and other embedded items prior to drilling holes for anchors. Do not damage existing reinforcement or embedded items during drilling. Notify the Architect if reinforcing steel or other embedded items are encountered during drilling. Locate and avoid prestressed tendons, electrical and telecommunications conduit, and gas lines.
2. Do not drill holes in concrete or masonry until concrete, mortar, or grout has achieved full design strength.
3. Wedge Anchors: Protect threads from damage during anchor installation. Heavy-duty sleeve anchors shall be installed with sleeve fully engaged in the structural element to which anchor is to be fastened.
4. Set anchors to manufacturer's recommended torque, using a torque wrench.
5. Install zinc-coated steel anchors for interior applications and stainless-steel anchors for applications exposed to weather.

3.5 CONNECTIONS

- A. Make connections to equipment with flexible connectors complying with Division 23 Section "Air Duct Accessories."
- B. Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" for branch, outlet and inlet, and terminal unit connections.

3.6 PAINTING

- A. Paint exterior of metal ducts that are visible. Paint materials and application requirements are specified in Division 09 painting Sections.

3.7 DUCT CLEANING

- A. Clean new duct system(s) before testing, adjusting, and balancing.
- B. Clean the following components by removing surface contaminants and deposits:
  1. Air outlets and inlets (registers, grilles, and diffusers).
  2. Supply, return, and exhaust fans including fan housings, plenums (except ceiling supply and return plenums), scrolls, blades or vanes, shafts, baffles, dampers, and drive assemblies.
  3. Air-handling unit internal surfaces and components including mixing box, coil section, air wash systems, spray eliminators, condensate drain pans, humidifiers and dehumidifiers, filters and filter sections, and condensate collectors and drains.
  4. Coils and related components.
  5. Return-air ducts, dampers, actuators, and turning vanes except in ceiling plenums and mechanical equipment rooms.
  6. Supply-air ducts, dampers, actuators, and turning vanes.
  7. Dedicated exhaust and ventilation components and makeup air systems.

### 3.8 START UP

- A. Air Balance: Comply with requirements in Division 23 Section "Testing, Adjusting, and Balancing for HVAC."

### 3.9 DUCT SCHEDULE

- A. Fabricate ducts with galvanized sheet steel except as otherwise indicated.

- B. Supply and Return Ducts:

- 1. Ducts Connected to Fan Coil Units, Furnaces, Heat Pumps, and Terminal Units:

- a. Pressure Class: Positive 2-inch wg (500 Pa).
    - b. Minimum SMACNA Seal Class: B.
    - c. SMACNA Leakage Class for Rectangular: 12.
    - d. SMACNA Leakage Class for Round: 12.

- 2. Ducts Connected to Constant-Volume Air-Handling Units:

- a. Pressure Class: Positive 2-inch wg (500 Pa).
    - b. Minimum SMACNA Seal Class: B.
    - c. SMACNA Leakage Class for Rectangular: 12.
    - d. SMACNA Leakage Class for Round: 12.

- C. Exhaust Ducts:

- 1. Ducts Connected to Fans Exhausting (ASHRAE 62.1, Class 1 and 2) Air:

- a. Pressure Class: Negative 2-inch wg (500 Pa).
    - b. Minimum SMACNA Seal Class: B if negative pressure, and A if positive pressure.
    - c. SMACNA Leakage Class for Rectangular: 12.
    - d. SMACNA Leakage Class for Round and Flat Oval: 12.

- D. Intermediate Reinforcement:

- 1. Galvanized-Steel Ducts: Galvanized steel or carbon steel coated with zinc-chromate primer.

- 2. Stainless-Steel Ducts:

- a. Exposed to Airstream: Match duct material.
    - b. Not Exposed to Airstream: Match duct material.

- E. Liner:

- 1. Supply Air Ducts: Fibrous glass, Type II, 1-1/2 inches (38 mm) thick.
  - 2. Return Air Ducts: Fibrous glass, Type II, 1-1/2 inches (38 mm) thick.

3. Supply Fan Plenums: Fibrous glass, Type II, 1-1/2 inches (38 mm) thick.
4. Return- and Exhaust-Fan Plenums: Fibrous glass, Type II, 2 inches (51 mm) thick.
5. Supply, Return and Energy Recovery Ducts Exposed on Roof: Fibrous glass, Type II, 2 inches thick.

F. Elbow Configuration:

1. Rectangular Duct: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 2-2, "Rectangular Elbows."
  - a. Velocity 1000 fpm (5 m/s) or Lower:
    - 1) Radius Type RE 1 with minimum 0.5 radius-to-diameter ratio.
    - 2) Mitered Type RE 4 without vanes.
  - b. Velocity 1000 to 1500 fpm (5 to 7.6 m/s):
    - 1) Radius Type RE 1 with minimum 1.0 radius-to-diameter ratio.
    - 2) Radius Type RE 3 with minimum 0.5 radius-to-diameter ratio and two vanes.
    - 3) Mitered Type RE 2 with vanes complying with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 2-3, "Vanes and Vane Runners," and Figure 2-4, "Vane Support in Elbows."
  - c. Velocity 1500 fpm (7.6 m/s) or Higher:
    - 1) Radius Type RE 1 with minimum 1.5 radius-to-diameter ratio.
    - 2) Radius Type RE 3 with minimum 1.0 radius-to-diameter ratio and two vanes.
    - 3) Mitered Type RE 2 with vanes complying with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 2-3, "Vanes and Vane Runners," and Figure 2-4, "Vane Support in Elbows."
2. Rectangular Duct: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 2-2, "Rectangular Elbows."
  - a. Radius Type RE 1 with minimum 1.5 radius-to-diameter ratio.
  - b. Radius Type RE 3 with minimum 1.0 radius-to-diameter ratio and two vanes.
  - c. Mitered Type RE 2 with vanes complying with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 2-3, "Vanes and Vane Runners," and Figure 2-4, "Vane Support in Elbows."

3. Round Duct: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 3-3, "Round Duct Elbows."
  - a. Minimum Radius-to-Diameter Ratio and Elbow Segments: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Table 3-1, "Mitered Elbows." Elbows with less than 90-degree change of direction have proportionately fewer segments.
    - 1) Velocity 1000 fpm (5 m/s) or Lower: 0.5 radius-to-diameter ratio and three segments for 90-degree elbow.
    - 2) Velocity 1000 to 1500 fpm (5 to 7.6 m/s): 1.0 radius-to-diameter ratio and four segments for 90-degree elbow.
    - 3) Velocity 1500 fpm (7.6 m/s) or Higher: 1.5 radius-to-diameter ratio and five segments for 90-degree elbow.
    - 4) Radius-to Diameter Ratio: 1.5.
  - b. Round Elbows, 12 Inches (305 mm) and Smaller in Diameter: Stamped or pleated.
  - c. Round Elbows, 14 Inches (356 mm) and Larger in Diameter: Spot welded seam.

G. Branch Configuration:

1. Rectangular Duct: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 2-6, "Branch Connections" and details provided on drawings.
  - a. Rectangular Main to Rectangular Branch: 45-degree entry.
  - b. Rectangular Main to Round Branch: 45 degree Lead-In,Low-loss.
2. Round: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 3-4, "90 Degree Tees and Laterals," and details provided on drawings.
  - a. All shall be 45-degree lateral.

END OF SECTION

SECTION 233300  
AIR DUCT ACCESSORIES

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:
  - 1. Backdraft and pressure relief dampers.
  - 2. Manual volume dampers.
  - 3. Flange connectors.
  - 4. Turning vanes.
  - 5. Duct-mounted access doors.
  - 6. Flexible connectors.
  - 7. Flexible ducts.
  - 8. Duct accessory hardware.

1.3 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Operation and Maintenance Data: For air duct accessories to include in operation and maintenance manuals.

1.4 QUALITY ASSURANCE

- A. Comply with NFPA 90A, "Installation of Air Conditioning and Ventilating Systems," and with NFPA 90B, "Installation of Warm Air Heating and Air Conditioning Systems."
- B. Comply with AMCA 500-D testing for damper rating.

## PART 2 - PRODUCTS

### 2.1 MATERIALS

- A. Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" for acceptable materials, material thicknesses, and duct construction methods unless otherwise indicated. Sheet metal materials shall be free of pitting, seam marks, roller marks, stains, discolorations, and other imperfections.
- B. Galvanized Sheet Steel: Comply with ASTM A 653/A 653M.
  - 1. Galvanized Coating Designation: G60.
  - 2. Exposed-Surface Finish: Mill phosphatized.
- C. Stainless-Steel Sheets: Comply with ASTM A 480/A 480M, Type 304, and having a No. 2 finish for concealed ducts and No. 3 finish for exposed ducts.
- D. Aluminum Sheets: Comply with ASTM B 209, Alloy 3003, Temper H14; with mill finish for concealed ducts and standard, 1-side bright finish for exposed ducts.
- E. Extruded Aluminum: Comply with ASTM B 221, Alloy 6063, Temper T6.
- F. Reinforcement Shapes and Plates: Galvanized-steel reinforcement where installed on galvanized sheet metal ducts; compatible materials for aluminum and stainless-steel ducts.
- G. Tie Rods: Galvanized steel, 1/4-inch minimum diameter for lengths 36 inches or less; 3/8-inch minimum diameter for lengths longer than 36 inches.

### 2.2 BACKDRAFT AND PRESSURE RELIEF DAMPERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. Ventfabrics, Ventlok
  - 2. Duro Dyne Inc.
  - 3. Greenheck Fan Corporation.
  - 4. Nailor Industries Inc.
  - 5. Pottorff; a division of PCI Industries, Inc.
  - 6. Ruskin Company.
- B. Description: Gravity balanced.
- C. Maximum Air Velocity: 2000 fpm.
- D. Maximum System Pressure: 1-inch wg.
- E. Frame: 0.052-inch-thick, galvanized sheet steel, with welded corners and mounting flange.

- F. Blades: Multiple single-piece blades, maximum 6-inch width, [0.025-inch- thick, roll-formed aluminum with sealed edges.
- G. Blade Action: Parallel.
- H. Blade Seals: Vinyl foam.
- I. Blade Axles:
  - 1. Material: Galvanized steel or Stainless steel.
  - 2. Diameter: 0.20 inch.
- J. Return Spring: Adjustable tension.
- K. Bearings: Steel ball or Synthetic pivot bushings.
- L. Accessories:
  - 1. Adjustment device to permit setting for varying differential static pressure.
  - 2. Counterweights and spring-assist kits for vertical airflow installations.
  - 3. Electric actuators.
  - 4. Chain pulls.
  - 5. Screen Mounting: Front mounted in sleeve.
    - a. Sleeve Thickness: 20-gage minimum.
    - b. Sleeve Length: 6 inches minimum.
  - 6. Screen Mounting: Rear mounted.
  - 7. Screen Material: Galvanized steel or Aluminum.
  - 8. Screen Type: Bird.
  - 9. 90-degree stops.

## 2.3 MANUAL VOLUME DAMPERS

- A. Standard, Steel, Manual Volume Dampers:
  - 1. Manufacturers: Subject to compliance with requirements, [provide products by one of the following] [available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following]:
    - a. Ventfabrics, Ventlok.
    - b. McGill AirFlow LLC.
    - c. METALAIRE, Inc.
    - d. Nailor Industries Inc.
    - e. Pottorff; a division of PCI Industries, Inc.
    - f. Ruskin Company.
    - g. Duro Dyne Inc.
  - 2. Standard leakage rating, with linkage outside airstream.
  - 3. Suitable for horizontal or vertical applications.

4. Frames:
  - a. Hat-shaped, galvanized-steel channels, 0.064-inch minimum thickness.
  - b. Mitered and welded corners.
  - c. Flanges for attaching to walls and flangeless frames for installing in ducts.

5. Blades:
  - a. Multiple or single blade.
  - b. Parallel- or opposed-blade design.
  - c. Stiffen damper blades for stability.
  - d. Galvanized-steel, 0.064 inch thick.

6. Blade Axles: Galvanized steel or Stainless steel.

7. Bearings:
  - a. Molded synthetic or Stainless-steel sleeve.
  - b. Dampers in ducts with pressure classes of 3-inch wg or less shall have axles full length of damper blades and bearings at both ends of operating shaft.

8. Tie Bars and Brackets: Galvanized steel.

B. Jackshaft:

1. Size: 1-inch diameter.
2. Material: Galvanized-steel pipe rotating within pipe-bearing assembly mounted on supports at each mullion and at each end of multiple-damper assemblies.
3. Length and Number of Mountings: As required to connect linkage of each damper in multiple-damper assembly.

C. Damper Hardware:

1. Zinc-plated, spring loaded, serrated die-cast core with dial and handle made of 3/32-inch- thick zinc-plated steel, and a 3/4-inch hexagon locking nut.
2. Include center hole to suit damper operating-rod size.
3. Include elevated platform for insulated duct mounting.

## 2.4 FLANGE CONNECTORS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Ductmate Industries, Inc.
2. Nexus PDQ; Division of Shilco Holdings Inc.
3. Ward Industries, Inc.; a division of Hart & Cooley, Inc.

B. Description: Roll-formed, factory-fabricated, slide-on transverse flange connectors, gaskets, and components.

C. Material: Galvanized steel.



- D. Gage and Shape: Match connecting ductwork.

## 2.5 TURNING VANES

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. Ductmate Industries, Inc.
  - 2. Duro Dyne Inc.
  - 3. METALAIRE, Inc.
  - 4. SEMCO Incorporated.
  - 5. Ward Industries, Inc.; a division of Hart & Cooley, Inc.
  - 6. Aero Dyne HEP
- B. Manufactured Turning Vanes for Metal Ducts: Double wall, hollow metal, airfoil shape blades of galvanized sheet steel; support with bars perpendicular to blades set; set into vane runners suitable for duct mounting.
  - 1. Acoustic Turning Vanes: Fabricate airfoil-shaped aluminum extrusions with perforated faces and fibrous-glass fill.
- C. General Requirements: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible"; Figures 2-3, "Vaness and Vane Runners," and 2-4, "Vane Support in Elbows."
- D. Vane Construction: Double wall.

## 2.6 DUCT-MOUNTED ACCESS DOORS

- A. Manufacturers: Subject to compliance with requirements, [provide products by one of the following] [available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following]:
  - 1. American Warming and Ventilating; a division of Mestek, Inc.
  - 2. Cesco Products; a division of Mestek, Inc.
  - 3. Ductmate Industries, Inc.
  - 4. Flexmaster U.S.A., Inc.
  - 5. Greenheck Fan Corporation.
  - 6. McGill AirFlow LLC.
  - 7. Nailor Industries Inc.
  - 8. Pottorff; a division of PCI Industries, Inc.
  - 9. Ventfabrics, Inc.
  - 10. Ward Industries, Inc.; a division of Hart & Cooley, Inc.
- B. Duct-Mounted Access Doors: Fabricate access panels according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible"; Figures 2-10, "Duct Access Doors and Panels," and 2-11, "Access Panels - Round Duct."
  - 1. Door:

- a. Double wall, rectangular.
  - b. Galvanized sheet metal with insulation fill and thickness as indicated for duct pressure class.
  - c. Vision panel.
  - d. Hinges and Latches: 1-by-1-inch butt or piano hinge and cam latches.
  - e. Fabricate doors airtight and suitable for duct pressure class.
- 2. Frame: Galvanized sheet steel, with bend-over tabs and foam gaskets.
  - 3. Number of Hinges and Locks:
    - a. Access Doors Less Than 12 Inches Square: No hinges and two sash locks.
    - b. Access Doors up to 18 Inches Square: Two hinges and two sash locks.
    - c. Access Doors up to 24 by 48 Inches: Three hinges and two compression latches.

C. Pressure Relief Access Door:

- 1. Door and Frame Material: Galvanized sheet steel.
- 2. Door: Double wall with insulation fill with metal thickness applicable for duct pressure class.
- 3. Operation: Open outward for positive-pressure ducts and inward for negative-pressure ducts.
- 4. Factory set at 10-inch wg.
- 5. Doors close when pressures are within set-point range.
- 6. Hinge: Continuous piano.
- 7. Latches: Cam.
- 8. Seal: Neoprene or foam rubber.
- 9. Insulation Fill: 1-inch-thick, fibrous-glass or polystyrene-foam board.

## 2.7 DUCT ACCESS PANEL ASSEMBLIES

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. Ductmate Industries, Inc.
  - 2. Flame Gard, Inc.
  - 3. 3M.
- B. Labeled according to UL 1978 by an NRTL.
- C. Panel and Frame: Minimum thickness 0.0528-inch carbon steel.
- D. Fasteners: Carbon steel. Panel fasteners shall not penetrate duct wall.
- E. Gasket: Comply with NFPA 96; grease-tight, high-temperature ceramic fiber, rated for minimum 2000 deg F.
- F. Minimum Pressure Rating: 10-inch wg, positive or negative.

## 2.8 FLEXIBLE CONNECTORS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. Ductmate Industries, Inc.
  2. Duro Dyne Inc.
  3. Ventfabrics, Inc.
  4. Ward Industries, Inc.; a division of Hart & Cooley, Inc.
- B. Materials: Flame-retardant or noncombustible fabrics.
- C. Coatings and Adhesives: Comply with UL 181, Class 1.
- D. Metal-Edged Connectors: Factory fabricated with a fabric strip 3-1/2 inches wide attached to 2 strips of 2-3/4-inch-wide, 0.028-inch-thick, galvanized sheet steel or 0.032-inch-thick aluminum sheets. Provide metal compatible with connected ducts.
- E. Indoor System, Flexible Connector Fabric: Glass fabric double coated with neoprene.
1. Minimum Weight: 26 oz./sq. yd..
  2. Tensile Strength: 480 lbf/inch in the warp and 360 lbf/inch in the filling.
  3. Service Temperature: Minus 40 to plus 200 deg F.
- F. Outdoor System, Flexible Connector Fabric: Glass fabric double coated with weatherproof, synthetic rubber resistant to UV rays and ozone.
1. Minimum Weight: 24 oz./sq. yd..
  2. Minimum Tensile Strength: 500 lbf/inch in the warp and 440 lbf/inch in the filling.
  3. Service Temperature: Minus 50 to plus 250 deg F.
- G. Thrust Limits: Combination coil spring and elastomeric insert with spring and insert in compression, and with a load stop. Include rod and angle-iron brackets for attaching to fan discharge and duct.
1. Frame: Steel, fabricated for connection to threaded rods and to allow for a maximum of 30 degrees of angular rod misalignment without binding or reducing isolation efficiency.
  2. Outdoor Spring Diameter: Not less than 80 percent of the compressed height of the spring at rated load.
  3. Minimum Additional Travel: 50 percent of the required deflection at rated load.
  4. Lateral Stiffness: More than 80 percent of rated vertical stiffness.
  5. Overload Capacity: Support 200 percent of rated load, fully compressed, without deformation or failure.
  6. Elastomeric Element: Molded, oil-resistant rubber or neoprene.
  7. Coil Spring: Factory set and field adjustable for a maximum of 1/4-inch movement at start and stop.

## 2.9 FLEXIBLE DUCTS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. Flexmaster U.S.A., Inc.
  - 2. McGill AirFlow LLC.
  - 3. Ward Industries, Inc.; a division of Hart & Cooley, Inc.
  - 4. J.P. Lamborn Co.
  
- B. Insulated, Flexible Duct: UL 181, Class 1, black polymer film supported by helically wound, spring-steel wire; fibrous-glass insulation; polyethylene or aluminized vapor-barrier film.
  - 1. Pressure Rating: 4-inch wg positive and 0.5-inch wg negative.
  - 2. Maximum Air Velocity: 4000 fpm.
  - 3. Temperature Range: Minus 20 to plus 175 deg F.
  - 4. Insulation R-Value: R-8.
  
- C. Flexible Duct Connectors:
  - 1. Clamps: Stainless-steel band with cadmium-plated hex screw to tighten band with a worm-gear action in sizes 3 through 18 inches, to suit duct size.
  - 2. Non-Clamp Connectors: Adhesive plus sheet metal screws.

## 2.10 DUCT ACCESSORY HARDWARE

- A. Instrument Test Holes: Cast iron or cast aluminum to suit duct material, including screw cap and gasket. Size to allow insertion of pitot tube and other testing instruments and of length to suit duct-insulation thickness.
  
- B. Adhesives: High strength, quick setting, neoprene based, waterproof, and resistant to gasoline and grease.

## PART 3 - EXECUTION

### 3.1 INSTALLATION

- A. Install duct accessories according to applicable details in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" for metal ducts and in NAIMA AH116, "Fibrous Glass Duct Construction Standards," for fibrous-glass ducts.
  
- B. Install duct accessories of materials suited to duct materials; use galvanized-steel accessories in galvanized-steel and fibrous-glass ducts, stainless-steel accessories in stainless-steel ducts, and aluminum accessories in aluminum ducts.
  
- C. Install backdraft dampers at inlet of exhaust fans or exhaust ducts as close as possible to exhaust fan unless otherwise indicated.

- D. Install volume dampers at points on supply, return, outside-air and exhaust systems where branches extend from larger ducts. Where dampers are installed in ducts having duct liner, install dampers with hat channels of same depth as liner, and terminate liner with nosing at hat channel.
  - 1. Install steel volume dampers in steel ducts.
  - 2. Install aluminum volume dampers in aluminum ducts.
- E. Set dampers to fully open position before testing, adjusting, and balancing.
- F. Install test holes at fan inlets and outlets and elsewhere as indicated.
- G. Install duct access doors on sides of ducts to allow for inspecting, adjusting, and maintaining accessories and equipment at the following locations:
  - 1. Adjacent to and close enough to fire or smoke dampers, to reset or reinstall fusible links. Access doors for access to fire or smoke dampers having fusible links shall be pressure relief access doors and shall be outward operation for access doors installed upstream from dampers and inward operation for access doors installed downstream from dampers.
  - 2. Control devices requiring inspection.
  - 3. Kitchen exhaust ductwork.
  - 4. Elsewhere as indicated.
- H. Install access doors with swing against duct static pressure.
- I. Access Door Sizes:
  - 1. One-Hand or Inspection Access: 8 by 5 inches.
  - 2. Two-Hand Access: 12 by 6 inches.
  - 3. Head and Hand Access: 18 by 10 inches.
  - 4. Head and Shoulders Access: 21 by 14 inches.
  - 5. Body Access: 25 by 14 inches.
  - 6. Body plus Ladder Access: 25 by 17 inches.
- J. Label access doors according to Division 23 Section "Identification for HVAC Piping and Equipment" to indicate the purpose of access door.
- K. Install flexible connectors to connect ducts to equipment.
- L. For fans developing static pressures of 5-inch wg and more, cover flexible connectors with loaded vinyl sheet held in place with metal straps.
- M. Connect diffusers to ducts directly or with maximum 60-inch lengths of flexible duct clamped or strapped in place.
- N. Connect flexible ducts to metal ducts with adhesive plus sheet metal screws.
- O. Install duct test holes where required for testing and balancing purposes.

- P. Install thrust limits at centerline of thrust, symmetrical on both sides of equipment. Attach thrust limits at centerline of thrust and adjust to a maximum of 1/4-inch movement during start and stop of fans.

### 3.2 FIELD QUALITY CONTROL

#### A. Tests and Inspections:

1. Operate dampers to verify full range of movement.
2. Inspect locations of access doors and verify that purpose of access door can be performed.
3. Operate fire, smoke, and combination fire and smoke dampers to verify full range of movement and verify that proper heat-response device is installed.
4. Inspect turning vanes for proper and secure installation.
5. Operate remote damper operators to verify full range of movement of operator and damper.

END OF SECTION

SECTION 233423  
HVAC POWER VENTILATORS

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. This Section includes the following:
  - 1. Centrifugal roof ventilators.

1.3 PERFORMANCE REQUIREMENTS

- A. Project Altitude: Base fan-performance ratings on sea level.
- B. Operating Limits: Classify according to AMCA 99.

1.4 SUBMITTALS

- A. Product Data: Include rated capacities, furnished specialties, and accessories for each type of product indicated and include the following:
  - 1. Certified fan performance curves with system operating conditions indicated.
  - 2. Certified fan sound-power ratings.
  - 3. Motor ratings and electrical characteristics, plus motor and electrical accessories.
  - 4. Material thickness and finishes, including color charts.
  - 5. Dampers, including housings, linkages, and operators.
  - 6. Roof curbs.
  - 7. Fan speed controllers.
- B. Operation and Maintenance Data: For power ventilators to include in emergency, operation, and maintenance manuals.

1.5 QUALITY ASSURANCE

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in the 2019 CEC, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

- B. AMCA Compliance: Products shall comply with performance requirements and shall be licensed to use the AMCA-Certified Ratings Seal.
- C. NEMA Compliance: Motors and electrical accessories shall comply with NEMA standards.
- D. UL Standard: Power ventilators shall comply with UL 705.

#### 1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver fans as factory-assembled unit, to the extent allowable by shipping limitations, with protective crating and covering.
- B. Disassemble and reassemble units, as required for moving to final location, according to manufacturer's written instructions.
- C. Lift and support units with manufacturer's designated lifting or supporting points.

#### 1.7 COORDINATION

- A. Coordinate size and location of structural-steel support members.
- B. Coordinate installation of roof curbs, equipment supports, and roof penetrations. These items are specified in Division 07 Section "Roof Accessories."

### PART 2 - PRODUCTS

#### 2.1 CENTRIFUGAL ROOF VENTILATORS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. Greenheck.
  - 2. Twin City Fan Company
  - 3. Carnes Company HVAC.
  - 4. Loren Cook Company.
  - 5. Penn Ventilation.
- B. Description: Direct- or belt-driven centrifugal fans consisting of housing, wheel, fan shaft, bearings, motor and disconnect switch, drive assembly, curb base, and accessories.
- C. Housing: Removable, spun-aluminum, dome top and outlet baffle; square, one-piece, aluminum base with venturi inlet cone.
  - 1. Upblast Units: Provide spun-aluminum discharge baffle to direct discharge air upward, with rain and snow drains.



2. Hinged Subbase: Galvanized-steel hinged arrangement permitting service and maintenance.
- D. Fan Wheels: Aluminum hub and wheel with backward-inclined blades.
- E. Belt-Driven Drive Assembly: Resiliently mounted to housing, with the following features:
1. Fan Shaft: Turned, ground, and polished steel; keyed to wheel hub.
  2. Shaft Bearings: Permanently lubricated, permanently sealed, self-aligning ball bearings.
  3. Pulleys: Cast-iron, adjustable-pitch motor pulley.
  4. Fan and motor isolated from exhaust airstream.
- F. Direct Drive Motors:
1. Open type motor enclosure with DC electronic commutation type motor (ECM) specifically designed for fan applications.
  2. Motors are permanently lubricated heavy duty ball bearing type to match with the fan load.
  3. Motor speed controllable down to 20% of full speed, controlled by either a potentiometer dial mounted at the motor or by a 0-10 VDC signal
  4. Motor shall be a minimum 85% efficient at all speeds.
- G. Accessories:
1. Variable-Speed Controller: Solid-state control to reduce speed from 100 to less than 50 percent.
  2. Disconnect Switch: Nonfusible type, with thermal-overload protection mounted inside fan housing, factory wired through an internal aluminum conduit.
  3. Bird Screens: Removable, 1/2-inch mesh, aluminum or brass wire.
  4. Dampers: Counterbalanced, parallel-blade, backdraft dampers mounted in curb base; factory set to close when fan stops.
- H. Roof Curbs: Galvanized steel; mitered and welded corners; 1-1/2-inch-thick, rigid, fiberglass insulation adhered to inside walls; and 1-1/2-inch wood nailer. Size as required to suit roof opening and fan base.
1. Configuration: Self-flashing without a cant strip, with mounting flange
  2. Overall Height: 12 inches minimum
  3. Pitch Mounting: Manufacture curb for roof slope.
  4. Vented Curb: Unlined with louvered vents in vertical sides.

## 2.2 MOTORS

- A. Comply with requirements in Division 23 Section "Common Motor Requirements for HVAC Equipment."

## 2.3 SOURCE QUALITY CONTROL

- A. Sound-Power Level Ratings: Comply with AMCA 301, "Methods for Calculating Fan Sound Ratings from Laboratory Test Data." Factory test fans according to AMCA 300, "Reverberant Room Method for Sound Testing of Fans." Label fans with the AMCA-Certified Ratings Seal.
- B. Fan Performance Ratings: Establish flow rate, pressure, power, air density, speed of rotation, and efficiency by factory tests and ratings according to AMCA 210, "Laboratory Methods of Testing Fans for Rating."

## PART 3 - EXECUTION

### 3.1 INSTALLATION

- A. Install power ventilators level and plumb.
- B. Secure roof-mounting fans to roof curbs with cadmium-plated hardware. Refer to Division 07 Section "Roof Accessories" for installation of roof curbs.
- C. Install units with clearances for service and maintenance.
- D. Label units according to requirements specified in Division 23 Section "Identification for HVAC Piping and Equipment."

### 3.2 CONNECTIONS

- A. Duct installation and connection requirements are specified in other Division 23 Sections. Drawings indicate general arrangement of ducts and duct accessories. Make final duct connections with flexible connectors. Flexible connectors are specified in Division 23 Section "Air Duct Accessories."
- B. Install ducts adjacent to power ventilators to allow service and maintenance.
- C. Ground equipment according to Division 26.
- D. Connect wiring according to Division 26.

### 3.3 FIELD QUALITY CONTROL

- A. Perform the following field tests and inspections and prepare test reports:
  - 1. Verify that shipping, blocking, and bracing are removed.
  - 2. Verify that unit is secure on mountings and supporting devices and that connections to ducts and electrical components are complete. Verify that proper thermal-overload protection is installed in motors, starters, and disconnect switches.
  - 3. Verify that cleaning and adjusting are complete.

4. Disconnect fan drive from motor, verify proper motor rotation direction, and verify fan wheel free rotation and smooth bearing operation. Reconnect fan drive system, align and adjust belts, and install belt guards.
  5. Adjust belt tension.
  6. Adjust damper linkages for proper damper operation.
  7. Verify lubrication for bearings and other moving parts.
  8. Verify that manual and automatic volume control and fire and smoke dampers in connected ductwork systems are in fully open position.
  9. Disable automatic temperature-control operators, energize motor and adjust fan to indicated rpm, and measure and record motor voltage and amperage.
  10. Shut unit down and reconnect automatic temperature-control operators.
  11. Remove and replace malfunctioning units and retest as specified above.
- B. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

### 3.4 ADJUSTING

- A. Adjust damper linkages for proper damper operation.
- B. Adjust belt tension.
- C. Refer to Division 23 Section "Testing, Adjusting, and Balancing for HVAC" for testing, adjusting, and balancing procedures.
- D. Replace fan and motor pulleys as required to achieve design airflow.
- E. Lubricate bearings.

END OF SECTION



SECTION 238126  
SPLIT-SYSTEM AIR-CONDITIONERS

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. This Section includes ductless single zone split-system air-conditioning and heat pump units consisting of separate evaporator-fan and compressor-condenser components. Units are designed for exposed or concealed mounting, and may be connected to ducts.

1.3 SUBMITTALS

- A. Product Data: Include rated capacities, furnished specialties, and accessories for each type of product indicated. Include performance data in terms of capacities, outlet velocities, static pressures, sound power characteristics, motor requirements, and electrical characteristics.
- B. Operation and Maintenance Data: For split-system air-conditioning units to include in emergency, operation, and maintenance manuals.
- C. Warranty: Special warranty specified in this Section.

1.4 COORDINATION

- A. Coordinate size, location, and connection details with roof curbs, equipment supports, and roof penetrations specified in Division 07 Section "Roof Accessories."

1.5 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of split-system air-conditioning units that fail in materials or workmanship within specified warranty period.
  - 1. Warranty Period: Five years from date of Substantial Completion.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
  - 1. Mitsubishi.
  - 2. Daikin AC.
  - 3. Carrier.

### 2.2 CEILING-MOUNTING, EVAPORATOR-FAN COMPONENTS

- A. Cabinet: Enameled steel with removable panels on front and ends in color selected by Architect, and discharge drain pans with drain connection.
  - 1. Airstream Surfaces: Surfaces in contact with the airstream shall comply with requirements in ASHRAE 62.1-2004.
  - 2. Drain Pan and Drain Connection: Comply with ASHRAE 62.1-2004. Integral condensate pump capable of providing minimum 31 inches lift. Safety switch to shutoff unit if condensate rises too high in drain pan.
- B. Refrigerant Coil: Copper tube, with mechanically bonded aluminum fins, complying with ARI 210/240, and with thermal-expansion valve.
- C. Fan: Direct drive, centrifugal fan.
- D. Fan Motors: Comply with requirements in Division 23 Section "Common Motor Requirements for HVAC Equipment."
  - 1. Special Motor Features: Multi-tapped, multispeed with internal thermal protection and permanent lubrication.
- E. Filters: Permanent, cleanable.

### 2.3 AIR-COOLED, COMPRESSOR-CONDENSER COMPONENTS

- A. Casing: Steel, finished with baked enamel in color selected by Architect, with removable panels for access to controls, weep holes for water drainage, and mounting holes in base. Provide brass service valves, fittings, and gage ports on exterior of casing.
- B. Compressor: Hermetically sealed with crankcase heater and mounted on vibration isolation. Compressor motor shall have thermal- and current-sensitive overload devices, start capacitor, relay, and contactor.

1. Compressor Type: Twin Rotary.
  2. Digitally controlled inverter driven compressor motor with manual-reset high-pressure switch and automatic-reset low-pressure switch.
  3. Refrigerant: R-407C or R-410A.
- C. Refrigerant Coil: Copper tube, with mechanically bonded aluminum fins, complying with ARI 210/240, and with liquid subcooler.
- D. Heat Pump Components: Reversing valve and low-temperature air cut-off thermostat.
- E. Fan: Aluminum-propeller type, directly connected to motor.
- F. Motor: Permanently lubricated, with integral thermal-overload protection.
- G. Low Ambient Kit: Permits operation down to 45 deg F.
- H. Mounting Base: Polyethylene.
- I. Minimum Energy Efficiency: Comply with ASHRAE/IESNA 90.1-2004, "Energy Standard for Buildings except Low-Rise Residential Buildings."

## 2.4 ACCESSORIES

- A. Control equipment and sequence of operation are specified in Division 25 "Direct Digital Control and Energy Management System."
- B. Thermostat: Low voltage with subbase to control compressor and evaporator fan.
1. Compressor time delay.
  2. 24-hour time control of system stop and start.
  3. Liquid-crystal display indicating temperature, set-point temperature, time setting, operating mode, and fan speed.
  4. Fan-speed selection, including auto setting.
- C. Automatic-reset timer to prevent rapid cycling of compressor.
- D. Refrigerant Line Kits: Soft-annealed copper suction and liquid lines factory cleaned, dried, pressurized, and sealed; factory-insulated suction line with flared fittings at both ends.
1. Minimum Insulation Thickness: 1 inch thick where indoors, 1-1/2 inch-thick with aluminum jacketing where outdoors.

## PART 3 - EXECUTION

### 3.1 INSTALLATION

- A. Install units level and plumb.

- B. Install evaporator-fan components using manufacturer's standard mounting devices securely fastened to building structure.
- C. Install roof-mounting compressor-condenser components on equipment supports as detailed on the drawings. Anchor units to supports with removable, cadmium-plated fasteners.
- D. Install seismic restraints.
- E. Install and connect pre-charged refrigerant tubing to component's quick-connect fittings. Install tubing to allow access to unit.

### 3.2 CONNECTIONS

- A. Piping installation requirements are specified in other Division 23 Sections. Drawings indicate general arrangement of piping, fittings, and specialties.
- B. Install piping adjacent to unit to allow service and maintenance.
- C. Duct Connections: Duct installation requirements are specified in Division 23 Section "Metal Ducts." Drawings indicate the general arrangement of ducts. Connect outside air, supply and return ducts to split-system air-conditioning units with flexible duct connectors. Flexible duct connectors are specified in Division 23 Section "Air Duct Accessories."
- D. Ground equipment according to Division 26 Section "Grounding and Bonding for Electrical Systems."
- E. Electrical Connections: Comply with requirements in Division 26 Sections for power wiring, switches, and motor controls.

### 3.3 FIELD QUALITY CONTROL

- A. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect, test, and adjust field-assembled components and equipment installation, including connections. Report results in writing.
- B. Perform the following field tests and inspections and prepare test reports:
  - 1. Leak Test: After installation, charge system and test for leaks. Repair leaks and retest until no leaks exist.
  - 2. Operational Test: After electrical circuitry has been energized, start units to confirm proper motor rotation and unit operation.
  - 3. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
- C. Remove and replace malfunctioning units and retest as specified above.



### 3.4 STARTUP SERVICE

- A. Engage a factory-authorized service representative to perform startup service.
  - 1. Complete installation and startup checks according to manufacturer's written instructions.

END OF SECTION



SECTION 260000  
SUMMARY OF ELECTRICAL WORK

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 shall form a part of this Section, with the same force and effect as though repeated here.

1.2 SUMMARY

- A. In general, the Electrical Work described herein consists of the modification of existing electrical, lighting and signal systems in place and the installation of new electrical, lighting and signal systems equipment. All work shall be completed as directed by the Owner's authorized representative, in accordance with the Contract, Specifications and Construction Documents listed below.
  - 1. General Conditions of Contract
    - Electrical Construction Drawings as listed on the Drawing Index of the Construction Drawing set.
- B. This Section includes all necessary and required work to complete the construction as indicated in the Drawings, called for by notes or schedules, or specified herein. This work includes the furnishing of all permits, labor, supervision, services, materials, tools, equipment, testing, transportation and miscellaneous expenses, and the performance of all operations necessary to or incidental to completion of lawful and operating electrical power, lighting and signal systems, whether or not specifically mentioned.
- C. All work not shown in complete detail shall be installed per the CEC and in conformance with the best standard practice for the trade. Any deviation from the approved Drawings shall be submitted in writing to the Engineer and Owner for approval prior to the installation of the work in question.
- D. This work shall include, but not necessarily be limited to, the following elements:
  - 1. Demolition and Phasing:
    - a. De-energize, disconnect and remove electrical feeds to devices and equipment being removed or relocated.
    - b. Disconnect and remove existing electrical facilities in areas of remodel and demolition that are not to be reused.
    - c. Make temporary feeds and connections to areas and equipment to allow phased construction and continuing operation.
  - 2. Electrical Distribution:
    - a. Power distribution system, as shown, complete with switchboards, transformers, panelboards, conduits, feeders, pull boxes, fittings and related equipment and equipment pads.

- b. Trenching, conduits and feeders for electrical power including connections to relocatable buildings.
3. Signal Distribution:
- a. Trenching, conduits and conductors for signal systems including connections to relocatable buildings.
  - b. Building mounted conduits and conductors for signal systems including connections to relocatable buildings.
  - c. Trenching and conduits for control systems as required by Division 21-25 Specification Sections.
4. Building Electrical and Mechanical Systems:
- a. Complete system of branch circuit wiring, conduit and distribution equipment for lighting, receptacles and power.
  - b. Electrical work associated with mechanical equipment, including conduit, conductor, disconnect switches and motor starters.
  - c. Furnish roof jacks for the weatherproofing of each electrical conduit penetrating the roof. Roof jacks shall be of the material specified for the specific roofing system and shall be delivered to the general contractor/construction manager for installation by the roofing contractor.
  - d. Connection to all equipment as furnished by other Sections of these Specifications or as listed on Drawings as furnished by Owner.
  - e. Remove, extend and re-install electrical devices in/on walls receiving new wall coverings.
  - f. Disconnect, demolish (where possible), and abandon all underground branch circuits and feeders.
  - g. Provide new branch circuits and feeders to replace those demolished. Circuits and feeders are to be hidden in walls where wall surfaces are being replaced.
  - h. Provide surface wireways for replacement of circuits and feeders where wall surfaces are to remain.
5. Lighting:
- a. Replace existing Lighting System with new Lighting System as shown in Drawings, including fixtures, hangers, lamps, wall switches and lighting controls.
  - b. Provide complete lighting system including fixtures, hangers, lamps, wall switches and lighting controls.
  - c. Provide complete Lighting Control System consisting of motion sensors, timer switches and other controls as shown in Drawings.
6. Data Distribution System
- a. Complete Data system per Specification Section 27 20 00 including IDF and/or MDF cabinets complete with Switches, Hubs, Category 5 and Fiber Optic Patch Panels and required Patch Cables, Category 5 Data Cable and Jacks, Fiber Optic Cable, Jacks and Innerduct, access panels, terminal cabinets, conduit, wiring and terminations for a complete working system.

- b. Extension of existing Data system.
  - c. Provide new two-compartment power/data raceway, as shown on Drawings. Transfer existing Data system cables and jacks to the new raceway.
7. Fire Alarm System:
- a. Pre-testing of existing Fire Alarm system prior to initiation of Fire Alarm work or other work that may affect Fire Alarm system.
  - b. Complete Fire Alarm system per Specification Section 28 31 00 including Fire Alarm Control Panels, Signal Expander Panels, initiation devices, signal devices, control devices, annunciators, access panels, terminal cabinets, conduit, wiring and terminations and equipment for a complete working system.
  - c. Installation of two (2) Type RJ31X Telephone Jacks at Fire Alarm Control Panel location and wiring back to Main Telephone Backboard.
  - d. Extension of existing Fire Alarm system.
  - e. Completely remove existing Fire Alarm system **EXCEPT** for existing Heat Detectors and Horns in the modular classrooms. Re-circuit existing Heat Detectors and Horns in modular classrooms per Drawings.
  - f. Replace existing exterior heat detectors with new detectors as shown on Drawings.
  - g. Remove, extend and re-install Fire Alarm devices as shown on Drawings.
8. Intercommunications, Clock and Program System:
- a. Complete Intercommunications system per Specification Section 16760 including rack-mounted amplification and distribution equipment, flush-mounted music source, antennas, speakers, horns, access panels, terminal cabinets, conduit, wiring and terminations for a complete working system.
  - b. Extension of existing Intercommunications system.
  - c. Complete Master Clock system per Specification Section 16760 including rack-mounted master clock equipment, analog AC clocks, access panels, terminal cabinets, conduit, wiring and terminations for a complete working system.
  - d. Extension of existing Master Clock system.
  - e. Replace existing PA Equipment Rack with new Equipment Rack per Specification.
  - f. Replace existing PA Console with new District Standard Interface in In-Wall Rack.
  - g. Replace Interior PA Speakers as shown on Drawings.
  - h. Provide additional Exterior Speakers as shown on Drawings.
9. Each system shall be terminated, tested and calibrated by a factory-authorized installer. This same installer shall terminate and test any peripheral equipment required for the operation of the system.
10. Equipment Connections

- a. Provide equipment connections and coordination in accordance with manufacturer's recommendations and product submittals.
  - b. Provide equipment connections and disconnect switches as required for the following equipment:
    - 1) Mechanical equipment.
    - 2) Laundry Equipment.
    - 3) Owner furnished equipment.
- E. Products supplied by Owner (or others, as noted) and installed by Contractor under this Section.
  - 1. None.
- F. Products supplied by Contractor but not installed under this Section.
  - 1. None.
- G. Work specifically **excluded** from this Division.
  - 1. Furnishing of motors.
  - 2. Work performed under SECTION 13120, PRE-ENGINEERED FABRICATED STRUCTURES, shall be **EXCLUDED** from this Section.
- H. The following Sections contain requirements that relate to this Section:
  - 1. None
- I. It shall be understood that the existing conduit with its wiring is presently active (hot), in operation with its pertinent equipment.
- J. It shall be noted that this construction work will be planned and executed during ongoing operation of the facility. Any modifications to the existing equipment currently in operation shall be done during scheduled shutdowns and coordinated with the Owner's authorized representative and facility operating personnel to assure minimum downtime.
- K. In order to avoid disruption to facility operations, certain items of work must be completed before other items of work can be started. Contractor shall coordinate with the Owner's authorized representative as to the sequence of construction activities.
- L. Drawings showing equipment layout, conduit runs, conduit sizes, number of wires, wire types, wire groupings and size will not be furnished. It shall be the Contractor's responsibility to prepare such drawings in accordance with specifications, project requirements and code to facilitate the installation.
- M. Coordinate with the civil engineer to locate the concrete pad and the knock out box in the pad for the high voltage conduits and electrical power circuits.
- N. Furnish, install and connect an underground grounding system, specifically mentioned on drawings as part of this contract, including all necessary materials and connections as required by code and/or as shown on the construction drawing.

- O. Furnish, install and connect all above grade grounding materials and make aboveground connections of underground cables to equipment and/or structural steel as shown on the construction drawings and as required by code.
- P. Size, furnish, install and connect new conduit, conduit fittings, and seal fittings, expansion fittings and supports. This includes above grade as well as underground.
- Q. Size, furnish, and install junction, pull and terminal boxes, in accordance to code requirements and as shown on the construction drawings.
- R. Size, furnish and install all supports required for conduit installation, supports required for the installation of the equipment furnished by this Contractor and equipment furnished by others but installed by this Contractor.
- S. Size and field cut the openings for conduits passing through building walls and/or floors. Close and seal all openings after conduits have been installed and/or removed. Closing shall be compatible with, or of the same material as wall and/or floor.
- T. Furnish and install permanent "DANGER - HIGH VOLTAGE" warning signs for the outdoor and indoor switchgear, all unit substations, motor control centers, power distribution panels, and on all doors of all electrical equipment rooms, fenced yards, etc.
- U. Furnish and install markers indicating voltage levels (e.g., 12.47 KV, 277/480V, 120/208V, etc.) for all of the electrical equipment such as motor control centers, local lighting panels, lighting transformers, power panels, switchboards, etc....
- V. Furnish and install new nameplates per specifications on new motor control centers, motors and on all local control stations, control panels, disconnect switches, push button stations, instrument devices, etc.
- W. Furnish and install wire tags in accordance with the specifications indicating wire number as shown on electrical schematics, one line, three line diagrams and specifications.
- X. Furnish, install and connect all power, control and instrumentation cable, including all necessary cable lugs, connectors and terminations.
- Y. Perform all testing per the Specifications (including generator cables) and report to Owner's field representative in a timely manner so as not to impede the scheduled completion of the Contract.
- Z. Furnish all material, labor and testing equipment necessary to check out and test the complete power distribution, control and pneumatic systems for all process and utility equipment in strict accordance with specifications. This shall include check out/start up of systems and/or equipment as directed by Owner.
- AA. Prime paint all uncoated carbon steel items furnished by Contractor.
- BB. Energize low voltage services after testing equipment and wiring in accordance with manufacturer instructions and specifications.
- CC. Provide four ¾" 10 ft copper ground rods, Cadweld the ground rods to the bare copper #4/0 ground ring. Install a ground rod for each of the generators. Connect ground cable to existing grounding loop at the facility

- DD. Provide a NEMA L5-30 extension cord to the electrical power circuit of each generator to maintain the battery charging circuits.
- EE. Electrical contractor to coordinate with the utility and the plant personnel to schedule an outage to terminate cables at the main bus in the existing main switchboard.

PART 2 - NOT USED

PART 3 - NOT USED

END OF SECTION 260000



SECTION 260100  
GENERAL CONDITIONS FOR ELECTRICAL WORK

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 shall form a part of this Section, with the same force and effect as though repeated here.

1.2 SUMMARY

- A. The provisions of this Section shall apply to all of the following Sections of Divisions 26-28 of these Specifications and shall be considered a part of these Sections.

1.3 QUALITY ASSURANCE

- A. All work and materials shall fully comply with current rules and regulations of all applicable codes. Nothing in these Drawings or Specifications shall be interpreted as to permit any work not in compliance with these codes. Where work is detailed and/or specified to a more restrictive standard or higher requirement, that standard or requirement shall govern such work. Applicable codes include, but are not limited to, the following:
  - 1. California Code of Regulations (CCR)
    - a. Title 8, Industrial Relations
    - b. Title 17, Public Health
    - c. Title 24, Building Standards
  - 2. 2019 California Building Code.
  - 3. 2019 California Fire Code.
  - 4. 2019 California Electrical Code.
  - 5. Local Codes.
- B. All electrical components, devices and accessories shall be listed with Underwriters Laboratories, Inc. (or other testing agency acceptable to authorities having jurisdiction), shall meet their requirements, shall bear their label wherever standards have been established and label service is regularly furnished by that agency, and shall be marked for intended use.

1.4 PERMITS, FEES AND TAXES

- A. The Contractor shall secure all necessary permits and pay all required fees and taxes. He shall notify the proper authorities and have the work inspected and tested as required by jurisdictional requirements, pay all charges in connection therewith, and shall present

to the Owner properly signed certificates of inspection. Acceptance of the work will not be considered until such certificates have been delivered.

- B. The Owner shall pay all utility company charges related to the new services. This shall include any required street lighting charges.

## 1.5 EXISTING CONDITIONS

- A. The Contractor shall carefully examine the site and existing buildings, compare them with Drawings and Specifications, and shall have satisfied himself as to the conditions to be encountered during the performance of the work. No subsequent allowance shall be made on his behalf for any additional expense he may incur due to failure or neglect of Contractor to examine site and to include existing conditions in bid.
- B. Any work done as an addition, expansion, or remodel of an existing system shall be compatible with that system.
- C. The Contractor shall examine all record drawings made available by the Owner to locate existing underground systems, utilities, conduits, and pipes prior to installing the electrical distribution system. The Contractor shall also examine the site for possible locations of sprinkler pipes. Any damage done to the existing systems during the course of the electrical work, whose locations could be reasonably determined, shall be repaired to the satisfaction of the Owner and the utility or agency involved, at the expense of the Contractor.

## 1.6 CONDUCT OF THE WORK

- A. The Contractor shall maintain on the job a competent foreman or a superintendent at all times to superintend the Work.

## 1.7 INTERPRETATION OF DRAWINGS AND SPECIFICATIONS

- A. The Engineer's decision will be final on interpretation of the Drawings and Specifications. Whenever the words "AS MAY BE DIRECTED", "SUITABLE", or "APPROVED EQUAL", or other words of similar intent and meaning are used, implying that judgment is to be exercised, it is understood that it is in reference to the judgement of the Engineer.

## 1.8 SUBMITTALS

- A. See Specification Section 013300, SUBMITTAL PROCEDURES, for additional information and requirements.
- B. Shop Drawings and Product Data
  - 1. In addition to the provisions of Specification Section 013300, SUBMITTAL PROCEDURES, all **Shop Drawings and Product Data** shall comply with the following requirements:
    - a. The Contractor shall submit for review, complete sets of Shop Drawings and Product Data brochures for materials and equipment as required by each section of the Specifications.

- b. All Shop Drawings and Product Data shall be submitted at one time in a neat and orderly fashion in a suitable binder with a Title Sheet including Project, Engineer and Contractor, Table of Contents, and indexed tabs dividing each group of materials or item of equipment. The Specification paragraph number for which they are proposed shall identify all items. The mark number as indicated on Drawings shall also identify all equipment and fixtures.
- c. Shop Drawings and Product Data submittal shall include manufacturer's name and catalog numbers, dimensions, loads, and all other characteristics and accessories as listed in the Specifications or on the Drawings. All loads, characteristics, and accessories called for in the Specifications or on the Drawings shall be highlighted, circled or underlined on the Shop Drawings and Product Data. Descriptive literature shall be current factory brochures and submittal sheets.
- d. FAX submittals are not acceptable.
- e. Material or equipment shall not be ordered or installed until the Engineer processes the written review. Any item omitted from the submittal shall be provided as specified without substitution.
- f. Prior to submission of the Shop Drawings and Project Data, Contractor shall review and certify that they meet the requirements of the Contract Documents.
- g. A minimum period of two weeks, exclusive of transmittal time, will be required each time Shop Drawings and/or Product Data are submitted or resubmitted for review. The Contractor shall consider this time when scheduling a submittal date.

C. Submittal Review

- 1. Submittals will be reviewed for general conformance with the design concept, but this review does not guarantee quantity shown, nor does it supersede the responsibility of the Contractor to provide all materials, equipment and installation in accordance with the Drawings and Specifications.
- 2. The Contractor shall agree that Shop Drawings and Product Data submittals processed by the Engineer are not Change Orders and that the purpose of Shop Drawings and Product Data submittals by the Contractor is to demonstrate to the Engineer that the Contractor understands the design concept. The Contractor demonstrates his understanding by indicating which equipment and material he intends to furnish and install and by detailing the fabrication and installation methods he intends to use.
- 3. It shall be clearly understood that the noting of some errors, but the overlooking of others, **does not** grant the Contractor permission to proceed in error or in conflict with Contract Documents. The Contractor shall agree that if deviations, discrepancies or conflicts between Shop Drawings and Design Drawings and Specifications are discovered either prior to or after Shop Drawing submittals are processed by the Engineer, the Design Drawings and Specifications shall control and shall be followed.
- 4. If a resubmittal is required, submit a complete copy of the Engineer's review letter requiring such with the resubmittal.

D. Substitutions

1. See Specification Section 012500, SUBSTITUTION PROCEDURES, for additional information and requirements.
2. In addition to the provisions of Specification Section 012500, SUBSTITUTION PROCEDURES, **Substitutions** shall comply with the following requirements:
  - a. Manufacturers, model numbers and other pertinent information listed in the Specifications or on the Drawings are intended to establish minimum standards of performance, function and quality. Unless otherwise noted, the Contractor may submit equivalent compatible UL-listed equipment from other manufacturers for review, as long as the minimum standards are met.
  - b. Calculations and other detailed data indicating how the item was selected shall be included for items that are not specified. Data must be complete enough to permit detailed comparison of every significant feature, function, performance, and quality characteristic that is specified, scheduled or detailed. The comparison must prove that the substituted item equals or exceeds the requirements of the specified item.
  - c. The Contractor shall assume full responsibility that substituted items or procedures will meet the Specification and job requirements and shall be responsible for the cost of redesign and modifications to the work caused by these items.
  - d. At the Engineer's request, the Contractor shall furnish locations where equipment similar to the substituted equipment is installed and operating along with the user's phone numbers and contact person. Satisfactory operation and service history will be considered in the acceptance or rejection of the proposed substitution.

E. Record Drawings

1. See Specification Section 017839, PROJECT RECORD DOCUMENTS, for additional information and requirements.
2. In addition to the provisions of Specification Section 017839, PROJECT RECORD DOCUMENTS, **Record Drawings** shall comply with the following requirements:
  - a. At the beginning of the Project, one print of each applicable Drawing will be issued to the Contractor specifically for use in preparing Record Drawings. As the work progresses, the Contractor shall maintain a record of all deviations in the work from that indicated on the Drawings. Final locations of all underground work shall be recorded by depth from finished grade and by offset distance from permanent surface structures, e.g. building, curbs, walks. The original Drawings will be made available to the Contractor, from which he shall have made, a set of reproducible Drawings. The Contractor shall then transfer the changes, notations, etc. from the marked-up prints to the reproducible Drawings. The Record Drawings (marked-up prints and reproducibles) shall be submitted to the Engineer for review, after first securing the Inspector's verification by signature.

F. Operations and Maintenance Instructions

1. See Specification Section 017823, OPERATION AND MAINTENANCE DATA, for additional information and requirements.

2. In addition to the provisions of Specification Section 017823, OPERATION AND MAINTENANCE DATA **Operations and Maintenance Instructions** shall comply with the following requirements:
  - a. Three copies of Operation and Maintenance Instructions and Wiring Diagrams for all equipment shall be submitted to the Engineer. All instructions shall be clearly identified by marking them with the same designation as the equipment item to which they apply (e.g. UPS-1). All Wiring Diagrams shall agree with reviewed Shop Drawings and indicate the exact field installation.
  - b. All instructions shall be submitted at the same time and shall be bound in a suitable binder with tabs dividing each type of equipment (e.g. MCC, UPS, etc.). Each binder shall be labeled indicating "Operating and Maintenance Instructions, Project Title, Contractor, Date" and shall have a Table of Contents listing all items included.
  - c. The Contractor shall verbally instruct the Owner's maintenance staff in the operation and maintenance of all equipment and systems. The Engineer's office shall be notified 48 hours prior to this meeting.
  - d. The Contractor shall prepare a letter indicating that all Operation and Maintenance Instructions (printed and verbal) have been given to the Owner, to the Owner's satisfaction. This letter shall be acknowledged (signed) by the Owner and submitted to the Engineer.

#### 1.9 COORDINATION

- A. See Specification Section 013113, PROJECT MANAGEMENT AND COORDINATION, for additional information and requirements.
- B. Electrical Drawings are essentially diagrammatic, unless specifically dimensioned. Some work may be shown offset for clarity. The actual locations of all materials, conduits, fixtures, supports, etc. shall be carefully planned prior to installation of any work in order to avoid all interferences with each other, or with architectural, civil, mechanical, plumbing, structural or other elements.
- C. While the size and location of equipment are shown to scale wherever possible, all dimensions and conduit/conductor data shall be verified in the field.
- D. Where the work requires connections to be made to equipment furnished and set in place by others, the Contractor shall obtain exact rough-in dimensions from the manufacturer of such equipment and he shall install the connections in a neat and workmanlike manner.
- E. If discrepancies are discovered between Drawings and Specifications requirements, the more stringent requirement shall apply.
- F. All conflicts shall be called to the attention of the Architect and the Engineer prior to the installation of any work or the ordering of any equipment.
- G. No work shall be prefabricated or installed prior to this coordination. No additional compensation will be considered to the Contractor for any prefabrication or installation performed prior to this coordination.

#### 1.10 SCHEDULING

- A. All work shall be scheduled subject to the review of the Architect, Engineer and the Owner. No work shall interfere with the operation of the existing facilities on or adjacent to the site. The Contractor shall have at all times, as conditions permit, a sufficient force of workmen and quantity of materials to install the work for which contracted, as rapidly as possible consistent with good work, and shall cause no delay to other Contractors engaged upon this project or to the Owner.

#### 1.11 WARRANTY

- A. See Specification Section 017836, WARRANTIES, for additional information and requirements.
- B. Guarantee shall be in accordance with the General Conditions. These Specifications may extend the period of the guarantee for certain items. Where such extension are called for, or where items are normally provided with guarantee periods in excess of that called for in the General Conditions, the Certificate of Guarantee shall be furnished to the Owner through the Engineer.
- C. Contractor shall deliver to the Owner a written guarantee on all workmanship, materials and equipment for a period of one (1) year from the date of acceptance by the Owner. Any work found to be faulty during that period of time shall be corrected at once, upon written notification, at the expense of the Contractor. This shall include repair or replacement of the premises that may be damaged as a result of faulty work and materials furnished.

### PART 2 - PRODUCTS

#### 2.1 MATERIALS AND EQUIPMENT

- A. Materials and equipment shall be new unless otherwise noted.
- B. Materials and equipment of a given type shall be by the same manufacturer.
- C. Materials and equipment shall be covered or otherwise protected during construction as required to maintain the material and equipment in new factory condition until project acceptance. Upon completion of work and prior to final inspection, Contractor shall thoroughly clean all exposed fixtures, trim and equipment, and shall leave the entire installation in neat, clean, and useable condition. Materials and equipment shall be free of dents, scratches, marks, shipping tags, and all defacing features at time of project acceptance.
- D. The Contractor shall order materials and equipment in a timely manner to prevent any delay in the construction schedule, and he shall bear any penalty by vendors to meet schedules.
- E. Verify all dimensional information to ensure proper clearance for installation of equipment. Check all materials and equipment after arrival on the jobsite and verify compliance with the Contract Documents.

### PART 3 - EXECUTION

### 3.1 DEMOLITION

- A. The Contractor shall protect existing electrical equipment and installations that are not indicated to be removed. If damaged or disturbed in the course of the Work, remove damaged portions and install new products of equal capacity, quality, and functionality.
- B. Exposed electrical equipment and installations, indicated to be demolished, shall be removed in their entirety.
- C. Buried raceway and wiring, indicated to be abandoned in place, shall be cut 2 inches below the surface of adjacent construction and removed in its entirety. Raceways abandoned in place shall be capped and disturbed surfaces shall be patched to match existing finish.
- D. Demolished material shall be removed from Project site.
- E. Components indicated for relocation shall be removed, stored, cleaned, reinstalled, reconnected, and made operational.

### 3.2 CUTTING AND PATCHING

- A. The Contractor shall perform all cutting and drilling, or other work, required to provide openings in walls, ceilings, floors, footings, foundations or other structures necessary to accomplish work under this Specification Division. The cutting shall be performed by skilled mechanics of the trades involved.
- B. Cutting or coring shall not impair the strength of the structure. Any damage resulting from this work shall be repaired at the Contractor's expense to the satisfaction of the Architect.
- C. Wherever possible, work shall be done in a concealed and neat workmanlike manner requiring the least amount of cutting of studs, plates and woodwork. Such cutting or notching is allowed only after consultation with and by permission of the Engineer.
- D. The Contractor shall repair and refinish disturbed finish materials and other surfaces to accurately match adjacent undisturbed new or existing structures and surfaces and shall install new fireproofing where existing fire-stopping has been disturbed. The repair and refinishing of materials and other surfaces shall be by skilled mechanics of the trades involved.
- E. All cuts are to be clean with no chipping. Where chipping occurs as a result of work in a cut area, a new clean cut shall be made immediately prior to patching.

### 3.3 EXCAVATION AND BACKFILL

- A. The Contractor shall provide excavation and backfilling required to complete work detailed in the Drawings and Specifications. Unless otherwise noted, minimum earth cover above top of conduit outside building walls shall be 24", not including base and paving in paved areas.
- B. The location of all underground facilities shall be verified with the Owner and utility companies prior to the commencement of any excavation.

- C. The Contractor shall contact Underground Service Alert (USA), at 1-800-642-2444, ten (10) days prior to doing any excavation or trenching, and shall advise USA of the work schedule and comply with their requirements.
- D. The Contractor shall notify
- E. Provide all shoring required by site conditions. Where over-excavation occurs, provide compacted sand backfill. Where groundwater is encountered, remove to keep excavation dry, using well points and pumps as required.
- F. The conduit shall be laid on firm soil cut true and even to afford bearing for the full length of the barrel of the conduit.
- G. When the bottom uncovered at sub-grade is soft and, in the opinion of the Engineer, cannot support the conduit, a further depth shall be excavated and refilled to conduit foundation grade as required by the Engineer.
- H. Backfill (where concrete encasement is not required):
  - 1. Material 3" below, 3" around, and to 6" above conduit shall be sand. Place carefully around and on top of conduit, taking care not to disturb conduit. Consolidate with vibrator.
  - 2. Material from 6" Above Conduit to Grade shall be sandy or silty loam, free of lumps, laid in 6" layers, uniformly mixed to proper moisture and compacted to required density. If backfill is determined to be suitable and required compaction is demonstrated by laboratory test, water compaction in 6" layers may be used, subject to review by Engineer.
- I. No excavation below the level of, or adjacent to, foundations of footings shall be made except in a manner approved by the Structural Engineer.
- J. Compaction
  - 1. Prior to compaction, moisten or aerate each layer as necessary to provide optimum moisture content. Compact each layer to required percentage of maximum dry density or relative dry density for each area classification. Do not place backfill or fill material on surfaces that are muddy, frozen, or contain frost or ice.
  - 2. Under **Structures, Building Slabs, Walkways, and Steps**, compact top 6" of sub-grade and each layer of backfill or fill material at 92% maximum relative compaction. Compact upper 2' of backfill in utility trenches or other excavations to 92% minimum relative compaction.
  - 3. In **Lawns and Unpaved Areas**, compact top 6" of sub-grade material to 85% relative compaction.
  - 4. Under **Pavement**, compact top 8" of sub-grade immediately beneath the base course at 95% minimum relative compaction.

### 3.4 CONCRETE EQUIPMENT BASES

- A. The Contractor shall provide a concrete equipment base for each piece of electrical equipment required to have a base as shown in the Drawings, Notes and Details.



- B. Concrete equipment bases shall be 6" high concrete, 3500PSI strength, unless otherwise noted. Base shall extend 6" beyond the largest dimensions of the equipment, unless otherwise noted. The top edge of the base shall have a 3/4" chamfer. The base shall have #4 reinforcing bars at 12" on center, each way, located at the mid-depth of the base.
- C. If the base is not poured at the same time as the floor slab with base rebar tied to floor rebar, the base shall be anchored to the floor slab per the following criteria:
  - 1. Drill 1" diameter, 4" deep hole in floor.
  - 2. Fill hole with **Simpson SET Epoxy** then insert 8" long, #4 rebar into hole. Tie this rebar to that required for the equipment base.
  - 3. Provide a minimum of 4 of these anchors per base but no more than 4 feet apart in either direction.
  - 4. Anchor points shall be 12" from the edge of the base.
- D. Concrete anchors shall be steel bolts with expansion anchors requiring a drilled hole. Powder-driven anchors are not acceptable. Minimum concrete embedment shall be 4.5 diameters but not less than manufacturer's requirements for minimum strength. Minimum spacing shall be 10 diameters center-to-center and 5 diameters center to edge of concrete but not less than manufacturer's requirements for minimum strength. Maximum allowable stresses for tension and shear shall be 80% of the ICC-ES test report values.
- E. Where applicable, concrete structures shall be submitted to the serving utility for their approval prior to installation.
- F. Concrete bases for pole mounted lighting fixtures shall be 3500PSI strength, unless otherwise noted, and shall have vertical reinforcing bars with horizontal reinforcing bar ties as detailed on the drawings. The top edge of the concrete base shall have a 1" chamfer.

### 3.5 SEISMIC ANCHORAGE AND BRACING

- A. Equipment Anchorage
  - 1. All electrical equipment and components shall be anchored and installed per the details on the DSA approved construction documents. Where no detail is indicated, the following components shall be anchored or braced to meet the force and displacements requirements prescribed in the 2019 CBC, Sections 1617A.1.18 through 1617A.1.26. and ASCE 7-16 Chapter 13, 26, and 30:
    - a. All permanent equipment and components
    - b. Temporary or movable equipment that is permanently attached (e.g. hard wired) to building utility electrical service.
    - c. Movable equipment which is stationed in one place for more than 8 hours and heavier than 400 pounds are required to be anchored with temporary attachments.
  - 2. The attachment of the following electrical components shall be positively attached to the structure, but need not be detailed on the plans. These components shall have flexible connections provided between the components and associated conduit.

- a. Components weighting less than 400 pounds and have a center of mass located 4 feet or less above the adjacent floor or roof level that directly support the components.
- b. Components weighting less than 20 pounds, or in the case of distributed systems, less than 5 pounds per foot, which are suspended from a roof or floor or hung from a wall.

For those elements that do not require details on the approved drawings, the installation shall be subject to the approval of the Structural Engineer of Record and the DSA Structural Engineer. The project inspector will verify that all components and equipment have been anchored in accordance with above requirements.

### 3.6 CLEANING AND PROTECTION

- A. The Contractor shall, progressively and at completion of the job, thoroughly clean all of his work including outlets, fittings, and devices, and inspect exposed finishes. The Contractor shall remove all burrs, dirt, grease, paint spots, stains, labels, tags, rust, foreign material, and construction debris resulting from his work.
- B. The Contractor shall protect equipment and installations and maintain conditions to ensure that coatings, finishes, and cabinets are without damage or deterioration at time of Substantial Completion.

END OF SECTION 260100

## SECTION 260500

### BASIC ELECTRICAL MATERIALS AND METHODS

#### 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 shall form a part of this Section, with the same force and effect as though repeated here.

##### 1.2 SUMMARY

- A. See Section 260000

##### 1.3 STANDARDS

- A. NEMA 250 Standard for Enclosures for Electrical Equipment (1000 Volts Maximum)

#### PART 2 - PRODUCTS

##### 2.1 CONCRETE PADS, PULL BOXES AND MANHOLES

- A. At the Contractor's option, he shall provide cast-in-place or pre-cast structures.
- B. Concrete Forms and Reinforcement Materials shall be as specified in Division 03 Section "Cast-in-Place Concrete".
- C. Concrete shall be 2500-psi, 28-day compressive strength as specified in Division 03 Section "Cast-in-Place concrete".
- D. Weatherproof concrete pull boxes, junction boxes and telephone boxes shall be manufactured by Christy Concrete Products or equal. All boxes shall have lids marked "Power", "Signal", "Fiber Optic", "Danger-High Voltage", etc. and be traffic-rated per CalTrans drawing ES-8 minimum where pull box occurs in vehicular traffic areas.

##### 2.2 RACEWAYS AND FITTINGS

- A. Galvanized rigid steel conduit (GRC) shall meet ANSI C80.1, and be heavy wall, hot dipped galvanized inside and out, with threaded ends, for use with threaded type fittings.

- B. Galvanized intermediate metallic conduit (IMC) shall meet ANSI C80.6, be zinc-coated steel and have threaded fittings.
- C. Galvanized electrical metallic tubing (EMT) shall meet ANSI C80.3, and be continuous, seamless steel tubing, galvanized or sherardized on exterior, coated on interior with smooth hard finish of lacquer, varnish or enamel, with steel set-screw, steel compression or die-cast compression type fittings. Provide concrete-tight type compression fittings where required and rain-tight wet location listed compression fittings for outdoor locations.
- D. Rigid non-metallic conduit (RNC) shall meet NEMA TC 2, be Schedule 40 PVC, suitable for 90°C, with solvent cemented type NEMA TC3 fittings.
- E. Flexible metallic conduit (FMC) shall be single strip, continuous, flexible interlocked double-wrapped steel, hot dip galvanized inside and out forming smooth internal wiring channel, with steel, compression type fittings.
- F. Liquid-tight flexible metallic conduit (LFMC) shall be same as FMC except with inert sunlight-resistant, mineral-oil-resistant watertight plastic outer jacket. Fittings shall be cast malleable iron body and gland nut, cadmium plated with one-piece brass grounding bushings threaded to interior of conduit. Spiral molded vinyl-sealing ring between gland nut and bushing and nylon-insulated throat.
- G. All raceway fittings shall be specifically designed for the raceway type with which used.

### 2.3 METAL CLAD CABLE (TYPE MC)

- A. Type MC Cable shall consist of 3 or more individually insulated 600V THHN/THWN conductors, an overall polypropylene cable assembly tape and an outer galvanized steel or aluminum interlocked armor.
- B. Type MC Cable shall have as one of its conductors a separate full sized equipment grounding conductor as the armor is not considered an equipment grounding means.
- C. Type MC Cable fittings shall be of the single screw clamp variety with steel or cast malleable iron bodies and threaded male hubs with insulated throats. Fittings shall be UL listed for use with MC cable type specified.

### 2.4 METAL CLAD CABLE (TYPE MC-PCS)

- A. Type MC-PCS Cable shall consist of 3 or more individually insulated 600V THHN/THWN copper conductors not less than #12 AWG + 2 additional insulated 600V THHN/THWN #16 AWG copper conductors separately contained within a PVC jacket. All conductors shall be contained within an overall polypropylene cable assembly tape and an outer galvanized steel or aluminum interlocked armor.
- B. Type MC-PCS Cable shall have as one of its conductors a separate full sized equipment grounding conductor as the armor is not considered an equipment grounding means.

- C. Type MC-PCS Cable fittings shall be of the single screw clamp variety with steel or cast malleable iron bodies and threaded male hubs with insulated throats. Fittings shall be UL listed for use with MC cable type specified.

## 2.5 CONDUCTORS

- A. All conductors shall be delivered to the site in their original unbroken packages, plainly marked or tagged with UL labels, size, type of wire, type of insulation, name of the manufacturing company and trade name of the wire.
- B. All conductors shall be minimum of 98% conductivity soft drawn copper. Conductors #8 AWG and larger shall be stranded type "THWN/THHN", 600 Volt insulation. Conductors #10 AWG and smaller shall be solid copper "THWN/THHN", 600 Volt insulation.
- C. Insulation shall be Thermoplastic Type rated at 75 degrees C. minimum.

## 2.6 PULL BOXES AND WIREWAYS

- A. Pullboxes and Enclosures for outdoor use shall be NEMA 250, Type 3R or Type 4, unless otherwise noted.
- B. Pullboxes and Enclosures for indoor use shall be NEMA 250, Type 1, unless otherwise noted.
- C. Wireways shall be constructed in accordance with UL 870 for wireways, auxiliary gutters and associated fittings. Every component including lengths, connectors and fittings shall be UL Listed.
- D. Wireways and auxiliary gutters shall have continuous removable cover secured with screws and keyhole slots. Hinged cover shall be provided where installed above suspended ceiling.
- E. Fabricated sheet steel pull boxes shall be installed only in dry, protected locations and shall be furnished with knockouts and removable screw cover. Box shall be finished with one coat of zinc chromate and a coat of primer sealer and where exposed to public view shall be painted to match the surrounding surface.
- F. Weatherproof sheet steel pull boxes shall be fabricated of code gauge galvanized sheet steel with two coats of rust resistant finish and shall be furnished with gasket and made completely weathertight.

## 2.7 WIRING DEVICES AND MATERIALS

- A. Outlet Boxes shall meet NEMA OS1 and be galvanized code gauge steel. Boxes in masonry shall be square cornered. Boxes exposed to weather or in wet locations shall be Type FD cast metal with external threaded hubs and gasketed cover and shall meet NEMA FB1.

- B. Outlet box extensions shall be U.L. listed and shall be attached to box with threaded metal screws. "Flash Guards" are not permitted to be used as box extensions.
- C. Approved manufacturers of metal boxes are Circle AW, Crouse-Hinds, Steel City or equal.
- D. A/C Snap Switches:
  - 1. 120/277 Volt Switches shall be quiet, fast make, fast break design, toggle handle, with totally enclosed case, rated 20 ampere, heavy duty specification grade. Provide matching two pole, 3-way, 4-way, and key switches as required.
  - 2. A/C snap switches served by emergency power circuits shall be red.
  - 3. A/C snap switches shall be Hubbell or Leviton 1221 series.
- E. Receptacles:
  - 1. Duplex Receptacles:
    - a. Duplex Receptacles shall be tamper-resistant, full gang size, polarized duplex, parallel blade, U-grounding slot, specification grade, rated at 20 amperes, 125 volts and designed for split feed service.
    - b. Receptacles served by normal power circuits shall be ivory, grey, white or brown, dependent upon room wall finish and as direct by Architect. Receptacles served by emergency power circuits shall be red.
    - c. Duplex receptacles shall be Hubbell HBL5362WTR series, or equivalent.
  - 2. GFCI Receptacles:
    - a. GFCI receptacles shall be weather-resistant, tamper-resistant, duplex, feed-through type, with integral NEMA WD 6, Configuration 5-20R duplex receptacle arranged to protect connected downstream receptacles on same circuit. Units shall be designed for installation in a 2-3/4-inch deep outlet box without an adapter.
    - b. Duplex GFCI receptacles shall be Hubbell #GFTWRST20W series, or equivalent to match regular duplex receptacles.
  - 3. Required California Energy Code Controlled Receptacles: Provide one controlled duplex receptacle within 6-feet of each uncontrolled receptacle in all private offices, open office areas, reception lobbies, conference rooms, kitchenettes in office spaces and copy rooms as required by 2019 California Energy Code Section 130.5(d). Controlled receptacles shall be permanently factory marked with the symbol shown in 2019 CEC Figure 406.3(E) and the word "controlled". Adhesive labels shall not be permitted in lieu of permanent factory marking. Controlled receptacles shall be tamper-resistant Hubbell HBL5362C2WHITR series or equivalent.
  - 4. Required Weather-Resistant Receptacles: All 15- and 20-ampere, 125- and 250-volt non-locking type receptacles located outdoors and in damp and wet locations shall be listed weather-resistant type.
  - 5. Required Tamper-Resistant Receptacles: Tamper resistant receptacles shall be provided in the following areas where required by CEC 406.12:

- a. Dwelling units;
  - b. Guest rooms and guest suites;
  - c. Child care facilities;
  - d. Preschool and elementary school education facilities;
  - e. Business offices, corridors, waiting rooms and the like in clinics, medical and dental offices and outpatient facilities;
  - f. Subset of assembly occupancies described in CEC 518.2 to include places of waiting transportation, gymnasiums, skating rinks and auditoriums;
  - g. Dormitories;
6. Receptacles for Owner-furnished equipment shall match that equipment's plug configuration.
7. Other Receptacles: Other receptacles shall match the plug configuration and ratings required for the utilization equipment that is served.
- F. Device cover plates shall be provided and installed at all wiring devices, switches, outlets, and similar applications, and shall be as directed by architect. Pull boxes and junction boxes to which no fixture is to be attached shall be fitted with blank cover plates painted to match surrounding. All cover plates installed on rated walls shall be brushed stainless steel. Cover plates for receptacles in wet locations shall have an enclosure that is weatherproof whether or not the attachment plug cap is inserted and shall be identified as "extra-duty". Cover plates installed at switches used for lighting control in all multiple occupant restrooms, all hallways and corridors, and in other locations where lockable cover plates are indicated on the Drawings shall be the dustproof locking stainless steel cover Legrand model WP26-L.

## 2.8 DISCONNECTING DEVICES

- A. Disconnecting devices shall be provided as shown and/or as required by CEC.
- B. Motor-rated switches shall be toggle-type, quick make-quick break, rated 2 HP, 250 VAC, with number of poles as required. They shall be equipped with overload heaters rated for overload protection of loads controlled.
- C. Motor-rated switches shall be flush-mounted adjacent to load controlled. Where flush mounting is not possible, switches shall be surface mounted in NEMA enclosure suitable for environment in which installed.
- D. Disconnect switches shall be 250V or 600V class, rated heavy-duty, horsepower rated, quick-make, quick-break, dead-front type and provided with proper number of poles.
- E. Disconnect Switches shall be self contained in a NEMA 1 gasketed enclosure (NEMA 3R where installed outdoors) and externally operable from the front.
- F. Fusible disconnect switches shall be equipped with rejection type clips suitable for UL Class R fuses up to 600A and suitable for UL Class L fuses above 600A. Fuse interrupting rating shall be 200,000 RMS symmetrical amperes.

- G. Circuit breakers utilized as disconnecting devices shall comply with the requirements stated in other articles of this section and CEC.

## 2.9 FUSES

- A. Subject to compliance with requirements, provide products by one of the following manufacturers:
  - 1. Bussman
  - 2. Gould Shawmut
  - 3. Littlefuse.
- B. Fuses 600 amperes and below shall be UL Class RK1, 200,000 RMS symmetrical amperes interrupting rating.
- C. Fuses 601 amperes through 4000 amperes shall be UL Class L, 200,000 RMS symmetrical amperes interrupting rating.

## 2.10 ELECTRICAL IDENTIFICATION

- A. Identification devices shall be a single type of product for each application category. Colors shall be as prescribed by ANSI A13.1, CEC, and these Specifications.
- B. Raceway and cable labels shall comply with ANSI A13.1, Table 3, for minimum size of letters for legend and minimum length of color field for each raceway and cable size.
  - 1. Pre-tensioned, wraparound plastic sleeves shall be a flexible, preprinted, color-coded, acrylic band sized to suit the diameter of the item it identifies.
  - 2. Preprinted, flexible, self-adhesive, vinyl labels shall have a legend, overlaminated with a clear, weather- and chemical-resistant coating.
  - 3. Color shall be black letters on orange background.
  - 4. Legend shall indicate voltage.
- C. Self-adhesive colored marking tape for raceways, wires and cables shall be vinyl tape, not less than 1 inch wide by 3 mils thick.
- D. Underground Warning Tape shall be vinyl tape, compounded for permanent direct-burial service, not less than 6 inches wide by 4 mils thick, embedded with a continuous metallic strip or core, brightly-colored, continuously-printed with a legend that indicates the type of underground line.
- E. Tape markers for wire shall be vinyl or vinyl-cloth, self-adhesive, wraparound type with preprinted numbers and letters.
- F. Color-coding cable ties shall be made of Type 6/6 nylon, be self-locking type and of colors to suit coding scheme.



- G. Engraved plastic labels, signs and instruction plates shall be made from black (or red as noted) Bakelite laminate engraving stock with a white core, punched or drilled for mechanical fasteners. It shall have a minimum thickness of 1/16-inch for signs up to 20 sq. in. and a minimum thickness of 1/8-inch for larger sizes.
- H. Interior Warning and Caution signs shall comply with 29 CFR, Chapter XVII, Part 1910.145 and shall be preprinted, aluminum, baked-enamel-finish signs, punched or drilled for mechanical fasteners, with colors, legend, and size appropriate to the application.
- I. Exterior Warning and Caution signs shall comply with 29 CFR, Chapter XVII, Part 1910.145 and shall be weather-resistant, non-fading, preprinted, cellulose-acetate butyrate signs with 0.0396-inch, galvanized-steel backing, with colors, legend, and size appropriate to the application. They shall be equipped with 1/4-inch grommets in each corner for mounting.
- J. Fasteners for nameplates and signs shall be self-tapping, stainless-steel screws or No. 10/32 stainless-steel machine screws with nuts and flat and lock washers.
- K. Arc-Flash Hazard Warning labels shall be provided at electrical equipment such as switchboards and panelboards in accordance with CEC 110.16.
- L. Circuit Identification – A typewritten circuit directory shall be provided at each panelboard and switchboard in accordance with CEC Article 408.4(A). The Contractor shall develop and prepare the circuit identification description based on the as-built condition.
- M. Source of Supply Identification – All switchboards, panelboards and transformers shall have a typewritten label applied indicating the device or equipment where the power supply originates per CEC Article 408.4(B).

## 2.11 TOUCHUP PAINT

- A. Touch-up paint shall be equipment manufacturer's paint selected to match installed equipment finish.
- B. Touch-up paint on galvanized surfaces shall be zinc-rich paint recommended by item manufacturer.

## PART 3 - EXECUTION

### 3.1 ELECTRICAL INSTALLATION

- A. All material, equipment, devices, etc., shall be installed in accordance with the recommendations of the manufacturer of the particular item. The Contractor shall be responsible for all installations contrary to the manufacturer's recommendations. The Contractor shall make all necessary changes and revisions to achieve such compliance. Manufacturer's installation instructions shall be delivered to and maintained at the job site throughout the construction of the project.

- B. The layout and installation of electrical work shall be coordinated with the overall construction schedule to prevent delay in completion of the project.
- C. Dimensions and information regarding accurate locations of equipment and structural limitations and finish shall be verified with other sections.
- D. The drawings do not show all raceway, wiring, offsets, bends, special fittings, junction or pull boxes necessary to meet job conditions. Items not shown as indicated, where are clearly necessary for proper operation or installation of systems shown, shall be provided as required, at no increase in contract price.
- E. Materials and Components shall be installed level, plumb, and parallel and perpendicular to other building systems and components, unless otherwise indicated.
- F. Electrical equipment, outlets, junctions and pull boxes shall be installed in accessible locations, avoiding obstructions, preserving maximum headroom, and keeping openings and passageways clear.
- G. Equipment shall be installed to facilitate service, maintenance, and repair or replacement of components. It shall be connected for ease of disconnecting, with minimum interference with other installations. Minor adjustments in the locations of equipment shall be made where necessary providing such adjustments do not adversely affect function of the equipment. Major adjustments for the location of equipment shall be previously approved and detailed on the Record Drawings.
- H. Right of Way shall be given to raceways and piping systems installed at a required slope.

### 3.2 RACEWAY INSTALLATION

- A. General
  - 1. Expansion joints shall be provided at building expansion joints or as required due to length of run or difference in temperatures.
  - 2. All fittings that are exposed or in damp areas shall have sealing glands and proper gasket.
  - 3. In general, all conduits shall be sloping to drain. Bends that place a trap in a conduit shall be avoided. Provided drip fitting as required. Dux-Seal high ends of all underground raceways.
  - 4. All conduit runs shall be mechanically and electrically continuous from outlet to outlet. Conduit size or type shall not be changed between outlets.
  - 5. All empty raceways shall be equipped with pull lines, capped and labeled. Pull lines shall be 3/16" polypropylene, No. 14 AWG zinc-coated steel or monofilament plastic line with not less than 200-lb tensile strength. Leave at least 24 inches of slack with identification tag at each end of the pull wire.
  - 6. Minimum size of any conduit for lighting, power and signal shall be 3/4" conduit unless shown otherwise.

7. Use temporary raceway caps to prevent foreign matter from entering. Immediately prior to installation of conductors, conduit shall be blown and swept free of foreign materials. All conduit stubs for future, both above and below grade, shall be capped. Run conduits for spare panelboard circuits to attic or accessible spaces.
8. Make conduit bends and offsets so ID is not reduced. Keep legs of bends in the same plane and straight legs of offsets parallel, unless otherwise indicated.
9. Make bends in exposed parallel or banked runs from same centerline to make bends parallel. Use factory elbows only where elbows can be installed parallel; otherwise, provide field bends for exposed parallel raceways.
10. There shall be no more than the equivalent of four quarter bends (360-degrees total) between pull points such as pull boxes, outlet boxes or conduit bodies, in one run of conduit.
11. Install raceways and cables at least 6 inches away from parallel runs of flues and steam or hot-water pipes. Locate horizontal raceway runs above water and steam piping.
12. Conduits shall be securely fastened to building structure at intervals not greater than ten feet.
13. Conduit shall be square cut and reamed if required to full size, with thread full cut and true.
14. Conduits shall be jointed by approved couplings with ends of conduits tightly butted. Non-insulating compound shall be used in making up joints below grade or inside on grade to insure a watertight system.
15. Conduit connections to outlet boxes or cabinets shall be made with approved connectors, using locknuts and insulated throat bushings.
16. Complete raceway installation before starting conductor installation.
17. Contractor shall provide rubber grommets to fasten galvanized conduit to exterior structures made of dissimilar metals at all exterior locations to prevent galvanic corrosion.
18. Contractor shall provide rubber grommets to fasten galvanized conduit to supports which are also used by other systems utilizing piping of dissimilar metals to prevent galvanic corrosion.

B. Interior

1. Conceal raceways and cables, unless otherwise indicated, within finished walls, ceilings, and floors.
2. All concealed conduits shall be installed in as direct a line as possible between outlets. No more than four quarter bends, or their equivalent, will be allowed between outlets. Feeder conduits shall follow arrangement shown on plans unless a change is authorized. Branch circuit conduits shall, in general, follow arrangement as shown as far as structural conditions permit. All exposed runs shall parallel buildings, walls, or partitions, and be supported on Kindorf Hangers to meet Title 24, Part 3, CEC.

C. Exterior

1. Exterior conduit including the sweep below grade and the vertical riser shall be galvanized rigid steel conduit, except where rigid non-metallic conduit is required for utility service conduits by the serving utility company.
2. No rigid non-metallic conduit (RNC) shall be installed above grade.

D. Underground

1. Two or more power **or** telecommunications conduit runs installed in a common trench shall be separated horizontally by a minimum of four inches (4").
2. Two or more power **and** telecommunications conduit runs installed in a common trench shall be separated horizontally by a minimum of twelve inches (12").
3. **All** electrical conduit runs installed in a common trench with other utility company lines, plumbing pipes, or heating pipes shall be separated horizontally from such lines by a minimum of twelve inches (12").
4. Conduits installed underground and not under buildings shall have a minimum of 24" of cover over the top of the conduit.
5. Utility service conduits shall be installed according to the serving utility's requirements for material, depth of cover, and separation.
6. Rigid non-metallic conduit shall be laid on excavated firm bed, sealed watertight and unless with 24 inch earth cover, shall have 3 inch minimum concrete encasement unless under concrete. Plastic conduit without encasement shall be random lay, "snaked", not pulled tight. Plastic conduit laid in areas of reinforcing steel shall be supported independently at each threaded fitting. Plastic conduit joints shall be full solvent welded.
7. Rigid non-metallic conduit installed underground and not below a building slab shall have a galvanized rigid steel long radius elbow installed at the terminating end where the transition from horizontal to vertical occurs.

E. In Concrete Slabs

1. Conduit installed within concrete slabs shall be Schedule 80 PVC rigid non-metallic conduit or full weight galvanized rigid steel conduit.
2. Conduits in concrete slabs 3 inches thick or less shall not be of size larger than  $\frac{3}{4}$  inch nominal trade size, and wired to top of reinforcing steel.
3. Conduit installed in concrete slabs shall be installed in the middle third of the slab thickness where practical, and have at least 1-inch concrete cover.
4. Secure raceways to reinforcing rods to prevent sagging or shifting during concrete placement.
5. Conduit installed in concrete slabs shall be installed side-by-side horizontally and shall have no less than 1" spacing between each conduit to allow for concrete consolidation to prevent voids in the concrete. Conduits that are installed in concrete slabs shall be arranged such that they do not cross over other conduits within the concrete slab. Where crossing of conduits is unavoidable the crossing

sets of conduits shall be installed below the slab. No more than 3 conduits shall be installed side-by-side in a concrete slab without special permission from the structural engineer.

6. Install conduit larger than 1-inch trade size parallel to or at right angles to main reinforcement. Where conduit is at right angles to reinforcement, place conduit close to slab support.
7. Contractor shall be responsible for damages to membrane and shall repair it.

F. Below Grade Level Concrete Building Slab

1. All conduits below the building slab shall be Schedule 40 PVC rigid nonmetallic conduit or full weight galvanized rigid steel conduit, and shall have a 6" minimum cover below the floor slab measured from the bottom of the floor slab to the top of the conduit.
2. Rigid non-metallic conduits that are 1" trade size or smaller that are installed below the building slab shall transition from Schedule 40 PVC below the building slab to Schedule 80 PVC rigid nonmetallic conduit or galvanized rigid steel conduit, before passing into the concrete building slab and shall transition to galvanized rigid steel conduit or IMC within the concrete building slab before exiting and rising above the building slab.
3. Rigid non-metallic conduits that are 1 ¼" trade size or larger that are installed below the building slab shall have a galvanized rigid steel long radius elbow installed at the terminating end where the transition from horizontal to vertical occurs and the vertical riser shall be galvanized rigid steel conduit rising above the building slab.
4. Rigid non-metallic conduit installed underground and not below a building slab.
5. Where conduits rise through the building slab they shall be installed at sufficient depth so that the curved portion of any bends, sweeps, or 90's are not visible above the finished slab.
6. Contractor shall be responsible for damages to membrane and shall repair it.

G. Signal Systems

1. Install telephone and signal system raceways in maximum lengths of 150 feet and with a maximum of two 90-degree bends or equivalent.
2. Separate lengths with pull or junction boxes where necessary to comply with these requirements.

H. Flexible Conduit

1. LFMC or FMC shall be used to connect motors and equipment subject to vibration, noise transmission, or movement to junction boxes, with a maximum length of 24-inches.
2. Install separate ground conductor across flexible connections.
3. Flexible conduits shall be independently suspended.

### 3.3 METAL CLAD TYPE MC CABLE APPLICATION

- A. Branch circuits **may** be Type MC cable only where they are completely concealed within walls or above ceilings.
- B. Type MC cable **shall not** be permitted for feeders.
- C. Type MC cable **shall not** be permitted underground.

### 3.4 METAL CLAD TYPE MC-PCS CABLE APPLICATION

- A. Lighting branch circuits **may** be Type MC-PCS cable only where they are completely concealed within walls or above ceilings.
- B. Type MC-PCS cable **shall not** be permitted for branch circuits other than the controlled lighting branch circuits of individual spaces.
- C. Type MC-PCS cable **shall not** be permitted for feeders.
- D. Type MC-PCS cable **shall not** be permitted underground.

### 3.5 METAL CLAD CABLE – INSTALLATION

- A. Install metal clad cable in accordance with manufacturer's instructions and in strict accordance with CEC Article 330. Follow manufacturer's explicit instructions when connecting the cable to fittings and boxes. Connectors shall be firmly secured to the cable, but not over tightened. Connector shall be firmly attached to metal boxes.
- B. Support metal clad cables every 6 feet and within 12 inches of boxes, per CEC Article 334, using separate spring metal clip or metal cable ties (not steel tie wire) for each cable. Metal clad cables shall not be bundled together.
- C. Suspended ceiling drop wire may be used to directly support a maximum of two separate metal clad cables.
- D. Provide separate drop wire above accessible ceiling, to support more than two metal clad cables.
- E. Do not rest metal clad cables on ceiling tiles or allow contact with mechanical piping systems.
- F. Bend metal clad cable per CEC Article 334.
- G. Provide separate sleeves and/or fire barriers where metal clad cable penetrates firewalls, unless cable is UL listed for the application.

### 3.6 MODULAR WIRING SYSTEM APPLICATION

- A. Modular wiring system shall be used for lighting system connection in accessible ceiling locations.

### 3.7 CONDUCTOR APPLICATION

- A. Feeders and branch circuits shall be Type THHN/THWN insulated conductors in raceway.
- B. Underground feeders and branch circuits shall be Type THWN or single-wire, Type UF insulated conductors in raceway.
- C. Branch circuits for other than lighting circuits shall be Type THW or THHN/THWN insulated conductors in raceway. Lighting branch circuits shall be Type THW or THHN/THWN insulated conductors in raceway where exposed and may be metal-clad cable where concealed in ceilings and gypsum board partitions.
- D. Minimum conductor size shall be #12 for power and lighting, #14 for 120V control circuits and #18 for 24V control circuits.
- E. Remote control, signaling and power-limited circuits shall be Type THHN/THWN insulated conductors in raceway for Classes 1, 2, and 3, unless otherwise indicated.

### 3.8 CONDUCTOR INSTALLATION

- A. Conductors shall be continuous from outlet to outlet, no splices shall be made except within outlet or junction boxes.
- B. Wiring at outlets shall be installed with at least 12 inches of slack conductor at each outlet.
- C. Outlet and component connections shall be made to wiring systems and to ground. Electrical connectors and terminals shall be tightened according to manufacturer's published torque-tightening values. Torque values specified in UL 486A shall be used where manufacturer's torque values are not indicated.
- D. Wire in panels, cabinets, pull boxes, and wiring gutters shall be squared, labeled, and neatly grouped with cable ties and fanned out to the terminals.
- E. All branch circuits, fixture wiring joints, splices, and taps for conductors #10 and smaller shall be made with 3M "Scotchlock" connectors, or approved equal.
- F. All branch circuits, fixture wiring joints, splices, and taps for conductors #8 and larger shall be made with two-bolt type solderless connectors or T & B "color keyed" compression lugs.
- G. Bolt-type solderless connectors shall be torqued with a torque wrench according to the manufacturer's recommendations, and then retightened after 24-48 hours before taping.

Owners' inspector shall be informed of this procedure during the waiting period and shall witness the act of retightening.

- H. Connectors and lugs for terminating stranded conductors #8 and larger shall be machine crimp compression type.
- I. All splices shall be taped with Scotch #88 plastic electrical tape with "Scotch Fill" where necessary for a smooth joint. Scotch #27 or #2520 shall be used for other than normal temperatures or conditions. All connections and splices shall be electrically perfect and in strict accordance with all code requirements.
- J. No splices shall be made below grade in a manhole or pullholes without Engineer's written approval, and then shall be encapsulated with 3M potting kits per 3M Specifications. For larger gauge wire where 3M potting kits are prohibited Contractor shall use submersible UL listed Polaris connectors by NSi.

### 3.9 WIREWAY AND AUXILIARY GUTTER APPLICATION

- A. Wireways and auxiliary gutters shall be used above and below panelboards, lighting relay cabinets, and terminal cabinets to accommodate large concentrations of wires.

### 3.10 PULL BOXES AND WIREWAYS:

- A. Boxes shall be installed square and plumb. An engraved nameplate shall be installed on each box indicating its function. Nameplate shall be installed on the exterior of each box in unfinished areas and on the interior of each box in finished areas.
- B. Wireways shall be installed with strip-type connectors with self-retained mounting screws. Hangers with two piece, hook together features shall be used to permit preassembly of wireway and hanger bottom plate before hanging on a preinstalled upper bracket.
- C. Pull and junction boxes shall be installed as shown to ease the pulling of wire and to comply with CEC requirements.

### 3.11 WIRING DEVICES AND MATERIALS

- A. Outlets shall be mounted at 18" minimum above finished floor unless otherwise noted.
- B. The locations of outlets shown on drawings shall be located with respect to work of others and to be symmetrical with room layout.
- C. Outlets in architectural patterned surfaces such as tile and finish panels shall be centered on intersections of four panels or in exact center of panels, unless otherwise shown on architectural plans or directed by Architect.
- D. Outlet boxes for concealed work shall be one-piece steel knock out type with zinc coating. Boxes shall not be smaller than 4" square nominal size, unless otherwise indicated. Extension rings, plaster rings, and covers shall be provided as necessary for flush finish.



- E. The Contractor shall inform himself of wall thickness throughout the building and shall provide outlet boxes of suitable depth that can be flush mounted and yet will be deep enough to contain the particular apparatus involved. Location of exposed pull or junction boxes will be subject to the Architect's approval.
- F. Outlet boxes on opposite sides of walls shall not be placed back-to-back, nor shall "through" boxes be employed (except where specifically permitted on the drawings by note).
- G. Switches shall be mounted 48" to top of device box above finished floor unless otherwise noted.
- H. Where more than one switch occurs at the same location, use multiple gang outlet boxes covered by a single plate; provide box partitions as required by the CEC.
- I. Bar hangers shall be used to support outlet boxes in stud or furred partitions and ceilings. Attachment screws, devices, etc., shall be of the proper type to secure boxes to metal studs complemented by expansion shields to concrete and masonry.
- J. All outlet boxes and particularly those supporting fixtures shall be securely anchored in place in an approved manner. Support outlet boxes and fixtures in acoustic ceiling areas from building structures, not from acoustic ceilings. All lighting fixture outlets shall be coordinated with mechanical, architectural, or other equipment to eliminate conflicts and provide a workable, neat installation.
- K. Approved knock out holes shall be provided. Outlet boxes from which light fixtures will be suspended shall be equipped with 3/8" fixture studs fastened through from back of box.
- L. Surface boxes of the cast metal threaded hub type with suitable gasketed covers shall be used for exposed conduit runs less than 5' above a finished floor or where waterproof boxes are required.
- M. Floor boxes shall be adjustable, brass trimmed with carpet flanges where carpet is indicated on architectural drawings.
- N. Set floor boxes level and trim after installation to fit flush to finished floor surface.
- O. Masonry boxes shall have conduit entrances to rear of box with depth as required to clear masonry.
- P. Boxes shall be sized for number of conductors entering box.
- Q. Wiring devices shall be securely fastened to the outlet box. Where the outlet box covers are back from the finished walls, the device shall be built out with washers so that it is rigidly held in place to the box. Metal extenders shall be provided in flammable construction per CEC.
- R. All device screw slots shall be left in a vertical orientation.
- S. Connect wiring device grounding terminal to branch-circuit equipment grounding conductor and to outlet box with bonding jumper.

- T. Connect ground terminal of isolated-ground receptacles to isolated-ground conductor routed to designated isolated equipment ground terminal of electrical system.

### 3.12 DISCONNECT DEVICES

- A. Thoroughly examine site conditions for acceptance of disconnects switch installation to verify conformance with manufacturer and specification tolerances. Do not commence with installation until all conditions are made satisfactory.
- B. Coordinate locations of switches and equipment in the field to provide code required clearances in front of switches and to insure that switches are in sight of the controllers as described in CEC Article 430.
- C. Install disconnect switches where indicated on the Drawings.
- D. Install fuses in fusible disconnect switches.
- E. Include construction channel and mounting hardware as required to support disconnect switch.
- F. Provide engraved, machine screw retained nameplate on each disconnect switch. Name plate shall identify equipment and panelboard + branch circuit breaker.

### 3.13 SUPPORT INSTALLATION

- A. Install support devices to securely and permanently fasten and support electrical components.
- B. Install individual and multiple raceway hangers and riser clamps to support raceways. Provide U-bolts, clamps, attachments, and other hardware necessary for hanger assemblies and for securing hanger rods and conduits.
- C. Support parallel runs of horizontal raceways together on trapeze- or bracket-type hangers.
- D. Size supports for multiple raceway installations so capacity can be increased by a 25 percent minimum in the future.
- E. Support individual horizontal raceways with separate, malleable-iron pipe hangers or clamps.
- F. Install [1/4-inch](#) diameter or larger threaded steel hanger rods, unless otherwise indicated.
- G. Spring-steel fasteners specifically designed for supporting single conduits or tubing may be used instead of malleable-iron hangers for [1-1/2-inch](#) and smaller raceways serving lighting and receptacle branch circuits above suspended ceilings and for fastening raceways to slotted channel and angle supports.
- H. Arrange supports in vertical runs so the weight of raceways and enclosed conductors is carried entirely by raceway supports, with no weight load on raceway terminals.

- I. Simultaneously install vertical conductor supports with conductors.
- J. Separately support cast boxes that are threaded to raceways and used for fixture support. Support sheet-metal boxes directly from the building structure or by bar hangers. If bar hangers are used, attach bar to raceways on opposite sides of the box and support the raceway with an approved fastener not more than 24 inches from the box.
- K. Install metal channel racks for mounting cabinets, panelboards, disconnect switches, control enclosures, pull and junction boxes, transformers, and other devices unless components are mounted directly to structural elements of adequate strength.
- L. Install sleeves for cable and raceway penetrations of concrete slabs and walls unless core-drilled holes are used. Install sleeves for cable and raceway penetrations of masonry and fire-rated gypsum walls and of all other fire-rated floor and wall assemblies. Install sleeves during erection of concrete and masonry walls.
- M. Securely fasten electrical items and their supports to the building structure, according to the following criteria, unless otherwise noted:
  - 1. Wood – wood screws or screw-type nails.
  - 2. Masonry – toggle bolts on hollow masonry units, expansion bolts on solid masonry units.
  - 3. New Concrete – concrete inserts with machine screws and bolts.
  - 4. Existing Concrete – expansion bolts.
  - 5. Steel – welded threaded studs or spring-tension clamps on steel. Field welding shall comply with AWS D1.1. Welding to steel structure may be used only for threaded studs, not for conduits, pipe straps, or other items.
  - 6. Light Steel – sheet-metal screws.
  - 7. Fasteners shall be selected so the load applied to each fastener does not exceed 25 percent of its proof-test load.

### 3.14 ELECTRICAL IDENTIFICATION

- A. Each conductor of every system shall be permanently tagged in each panelboard, pull box, J-box, etc., in compliance with the Occupational Safety and Health Administration (OSHA).
- B. Brady labels shall be used to identify terminals and destination of feeders, branch circuits, signal and control circuits, etc., at all terminations, junction boxes and pull boxes, and shall be coordinated with the nameplates in all boxes and equipment.
- C. All terminals in the switchboards, panels, relays, switches, devices, starter terminals, etc., shall have Brady labels for identification to identify both ends of all wiring.
- D. The Contractor shall furnish and install 1" x 3" x 3/32" thick laminated black Bakelite nameplates with a white core (unless specifically shown as red) engraved to produce

white letters on black background for all items of electrical equipment, including 2-pole and 3-pole circuit breakers, panelboards, starters, relays, time switches and disconnect switches.

- E. All devices shall have their branch circuit identified on the back side of device plate with a permanent type black marker, i.e. CT A-21. Identify panelboard and circuit number from which receptacles are served. Use machine-printed, pressure-sensitive, abrasion-resistant label tape on face of plate and durable wire markers or tags within outlet boxes.
- F. Coordinate names, abbreviations, colors, and other designations used for electrical identification with corresponding designations indicated in the Contract Documents or required by codes and standards. Use consistent designations throughout Project.
- G. Panels having single-pole circuit breakers shall be provided with typed schedules mounted in welded metal holders behind plastic.
- H. Clean surfaces that are to receive self-adhesive identification products before applying.
- I. Where three or more switches are ganged, and elsewhere as indicated, identify each switch with approved legend engraved on wall plate.
- J. Identify raceways and cables with color banding as follows:
  - 1. Bands: Pretensioned, snap-around, colored plastic sleeves or colored adhesive marking tape. Make each color band **2 inches** wide, completely encircling conduit, and place adjacent bands of two-color markings in contact, side by side.
  - 2. Band Locations: At changes in direction, at penetrations of walls and floors, at **50-foot** maximum intervals in straight runs, and at **25-foot** maximum intervals in congested areas.
  - 3. Colors: As follows:
    - a. Fire Alarm System: Red.
    - b. Security System: Blue and yellow.
    - c. Telecommunication System: Green and yellow.
- K. Tag and label circuits designated to be extended in the future. Identify source and circuit numbers in each cabinet, pull and junction box, and outlet box. Color-coding may be used for voltage and phase identification.
- L. Install continuous underground plastic markers during trench backfilling, for exterior underground power, control, signal, and communication lines located directly above power and communication lines. Locate **6 to 8 inches** below finished grade. If width of multiple lines installed in a common trench or concrete envelope does not exceed **16 inches**, overall, use a single line marker.
- M. All power conductors shall be identified in accordance with the following schedule:
  - 1. 120/208V, 3 Phase, 4 Wire System.
    - a. Phase A: Black.
    - b. Phase B: Red.

- c. Phase C: Blue.
  - d. Neutral: White.
  - e. Ground: Green
- 2. 277/480V, 3 Phase, 4 Wire System.
  - a. Phase A: Brown.
  - b. Phase B: Orange.
  - c. Phase C: Yellow.
  - d. Neutral: White with a colored stripe or gray.
  - e. Ground: Green.
- 3. Clock wiring shall be 4 #14 TW or THWN, color coded as follows:
  - a. Hot circuit                      Black
  - b. Correction circuit            Red
  - c. Neutral                            White
  - d. Ground                            Green
- N. Install warning, caution, and instruction signs where required to comply with 29 CFR, Chapter XVII, Part 1910.145, and where needed to ensure safe operation and maintenance of electrical systems and of items to which they connect. Install engraved plastic-laminated instruction signs with approved legend where instructions are needed for system or equipment operation. Install metal-backed butyrate signs for outdoor items.
- O. Install engraved-laminated emergency-operating signs with white letters on red background with minimum 3/8-inch high lettering for emergency instructions on power transfer, load shedding, and other emergency operations.

### 3.15 UTILITY COMPANY ELECTRICITY-METERING EQUIPMENT

- A. Equipment shall be installed according to governing electric utility company's written requirements. Grounding and empty conduits shall be provided as required by utility company.

### 3.16 FIRESTOPPING

- A. Seal all penetrations for work of this section through fire rated floors, walls and ceilings to prevent the spread of smoke, fire, toxic gas or water through the penetration, either before, during, or after the fire. The fire **and** temperature ratings of the penetration assembly shall be at least that of the floor, wall, or ceiling into which it is installed so that the original fire rating of the floor or wall is maintained as required by Article 300.21 of the California Electrical Code (CEC).
- B. Where applicable, provide OZ Type CFSF/I and CAFSF/I fire seal fittings for conduit and cable penetrations through concrete and masonry walls, floors, slabs and similar structures. Where applicable, provide 3M fire barrier sealing penetration system, and/or

Thomas and Bett Flame Safe Fire Stop System, and/or Chase Foam fire stop system, including wall wrap, partitions, caps and other accessories as required. All manufacturers' instructions and recommendations for installation of sealing fittings and barrier sealing systems.

- C. The Contractor shall repair and refinish disturbed finish materials and other surfaces to match adjacent undisturbed new structures, surfaces and shall install new fireproofing where existing firestopping has been disturbed. The repair and refinishing of materials and other surfaces shall be by skilled mechanics of the trades involved.

### 3.17 REFINISHING AND TOUCHUP PAINTING

- A. The Contractor shall clean damaged and disturbed areas and apply primer, intermediate, and finish coats to suit the degree of damage at each location. He shall follow paint manufacturer's written instructions for surface preparation and for timing and application of successive coats.
- B. Damage to galvanized finishes shall be repaired with zinc-rich paint recommended by manufacturer.
- C. Damage to PVC or paint finishes shall be repaired with matching touchup coating recommended by manufacturer.
- D. See Section 09900, "Painting".

### 3.18 FIELD QUALITY CONTROL

- A. Test Owner's electricity-metering installation for proper operation, accuracy, and usability of output data.
  - 1. Connect a load of known kW rating, 1.5 kW minimum, to a circuit supplied by the metered feeder.
  - 2. Turn off circuits supplied by the metered feeder and secure them in the "off" condition.
  - 3. Run the test load continuously for eight hours, minimum, or longer to obtain a measurable meter indication. Use a test load placement and setting that ensure continuous, safe operation.
  - 4. Check and record meter reading at end of test period and compare with actual electricity used based on test load rating, duration of test, and sample measurements of supply voltage at the test load connection. Record test results.
  - 5. Repair or replace malfunctioning metering equipment or correct test setup; then retest. Repeat for each meter in installation until proper operation of entire system is verified.

### 3.19 SYSTEM TESTING AND STARTUP

- A. Refer to Specification Section 26 95 00 "Electrical Acceptance Tests" for minimum required systems testing and startup.

3.20 TITLE 24 - PART 6 DOCUMENTATION OF INSTALLATION AND ACCEPTANCE FOR ELECTRICAL POWER DISTRIBUTION SYSTEMS

- A. The Contractor shall prepare and submit the following Certificates of Installation:
  - 1. Electrical:
    - a. Certificate of Installation – Electrical Power Distribution (NRCI-ELE-01-E)

END OF SECTION 260500





SECTION 265113  
LIGHTING

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 shall form a part of this Section, with the same force and effect as though repeated here.

1.2 SCOPE

- A. The Contractor shall provide, install, connect, commission, test and place into operation a complete lighting system in accordance with the requirements of 2019 California Energy Code, California Code of Regulations Title 24, Part 6, and as herein specified.
- B. Basis of Design for lighting system: Lighting systems are primarily based on the use of dimmable LED fixtures as specified herein.
- C. Provide lighting fixtures of sizes, types and ratings as indicated by Drawings and Schedules, including, but not limited to, housing, light emitting diode (LED) modules, LED drivers, reflectors, diffusers, emergency lighting units, starters, wiring, accessories, poles, pole bases and mounting hardware.

1.3 DEFINITIONS

- A. A **Fixture** is a complete unit, exit sign, or emergency lighting unit. Fixtures include LED modules or lamps, as specified, and parts required to distribute light, position and protect LED modules, and connect and disconnect LED modules to and from the power supply.
- B. An **Emergency Lighting Unit** is a fixture with integral emergency battery-powered supply and the means for controlling and charging the battery. It is also known as an emergency light set. Emergency lighting units include ones with and without integral LED or lamp heads.

1.4 DESIGNATION

- A. Unless otherwise shown on the plans, fixture type designation for an individual fixture shall be typical for similarly indicated fixtures within the entire room or defined area.
- B. Unless otherwise shown on the plans, fixtures mounted in a continuous row shall be of the same type as any individually designated fixture within the row.
- C. Where a fixture is undesignated on the plans, it shall be of the same type as fixtures of similar function within the room it is located or within similar rooms or areas.

## 1.5 COORDINATION

- A. Confirm compatibility and interface of other materials with luminaires and ceiling system. Report discrepancies to the Architect or Electrical Engineer, and defer ordering until clarified.
- B. Supply plaster frames, trim rings, and back boxes to other trades.
- C. Coordinate with Division 21-25 to avoid conflicts between luminaires, supports, fittings, and mechanical equipment.
- D. All fixtures shall be coordinated with the architectural reflected ceiling plan. If any discrepancies occur, the Architect or Electrical Engineer must be notified in writing before installation is started.

## 1.6 SUBMITTALS

- A. Submittals for this Section shall be made according to the Conditions of the Contract, Division 01 Specification Sections and Specification Section 260100.
- B. Product Data
  - 1. Submit complete list of fixtures and manufacturer's catalog cuts and installation instructions on each type of lighting fixture and component. Include data on LED modules, LED drivers, poles, accessories and finishes. Include details indicating compatibility with ceiling grid system.
  - 2. Submit outline drawings indicating dimensions and principal features of fixtures and poles.
  - 3. Submit manufacturer's data on lighting control equipment and components. Include complete wiring diagrams, with wiring types and any installation limitations.
  - 4. Submit battery and charger data for emergency lighting units.
- C. Shop Drawings
  - 1. Submit layout drawings of all non-standard or customized fixtures. Drawings shall include mounting and feed points and methods.
  - 2. Submit wiring diagrams detailing wiring for control system specific to this Project and showing both factory-installed and field-installed wiring, and differentiating between factory-installed and field-installed wiring.
- D. Operation and Maintenance Data
  - 1. Submit operation and maintenance data for lighting control devices to include in maintenance manuals specified in Division 01 and Specification Section 260100.

## 1.7 QUALITY ASSURANCE

- A. Nothing in these Drawings or Specifications shall be interpreted as to permit any device, system, or work that is not in compliance with the current California Code of Regulations. Where work is detailed and/or specified to a more restrictive standard or higher requirement, that standard or requirement shall govern such work. Applicable codes and regulations include, but are not limited to, the following:
  - 1. Fixtures and emergency lighting units shall be certified by the manufacturer as meeting efficiency requirements prescribed under the test methods of the current California Code of Regulations Title 20, Appliance Efficiency Regulations.
  - 2. All work, commissioning and testing shall fully comply with the 2019 California Energy Code.

## 1.8 WARRANTY

- A. The **Special Warranties** specified in this Article shall not deprive the Owner of other rights the Owner may have under provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by the Contractor under requirements of the Contract Documents.
- B. Special Warranty for Batteries
  - 1. Submit a written warranty executed by the manufacturer agreeing to replace (includes material and labor) rechargeable system batteries that fail in materials or workmanship within the specified warranty period.
  - 2. The Special Warranty Period shall be manufacturer's standard but not less than 10 years after date of Completion. Full warranty shall apply for first year, and prorated warranty for last 9 years.
- C. Special Warranty for Exterior Fixtures
  - 1. Submit a written warranty signed by manufacturer and installer agreeing to replace external parts of lighting fixtures exhibiting a failure of finish within specified warranty period.
  - 2. Failure of finish is defined as perforation or erosion of finish due to weathering or fading, staining, and chalking of finish color due to effects of weather and solar radiation.
  - 3. The Special Warranty Period shall be five years from date of Substantial Completion.
- D. Special Warranty for LED Modules and Drivers
  - 1. LED modules and drivers shall be provided with a five year warranty including labor charges for replacement of defective LED modules and drivers.

## PART 2 - PRODUCTS

### 2.1 FIXTURES (General)

- A. The fixtures described in the Lighting Fixture Schedule on the drawings are to be used as a standard of quality to be maintained. Substitute items of same function, performance, and appearance are acceptable in conformance with Section 260100, except where noted otherwise.
- B. Provide fixtures complete with all fittings, LED modules, drivers, stems, hangers, and component parts to make a complete installation. Fixtures shall have a suitable interior means of grounding the enclosure.
- C. All attaching devices for recessed or surface mounted fixtures mounted in the ceiling shall be of formed or rolled steel and of sufficient strength to prevent movement of fixture after installation.
- D. The Architect, Electrical Engineer or Owner shall have the right to reject any damaged fixture, including any fixture with damaged or cracked finishes, broken or bent metal, damaged or broken lenses. Any fixture with an appearance deemed to be abnormal, may also be rejected by the Architect, Electrical Engineer or Owner. Rejected fixtures shall be removed and replaced with an undamaged fixture at no cost to the Owner.
- E. Lenses shall be virgin acrylic, 0.125 inches thick minimum, unless otherwise noted.
- F. There shall be no visible trademarks or monograms on the lighting fixtures.
- G. The Contractor shall provide lay-in frames for all exposed "T" ceiling systems and flanged trims for plasterboard, spline or metal lathe and plaster ceiling systems. The Contractor shall provide plaster or mounting frames where required.
- H. Doors, frames, and other internal access shall be smooth operating, free from light leakage under operating conditions, and arranged to permit re-lamping without use of tools. Arrange doors, frames, lenses, diffusers, and other pieces to prevent accidental falling during maintenance and when secured in operating position.
- I. Minimum reflectance of reflecting surfaces shall be as follows, except as otherwise indicated:
  - 1. White Surfaces - 85 percent.
  - 2. Specular Surfaces - 83 percent
  - 3. Diffusing Specular Surfaces - 75 percent
  - 4. Laminating Silver Metallized Film - 90 percent
- J. Fixtures installed in non-hazardous locations shall conform to UL 1598.
- K. Light emitting diode (LED) equipment used in fixtures shall conform to UL 8750.
- L. Exposed hardware shall be stainless steel.

## 2.2 LED FIXTURES

### A. LED Modules

1. Color Temperature: 4,000 Kelvin (K)
2. Color Consistency: 2-step MacAdams ellipse
3. Color Rendering:
  - a. Indoor Fixtures: 90 CRI, or greater
  - b. Outdoor Fixtures: 70 CRI, or greater
4. Dimming: LED modules shall be compatible with the 0-10VDC dimmable LED driver.
5. Light Distribution: As indicated on Lighting Fixture Schedule
6. Rated Life: 60,000-hours, with 90-percent lumen maintenance at 50-degrees C, in accordance with TM-21-11.

### B. LED Drivers

1. LED Drivers shall be 0-10VDC dimmable and shall be compatible with the LED modules and provide the correct 0-10VDC control voltage.
2. LED Drivers shall be independently tested by Intertek and shall bear the ETL Listed Mark as proof of meeting the applicable published safety standards.
3. LED Drivers shall be independently tested and certified by Underwriters Laboratories (UL) to meet FCC Regulations Part 15 and Part 18 and NEMA standards regarding electromagnetic and radio frequency interference, shall bear the United States UL Listed Mark as proof of meeting the applicable published standards.
4. LED Drivers shall comply with ANSI C62.41, Category A and IEEE 587 standards regarding harmonic distortion and surge protection. Total Harmonic Distortion (THD) shall not exceed 20 percent.
5. LED Drivers shall comply with IEC standard 60929, Annex E and shall source no more than 2mA of control current at 0-10VDC.
6. LED Drivers shall be solid-state, electronic, high power factor (minimum 0.9).
7. LED Drivers shall have a Class A sound rating.
8. LED Drivers shall have internal thermal protection to limit driver case temperature to a maximum of 75-degrees C.
9. Ambient Operating Temperature Range: -40-degrees C to 55-degrees C.
10. Rated Frequency: 60-Hertz
11. Rated Life: 60,000-hours

### C. Quality Control

1. Testing and measurement of LED lighting fixture performance shall comply with IES LM-79-08 and IES LM-82-12.

2. Testing and measurement of LED and LED module lumen maintenance shall comply with IES LM-80-08.

### 2.3 NLIGHT ENABLED NETWORK LIGHTING FIXTURES

- A. Lighting fixtures specified as nLight enabled shall have an integral nLight network interface and be integrated into the nLight network lighting control system.

### 2.4 EXTERIOR FIXTURES

- A. Metal parts of exterior fixtures exposed to weather conditions shall be constructed of cast or spun aluminum, cast bronze, stainless steel or other nonferrous metals available to withstand exposure.
- B. Steel fixtures installed in damp or wet locations shall have zinc-chromate or equal primer.
- C. Provide gaskets on all trims and housings.
- D. All exterior fixtures shall be supplied by a branch circuit that is controlled by an astronomic time clock that is programmed to automatically turn lights off during daylight hours.

### 2.5 EXIT SIGNS

- A. Exit signs shall conform to UL 924.
- B. Sign Colors and Minimum Letter Height shall be per local code.
- C. Exit signs shall include arrows as indicated.
- D. Exit signs shall have an integral emergency battery pack and shall include an integral automatic charger in a self-contained power pack. Battery shall be sealed, maintenance-free, nickel-cadmium type with special warranty. Charger shall be fully automatic, solid-state type with sealed transfer relay.
- E. Lamps for AC operation shall be light emitting diodes with 20,000 hours minimum rated lamp life.
- F. Operation: Relay automatically energizes lamp from unit when circuit voltage drops to 80 percent of nominal or below. When normal voltage is restored, relay disconnects lamps, and battery is automatically recharged and floated on charger.

### 2.6 EMERGENCY LIGHTING UNITS

- A. Emergency Lighting Units shall conform to UL 924.
- B. Emergency Lighting Units shall be self-contained with sealed, maintenance-free, lead-acid type battery with minimum 10-year nominal life and special warranty. Charger shall be minimum 2-rate, fully automatic, solid-state type, with sealed transfer relay.

- C. Operation: Relay automatically turns lamp on when supply circuit voltage drops to 80 percent on nominal voltage or below. Lamp automatically disconnects from battery when voltage approaches deep-discharge level. Relay disconnects lamps and battery and automatically recharges and floats on trickle charger when normal voltage is restored.
- D. Where indicated, provide heavy-chrome-plated wire guard arranged to protect lamp heads or fixtures.
- E. Provide time-delay relay in emergency lighting unit control circuit arranged to hold unit ON for fixed interval after restoration of power after an outage. Provide adequate time delay to permit HID lamps to restrike and develop adequate output.

## 2.7 EMERGENCY LED DRIVERS

- A. Emergency LED Drivers shall conform to UL 924
- B. Emergency LED Drivers shall be self-contained, modular, battery-inverter unit factory mounted within fixture body. Battery shall be sealed, maintenance-free, nickel-cadmium type with minimum 10-year nominal life. Charger shall be fully automatic, solid-state, constant-current type.
- C. Emergency LED Drivers shall be provided with test switch and LED indicator light visible and accessible without opening fixture or entering ceiling space.
- D. Operation: Relay automatically turns lamp on when supply circuit voltage drops to 80 percent of nominal voltage or below. Relay disconnects lamp and battery and automatically recharges when normal voltage is restored.

## 2.8 EMERGENCY LIGHTING INVERTERS

- A. Emergency Lighting Inverters shall be listed to UL 1778 and UL 924 by ETL.
- B. Emergency Lighting Inverters shall be compact central lighting inverters self-contained in a single cabinet with the following ratings:
  1. Available sizes: 500-, 750-, 1000-, 1250-, 1500-, and 2100-watts; provide sizes as scheduled on the Drawings.
  2. Input Voltage: 277-volt
  3. Output Voltage: 277-volt
  4. Output Frequency: 60-Hz
  5. Output Voltage Regulation: 4%
  6. Output Waveform: Sinusoidal during emergency with no greater than 10% total harmonic distortion.
  7. Output protection: Current limiting and short circuit protection.
  8. Battery: Maintenance free sealed lead calcium.
  9. Recharge Time: Recharge time shall comply with UL 924.
  10. Dimensions: 23.5"W x 34.25"H x 18.25"D

11. Weight: Weight shall not exceed 570-lbs.
- C. Emergency Lighting Inverters shall be rated for the following applications: HID, LED, Incandescent, Fluorescent and High Pressure Sodium.
- D. Emergency Power inverter shall have the following features:
  1. Low profile compact cabinet
  2. Single-phase, full range voltage regulation
  3. Input circuit breaker
  4. Output circuit breaker
  5. Battery circuit breaker
  6. Monitoring panel: Front panel LCD display unit status; alarm indicators
- E. Emergency Lighting Inverters shall be Crucial Power EconoSine 2, sized as scheduled on the Drawings.

## 2.9 POLES

- A. Light standards shall be as specified on the Lighting Fixture Schedule. Where a color is specified a powder coating and over galvanizing finish shall be applied.
- B. Poles shall have provisions for bonding to ground and shall be bonded to the equipment grounding conductor run with the supply branch circuit.

## 2.10 WET AND DAMP LOCATIONS

- A. All lighting fixtures installed in damp locations shall have UL approved "wet" or "damp" location labels visible in interior of fixtures.
- B. All lighting fixtures installed in wet locations shall have UL approved "wet" location labels visible in interior of fixtures.

## PART 3 - EXECUTION

### 3.1 LIGHTING FIXTURES INSTALLATION

- A. Continuous runs of fixtures shall be installed straight and true.
- B. All new fixtures shall be securely anchored to prevent any possible chance of their falling.
- C. The Contractor shall coordinate outlets with Acoustic Tile Contractor and other trades and locate outlets in center or at intersections of acoustical tile in all acoustical tile ceilings. All fixtures must be kept 1 ½" clear of all acoustic tile and any combustible material by use of approved spacers, unless Fire Underwriters approved to be surface mounted.



- D. All fixtures mounted in or on suspended ceilings shall be fastened to the ceiling framing members in accordance with CEC 410.36(B).
- E. Recessed fixtures shall be complete with plaster frames, supporting brackets and hanger wires.
- F. When lighting fixtures are equipped with integral emergency battery packs the fixtures shall be wired so that all lamps switch on and off via the room light switch and the emergency lamps are automatically energized if the normal power has failed.
- G. Install equipment level and plumb and according to manufacturer's written instructions.
- H. Mounting heights indicated are to bottom of unit for suspended devices and to center of unit for wall-mounted devices.
- I. Fixture installation shall conform to all applicable standards for installation, mounting, wiring, and quality.
- J. All fixtures shall be grounded and bonded in accordance with applicable codes. Where fixtures are installed in rows, a bonding screw shall be used to maintain bonding integrity from fixture to fixture.
- K. All fixtures, lenses, and other trim shall be aligned, cleaned, free of paint and blemishes before final acceptance.
- L. Fixtures weighing more than 50 pounds shall be supported independent of the fixture box. All outlet boxes shall be able to support a minimum of eight pounds.
- M. For fixtures weighing more than two pounds, support shall be provided at all four corners, plus the outlet box. Each support shall be able to carry a minimum of four times its intended load.
- N. No support or insert, except pendant canopies, shall be visible from the floor.
- O. Where fixtures are pendant suspended, the use of ball aligner and canopies at ceiling and fixture, stem, and other required mounting devices shall be required for installation as required to meet Title 24 requirements. A safety cable anchored to the roof structure shall be installed in all pendants. If any obstruction within the 45 degree swing of the fixture exists, the Contractor shall provide a State approved restraint system to prevent the fixture from swinging into the obstruction.
- P. When fixtures are stem mounted, the variation in distance from the finished floor shall vary no more than ½" from the heights as specified on the plans.
- Q. Pendant-Mounted fixtures mounting heights shall be to the bottom of the fixture. Mounting heights of the wall-mounted fixtures shall be to the center of the outlet box unless otherwise noted.
- R. Provide surface-mounted fixtures with UL approval for direct mounting on the various ceilings, unless specified otherwise. Spacers will not be approved.
- S. All fixtures shall be supported directly to building structural members or from bridging attached to the structural members, or shall have positive attached structural angles, and/or all-thread rod extensions from structure to ceiling plane. Fixtures and supports shall be laterally braced independently from suspended ceilings (hard or T-bar) utilizing

structural angles at approximate 45° angles in two planes from ceiling plane to structure above. Minimum rod size shall be ½" and minimum angle size shall be ¾" x ¾" x 3/16" unless noted otherwise in specific details. Provide all necessary blocking and hardware so that fixtures hang true, square, plumb, and in proper alignment.

- T. Recessed fixtures in T-bar ceilings (CCR Title 24, part 2, Section 1616A.1.20)
1. All light fixtures shall be attached positively to the ceiling suspension systems by mechanical means per CEC Article 410.36 to resist a horizontal force equal to the weight of the fixture. A minimum of two screws or approved fasteners are required at each light fixture, per ASTM E580, Section 5.3.1.
  2. Light fixtures weighing less than or equal to 10 lbs shall have a minimum of one #12 gage slack safety wire connected from the fixture housing to the structure above.
  3. Light fixtures weighing greater than 10 lbs but less than or equal to 56 lbs may be supported directly on the ceiling runners, but they shall have a minimum of two #12 gage slack safety wires connected from the fixture housing at diagonal corners and anchored to the structure above.
  4. Light fixture weighing greater than 56 lbs shall be independently supported by not less than four taut #12 gage wires attached to the housing and to the structure above. The four taut #12 gage wires, including their attachment to structure above, must be capable of supporting four times the weight of the unit.
- U. Surface fixtures mounted to T-bar ceilings shall be bolted through ceiling panel to metal channel struts suspended between ceiling main runners. Install hanger wires per above from struts to ceiling.
- V. Install flush mounted fixtures properly to eliminate light leakage between fixture frame and finished surface.
- W. Provide plaster frames for recessed fixtures installed in other than suspended grid type acoustical ceiling systems. Brace frames temporarily to prevent distortion during handling.
- X. Installation of Recessed Lighting Fixtures in Accessible-type Suspended Ceilings shall be such that the fixtures will exactly suit the type of ceilings used without altering the fixture or the ceiling. Each fixture shall be wired with a piece of flexible conduit sufficiently long to remove fixture enclosure from ceiling without disconnecting unit. Fixture manufacturer shall prepare drawing or catalog sheets in which all details of fixture installation are carefully analyzed. Contractor to submit these shop drawings for approval. If clearance above "T" bar system is too restricted to "tip-in" fixture, the Electrical Contractor shall coordinate with acoustic ceiling installer by leaving one cross "T" off until the cross "T" shall be secured into its proper place.
- Y. Where fixtures are installed in 1-Hour Rated Ceiling, Contractor shall provide gypboard "tents" above the fixtures to maintain the integrity of the 1-hour fire ceiling.
- Z. Adjust aimable fixtures to provide required light intensities.

3.2 FIELD QUALITY CONTROL

- A. Refer to Specification Section 269500, Electrical Acceptance Testing, for minimum required lighting testing by Contractor.

END OF SECTION 265113



SECTION 266100  
LIGHTING CONTROL SYSTEMS

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 shall form a part of this Section, with the same force and effect as though repeated here.

1.2 SCOPE

- A. The Contractor shall provide, install, connect, commission, test and place into operation a complete system of lighting control equipment in accordance with the requirements of 2019 California Energy Code, California Code of Regulations Title 24, Part 6, and as herein specified.
- B. Basis of Design for lighting control systems: Lighting control systems are primarily based on the use of a distributed digital lighting management system for control of indoor lighting systems and astronomic time clock controls for outdoor lighting systems and sign lighting.
- C. Provide lighting control equipment as indicated by drawings and schedules, including but not limited to, digital lighting management system dimming equipment, occupancy sensors, daylight sensors (photosensors), astronomic time clocks and multi-pole lighting relays and contactors and wiring.
- D. Mandatory Indoor Lighting Controls:
  - 1. Area Controls – Provide area controls in each space to facilitate the manual control of lighting within that space.
  - 2. Multi-level controls – Provide multi-level controls to facilitate the uniform reduction of lighting energy used in each space. Multi-level controls shall be accomplished through dimming.
  - 3. Automatic Shutoff Controls – Provide occupancy sensors in each space to automatically shut-OFF the lighting when the space is unoccupied.
  - 4. Automatic Daylighting Controls – Provide daylight sensors in each daylit area and automatically control lighting fixtures within the daylit areas separately from the fixtures located in non-daylit areas.
  - 5. Demand Responsive Controls – Provide controls that are capable of receiving and automatically responding to a demand response signal.
- E. Mandatory Outdoor Lighting Controls:
  - 1. Outdoor incandescent lighting – Provide a motion sensor at each outdoor incandescent luminaire that is rated over 100-watts.

2. Controls for outdoor lighting – Outdoor lighting shall be controlled by an astronomic time-switch that automatically turns OFF the outdoor lighting when daylight is available.
  3. Motion Sensor Controls – Provide a motion sensor control at each outdoor lighting fixture that is located 24-feet or less above the ground; except lighting fixtures rated 40-watts or less.
- F. Provide and install lighting control systems and equipment as indicated on drawings and schedules, including but not limited to, network lighting control system, network ceiling mounted occupancy sensors, network dimming manual control stations, network daylighting sensors (photosensors), network dimming control relays, network plug load control relays, network bridges, network gateways, network automated demand response control interface, network lighting control system integration for nLight enabled lighting fixtures, configuration tools, programming, configuration and documentation software, wall switches with integral occupancy sensors, emergency lighting control devices, astronomic time-switch controls and lighting control panels, photoelectric relays, and multi-pole lighting relays and contactors.

### 1.3 COORDINATION

- A. Confirm compatibility and interface of lighting control equipment with lighting fixtures, LED drivers and ceiling systems. Report discrepancies to the Architect or Electrical Engineer, and defer ordering until clarified.
- B. Coordinate with Division 21-25 to avoid conflicts between supports, fittings, and mechanical equipment.

### 1.4 SUBMITTALS

- A. Submittals for this Section shall be made according to the Conditions of the Contract, Division 01 Specification Sections and Specification Section 260100.
- B. Shop Drawings:
  1. Composite wiring and/or schematic diagram of each control circuit as proposed to be installed.
  2. Show exact location of all digital devices, including at minimum sensors, room controllers, and switches for each area on reflected ceiling plans.
  3. Provide room/area details including products and sequence of operation for each room or area. Illustrate typical acceptable room/area connection topologies.
  4. Network riser diagram including floor and building level details. Include network cable specification and end-of-line termination details, if required. Illustrate points of connection to integrated systems. Coordinate integration with mechanical and/or other trades.
- C. Product Data: Catalog sheets, specifications and installation instructions.
- D. Include data for each device which:
  1. Indicates where sensor is proposed to be installed.

2. Prove that the sensor is suitable for the proposed application.

## 1.5 QUALITY ASSURANCE

- A. Nothing in these Drawings or Specifications shall be interpreted as to permit any device, system, or work that is not in compliance with the current California Code of Regulations. Where work is detailed and/or specified to a more restrictive standard or higher requirement, that standard or requirement shall govern such work. Applicable codes and regulations include, but are not limited to, the following:
  1. All lighting control devices and systems shall be certified by the manufacturer as meeting the requirements of the current California Code of Regulations Title 20, Appliance Efficiency Regulations.
  2. All work, commissioning and testing shall fully comply with the 2019 California Energy Code.

## 1.6 CODES AND STANDARDS

- A. All work and materials shall fully comply with current rules and regulations of all applicable codes. Nothing in these Drawings or Specifications shall be interpreted as to permit any work not in compliance with these codes. Where work is detailed and/or specified to a more restrictive standard or higher requirement, that standard or requirement shall govern such work. Installation shall comply with the following codes and standards:
  1. California Code of Regulations (CCR)
    - a. Title 8, Industrial Relations
    - b. Title 17, Public Health
    - c. Title 24, Building Standards
  2. 2019 California Building Code.
  3. 2019 California Fire Code.
  4. 2019 California Electrical Code.
  5. 2019 California Energy Code.
  6. Local Codes.
  7. ANSI/TIA/EIA-568-C-2012 Commercial Building Telecommunications Standard
  8. ANSI/TIA/EIA-607-B-2013 Grounding and Bonding Requirements for Telecommunications in Commercial Buildings
  9. BICSI TDMM Telecommunications Distribution Methods Manual 12<sup>th</sup> Edition
  10. NEMA VE1 Cable Tray Systems
  11. NEMA VE2 Cable Tray Installation Guides
  12. UL 467 Grounding and Bonding Equipment.
  13. UL 1479 Fire Tests of Through-Penetration Firestops

## 1.7 WARRANTY

- A. The **Warranties** specified in this Article shall not deprive the Owner of other rights the Owner may have under provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by the Contractor under requirements of the Contract Documents.
- B. Provide five-year manufacturer's warranty on all digital lighting management system room control devices and panels.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

- A. This design is based on the use of nLight network lighting controls equipment manufactured by Acuity Brands nLight. Subject to compliance with project and specification requirements, equivalent products by the following manufacturers may be considered if a complete substitution request including shop drawings is submitted and approved prior to bid.
  - 1. Network Lighting Controls nLight
  - 2. Cooper Greengate;
  - 3. WattStopper;
- B. System: Network Lighting Controls nLight

### 2.2 NETWORK CEILING MOUNTED OCCUPANCY SENSOR

- A. Network ceiling mounted occupancy sensors shall be dual technology digital passive infrared and microphonic occupancy sensors.
- B. Network ceiling mounted occupancy sensors shall include the following features:
  - 1. Communicates with the nLight network;
  - 2. Low voltage auxiliary relay rated 1-amp at 24VAC/VDC with 2#20 AWG wire leads;
  - 3. RJ45 port, RJ45 splitter and Category 5e patch cable;
  - 4. Physical Description: Size: 4.55" diameter, 1.55" deep; Weight: 6oz; Color: Matte White;
  - 5. Mounting: Ceiling Tile / Gypsum board surface, or 3.5" octagonal box, or single-gang handy box;
- C. Network ceiling mounted occupancy sensors shall be nLight Network Lighting Controls communication compatible and powered through the nLight bus.
- D. nLight product numbers: nCM PDT 9 RJB AR (in offices and spaces less than 250-square-foot); nCM PDT 10 RJB AR (in corridors and spaces greater than 250-square-foot); nCM PDT 6 RJB AR (only in spaces with ceiling height greater than 15-feet);



## 2.3 SINGLE-ZONE NETWORK DIMMING MANUAL CONTROL STATIONS

- A. Single-zone network dimming manual control stations shall include the following features:
  - 1. Communicates with the nLight network;
  - 2. Two RJ45 ports;
  - 3. Physical Description: Size: 2.74" high, 1.68" wide, 1.63" deep; Weight: 2oz; Color: Matte White;
  - 4. Three buttons: "ON/OFF"; up arrow; and down arrow
  - 5. Mounting: Single-gang, 2-3/4" deep switch box with single gang plaster ring, or multi-gang switch box with multi-gang plaster ring matching the number of control stations where multiple control stations are collocated.
- B. Network dimming manual control stations shall be nLight Network Lighting Controls communication compatible and powered through the nLight bus.
- C. nLight product number: nPODM DX; Coordinate device color with the architect and Owner prior to ordering. Device shall be compatible with wall plates having decora style openings. Provide and install a decora style wall plate matching the switch color at each switch. Provide multi-gang wall plates at multi-gang switch locations.

## 2.4 FOUR-SCENE NETWORK DIMMING MANUAL CONTROL STATIONS

- A. Four-scene network dimming manual control stations shall include the following features:
  - 1. Communicates with the nLight network;
  - 2. Two RJ45 ports;
  - 3. Physical Description: Size: 2.74" high, 1.68" wide, 1.63" deep; Weight: 2oz; Color: Matte White;
  - 4. Eight buttons custom engraved: "ON"; "OFF"; "ENERGY"; "A/V"; "DIM-50%"; "DIM-5%"; up arrow; and down arrow
  - 5. Mounting: Single-gang, 2-3/4" deep switch box with single gang plaster ring, or multi-gang switch box with multi-gang plaster ring matching the number of control stations where multiple control stations are collocated.
- B. Network dimming manual control stations shall be nLight Network Lighting Controls communication compatible and powered through the nLight bus.
- C. nLight product number: nPODM 4S DX; Coordinate device color with the architect and Owner prior to ordering. Device shall be compatible with wall plates having decora style openings. Provide and install a decora style wall plate matching the switch color at each switch. Provide multi-gang wall plates at multi-gang switch locations.

## 2.5 DIGITAL KEYED SWITCH MANUAL CONTROL STATIONS

- A. Digital keyed switch manual control stations shall include the following features:
  - 1. Communicates with the nLight network;
  - 2. Two RJ45 ports;
  - 3. Physical Description: Size: 4" high, 1.3" wide, 1.63" deep; Weight: 2oz; Color: Matte White;
  - 4. Key action: Return-to-center for momentary.
  - 5. Pilot LED's to indicate on or off status.
  - 6. Mounting: Single-gang, 2-3/4" deep switch box with single gang plaster ring, or multi-gang switch box with multi-gang plaster ring matching the number of control stations where multiple control stations are collocated.
- B. Digital keyed switch manual control stations shall be nLight Network Lighting Controls communication compatible and powered through the nLight bus.
- C. nLight product number: nPOD KEY; Coordinate device color with the architect and Owner prior to ordering. Device shall be compatible with wall plates having decora style openings. Provide and install a decora style wall plate matching the switch color at each switch. Provide multi-gang wall plates at multi-gang switch locations.

## 2.6 NETWORK DIMMING CONTROL RELAYS

- A. Network dimming control relays shall automatically bind the room loads to the connected devices in the space. The quantity of network dimming control relays shall be provided to match the number of control zones required in each space.
- B. Network dimming control relays shall be the On/Off/Dimming type and include the following features:
  - 1. Communicates with the nLight network;
  - 2. One 120/240/277VAC, 16-amp, latching lighting relay;
  - 3. Sinks 100mA; 0-10VDC dimmable LED drivers;
  - 4. Two RJ45 ports;
  - 5. LED indicator;
  - 6. Physical Description: Size: 3.38" high x 2.53" wide x 1.83" deep + 1/2" chase nipple; Weight: 6oz; Color: White;
  - 7. Mounting: Mount to a 5S x 2.5" deep large capacity outlet box;
- C. Network dimming manual control stations shall be nLight Network Lighting Controls communication compatible and powered through the nLight bus.
- D. nLight Product Number: nPP16 (D).

## 2.7 NETWORK PLUG LOAD CONTROL RELAYS

- A. Network plug load control relays shall automatically bind a rooms controlled receptacles loads to the network occupancy sensor in the space.
- B. Network plug load control relays shall include the following features:
  - 1. Communicates with the nLight network;
  - 2. One 120-volt, 20-amp, UL general purpose latching relay
  - 3. Two RJ45 ports;
  - 4. LED indicator;
  - 5. Physical Description: Size: 3.38" high x 2.53" wide x 1.83" deep + ½" chase nipple; Weight: 6oz; Color: Blue;
  - 6. Mounting: Mount to a 5S x 2.5" deep large capacity outlet box;
- C. Network dimming manual control stations shall be nLight Network Lighting Controls communication compatible and powered through the nLight bus.
- D. nLight Product Number: nPP20 PL

## 2.8 PROGRAMMING, CONFIGURATION AND DOCUMENTATION SOFTWARE

- A. Programming shall be provided by the Contractor through a web-based suite of applications that gives the programmer the ability to remotely configure and monitor nLight network luminaires and nLight control devices.
- B. The Contractor shall completely program and configure the lighting control system to comply with 2019 California Energy Code requirements.
- C. Provide one nCOMKIT and commissioning tool interface;
- D. Communication Protocol: Programming software shall communicate with nGWY2 over LAN IP network and with nLight network directly through nCOMKIT and commissioning tool interface and shall be able to program up to 20,000 network controlled devices.
- E. System Requirements: Laptop or PC with Windows 7 or newer operating system; 4GB RAM and 2GB minimum available memory; Internet Explorer 10 and newer, Chrome, or Firefox browsers.
- F. Acuity Controls Product Number: SensorView 13, nCOMKIT

## 2.9 WALL SWITCH WITH INTEGRAL OCCUPANCY SENSOR

- A. Wall switches with integral occupancy sensors shall be comprised of an all digital, passive infrared technology (PIR) sensor to detect human presence.
- B. System shall have field selectable auto-ON or manual-ON operating modes and shall be factory set to the manual-ON operating mode.

- C. Wall switches with integral occupancy sensors shall be rated: 120/277-volt; 60Hz and shall have separate neutral and equipment grounding connection wire leads.
- D. Wall switches with integral occupancy sensing shall be Sensor Switch model WSX (in Janitors closets and storage rooms having only one lighting fixture).

## 2.10 EMERGENCY LIGHTING CONTROL DEVICES

- A. Emergency Lighting Control Unit – A UL 924 listed device that monitors a circuit providing normal lighting to an area. The unit provides normal dimming and ON/OFF control of emergency lighting along with the normal lighting. Upon normal power failure the emergency lighting circuit will close, forcing the emergency lighting ON until normal power is restored. Features include:
  - 1. 120/277 volts, 50/60 Hz, 20 amp dimming LED driver rating
  - 2. Push to test button
  - 3. Auxiliary contact for remote test or fire alarm system interface
- B. nLight Product Numbers: nPP16 ER SHUNT.

## 2.11 nLIGHT ENABLED NETWORK LIGHTING FIXTURES

- A. Lighting fixtures specified as nLight enabled shall have an integral nLight network interface and be integrated into the nLight network lighting control system.

## PART 3 - EXECUTION

### 3.1 PRE-INSTALLATION MEETING

- A. A factory authorized manufacturer's representative shall provide the electrical contractor a functional overview of the lighting control system prior to installation. The contractor shall schedule the pre-installation site visit after receipt of approved submittals to review the following:
  - 1. Confirm the location and mounting of all digital devices, with special attention to placement of occupancy and daylighting sensors.
  - 2. Review the specifications for low voltage control wiring and termination.
  - 3. Discuss the functionality and configuration of all products, including sequences of operation, per design requirements.
  - 4. Discuss requirements for integration with other trades.

### 3.2 INSTALLATION, CALIBRATION AND PROGRAMMING SERVICES

- A. Install all devices and wiring in a professional manner. All line voltage connections shall be tagged to indicate circuit and switched legs.
- B. Category 5e network cables shall not have boots installed at the RJ45 plug connectors.

- C. Provide and install category 5e cable with RJ-45 connectors interconnecting all control device, bridges and gateways. If pre-terminated cable is not used for room/area wiring, the contractor is responsible for testing each field-terminated cable following installation, and shall supply the lighting controls manufacturer with test results. Low voltage wiring topology must comply with manufacturer's specifications. Contractor shall route network wiring as shown in submittal drawings as closely as possible, and shall document final wiring location, routing and topology on as built drawings.
- D. Provide and install one ¾" conduit with 2#12 copper THWN/THHN + 1#12 copper ground between nearest constant hot portion of lighting branch circuit and each PS 150 power supply. Connect line voltage to each power supply and connect the Class 2 low voltage wiring between the PS 150 power supply and network bridge.
- E. Install the work of this Section in accordance with manufacturer's printed instructions unless otherwise indicated. Before start up, the contractor shall test all devices to ensure proper communication.
- F. Calibrate all sensor time delays and sensitivity to guarantee proper detection of occupants and energy savings.
- G. Adjust time delay so that controlled area remains lighted while occupied.
- H. Provide written or computer-generated documentation on the configuration of the system including room by room description including:
  - 1. Sensor parameters, time delays, sensitivities, and daylighting setpoints.
  - 2. Sequence of operation, (e.g. manual ON, Auto OFF. etc.)
  - 3. Load Parameters (e.g. blink warning, etc.)
- I. Post start-up tuning – After 30 days from occupancy contractor shall adjust sensor time delays and sensitivities to meet the Owner's requirements. Provide a detailed report to the Architect / Owner of post start-up activity.
- J. Network daylight sensors for automatic dimming within a daylit zone shall be calibrated such that lighting power for the lighting fixtures within that daylit zone shall be reduced by 65% when daylit illuminance is 150% of design illuminance. Design illuminance for specific spaces shall be as recommended by the IESNA Lighting Handbook 8<sup>th</sup> Edition Chapter 11, Figure 11-1, for Commercial, Institutional, Residential, and Public Assembly Interiors.
- K. Program uniform manual dimming and ON-OFF control within each space that has a network daylight sensor:
  - 1. Lighting fixtures located within daylit zones shall be programmed to manually turn ON and OFF with lighting fixtures located outside of the daylit zones (in the same space) with a common ON/OFF button.
  - 2. Lighting fixtures located within daylit zones shall be programmed to manually dim at the same rate as lighting fixtures outside of the daylit zone (in the same space) once lighting fixtures outside of the daylit zone have had lighting power manually reduced by 65%.
- L. Program four-scene network dimming manual control stations as follows:

1. ENERGY (Scene 1): Selection of the "ENERGY" scene shall uniformly lower the lighting levels of all lighting fixtures within the space to 85-percent of their maximum lighting power demand.
  2. A/V (Scene 2): Selection of the "A/V" scene shall turn OFF all lighting fixtures the first row located in front of a projection screen or video monitor and shall reduce all other zones within the space to 20-percent of maximum light output.
  3. DIM-50% (Scene 3): Selection of the "DIM-50%" scene shall uniformly lower the lighting levels of all lighting fixtures within the space to 50-percent of maximum light output.
  4. DIM-5% (Scene 4): Selection of the "DIM-5%" scene shall uniformly lower the lighting levels of all lighting fixtures within the space to 5-percent of maximum light output.
- M. Lighting controls shall be connected and programmed to be demand responsive and shall automatically reduce building lighting power demand by 15% in response to a demand response signal per 2019 CA Energy Code section 130.1 (e).

### 3.3 FACTORY SERVICES

- A. Upon completion of the installation, a manufacturer's factory authorized representative shall start up and verify a complete and fully functional system.
- B. Upon completion of the system start up, the factory-authorized technician shall provide the proper training to the owner's personnel on the adjustment and maintenance of the system.

### 3.4 ACCEPTANCE TESTING AND COMMISSIONING

- A. The Contractor shall provide the services of a California State certified lighting controls acceptance test technician (CLCATT) to act as the acceptance testing agent and verify the installation of the lighting control systems.
- B. Provide the services of a manufacturer's factory technician time to assist the CLCATT review the functionality and settings of the lighting control hardware per the requirements in the California State forms.
- C. The Contractor shall provide the services of a Commissioning Agent to provide commissioning of the indoor and outdoor lighting systems. The following commission tasks shall be completed in accordance with 2019 California Energy Code, Section 120.8 Building Commissioning:
  1. The Commissioning Agent shall obtain the Owner's Project Requirements.
  2. The Commissioning Agent shall compile and update a Basis of Design during the construction of the project.
  3. The Commissioning Agent shall complete a commissioning plan including the following information:
    - a. General project information
    - b. Commissioning goals

- c. Systems to be commissioned
- d. Plans to test systems and components, which shall include:
  - 1) An explanation of the original design intent
  - 2) Equipment and systems to be tested, including the extent of the tests
  - 3) Functions to be tested
  - 4) Conditions under which the test shall be performed
  - 5) Measurable criteria for acceptable performance
  - 6) Commissioning team information
  - 7) Commission process activities, schedules and responsibilities
- 4. The Commissioning Agent shall provide function performance testing.
- 5. The Commissioning Agent shall provide system documentation and training requirements.
- 6. The Commissioning Agent shall provide a commissioning report.

3.5 TITLE 24 - PART 6 DOCUMENTATION OF INSTALLATION AND ACCEPTANCE FOR INDOOR AND OUTDOOR LIGHTING

- A. The Contractor shall prepare and submit the following Certificates of Installation:
  - 1. Indoor Lighting:
    - a. Certificate of Installation – Validation of Certificate of Compliance (NRCI-LTI-01-E)
    - b. Certificate of Installation – Energy Management Control System or Lighting Control System (NRCI-LTI-02-E)
    - c. Certificate of Installation – Line-Voltage Track Lighting (NRCI-LTI-03-E)
    - d. Certificate of Installation – Two Interlocked Lighting Systems (NRCI-LTI-04-E)
    - e. Certificate of Installation – Power Adjustment Factors (NRCI-LTI-05-E)
    - f. Certificate of Installation – Additional Videoconference Studio Lighting (NRCI-LTI-06-E)
- B. The Contractor shall provide the services of a California state certified lighting controls acceptance test technician (CLCATT) to perform acceptance tests, prepare Certificates of Acceptance and certify that all indoor and outdoor lighting systems comply with the 2019 California Energy Code Section 130.4. The Certificates of Acceptance shall bear the name and certification identification number of the certified lighting compliance acceptance test technician. The certified lighting compliance acceptance test technician shall prepare and submit the following Certificates of Acceptance:
  - 1. Indoor Lighting:
    - a. Certificate of Acceptance – Lighting Controls (NRCA-LTI-02-A)
    - b. Certificate of Acceptance – Automatic Daylighting (NRCA-LTI-03-A)

- c. Certificate of Acceptance – Demand Responsive Lighting Controls (NRCA-LTI-04-A)
- C. The Contractor shall properly calibrate all lighting control devices and systems. To verify that the lighting control devices and systems have been properly calibrated the Contractor shall conduct the following tests as outlined in Chapter 13 of the 2019 California Energy Commission Nonresidential Compliance Manual, Article 13.87 Test Procedures for Indoor & Outdoor Lighting, and make modifications to the control until it passes the test:
  - 1. Indoor Lighting:
    - a. 13.88 NA7.6.1 Automatic Daylighting Control Acceptance
    - b. 13.89 NA7.6.2.4 and NA7.6.2.5 Automatic Time Switch Acceptance
    - c. 13.90 NA7.6.2.2 and 7.6.2.3 Occupant Sensor Acceptance
    - d. 13.91 NA 7.6.3 Demand Responsive Controls Acceptance

### 3.6 ON-SITE ASSISTANCE

- A. Within one year of date of Substantial Completion, provide up to three Project site visits, when requested, to adjust light levels, make program changes, and adjust sensors and controls to suit actual conditions.

### 3.7 PERSONNEL TRAINING

- A. Train Owner's building personnel in procedures for starting-up, testing and operating lighting control system equipment.

**END OF SECTION 266100**



SECTION 272000  
TELECOMMUNICATIONS SYSTEMS

PART 1 - GENERAL

1.1 SCOPE

- A. Furnish and install a complete network telecommunications cabling system including Main Distribution Frame (MDF), Intermediate Distribution Frames (IDF), radial distributed site fiber optic cables (data backbone) between the MDF and each IDF, radial distributed site multi-pair copper cables (voice backbone) between the campus Minimum Point of Entry (MPOE) for the telephone service and a telephone backboard located in each building, a system of horizontal cable links between each buildings outlets and the corresponding building IDF/MDF, patch panels, outlet boxes, conduits and raceways, jack modules for terminating both ends of each cable, and coverplates.
- B. The Contractor shall provide termination, testing and certification of each cable.
- C. The furnishing of network servers and switches is specifically excluded from this section.

PART 2 - PRODUCTS

2.1 TELECOMMUNICATION HORIZONTAL CABLING

- A. Horizontal Voice Cable
  - 1. Materials – 23 AWG solid copper UTP, 4-pair, CMP rated, premium Category 6 cable. Color: Grey.
  - 2. Manufacturer – Berk-Tek
  - 3. Model: 10167307; Description: type LANmark-2000 series.
- B. Horizontal Data Cable - For Workstation Outlets
  - 1. Materials – 23 AWG solid copper UTP, 4-pair, CMP rated, premium Category 6 cable. Color: Blue.
  - 2. Manufacturer – Berk-Tek
  - 3. Model: 10163780; Description: type LANmark-2000 series.
- C. Horizontal Data Cable – For Wireless Access Points
  - 1. Materials – 23 AWG solid copper UTP, 4-pair, CMP rated, 10-Gigabit Ethernet Category 6A cable. Color: White.
  - 2. Manufacturer – Berk-Tek
  - 3. Model: 11082058; Description: type LANmark-XTP series.
- D. Horizontal Data Cable – For Connection of Energy Management Systems and Lighting Control Systems to the Local Area Network:

1. Materials – 23 AWG solid copper UTP, 4-pair, CMP rated, premium Category 6 cable. Color: Yellow.
2. Manufacturer – Berk-Tek
3. Model: 10167309; Description: type LANmark-2000 series.

E. J Hooks

1. J hook cable supports shall provide a bearing surface of sufficient width to comply with required bend radii of high-performance cables; cULus Listed. J hook cable supports shall have flared edges to prevent damage while installing cables. J hook cable supports shall be 1 5/16" minimum and have a cable retainer strap to provide containment of cables within the hanger. The cable retainer strap shall be removable and reusable and be suitable for use in air handling spaces. J hook cable supports shall have an electro-galvanized or G60 finish and shall be rated for indoor use in non-corrosive environments.
2. Manufacturer – Erico (Caddy Cablecat Series Non-continuous Support Cable System).

## 2.2 TELECOMMUNICATION BACKBONE CABLE TERMINATIONS

A. OSP Rated Copper Cable Termination Blocks (Voice Backbone)

1. Materials – Siemon 66 type punch down block w/50 pair capacity (66M1-50), wall mounted, with 400 pair capacity backboards (Allen Tel P/N 183B2) complete with brackets and cross-connect spools (Allen Tel P/N 187B1). Punch down blocks shall be of high impact flame-retardant thermoplastic, which secure and organize groups of 25 UTP pairs of 22-26 gauge each.
2. Manufacturer – The Siemon Company (66-Type), Allen Tel.
3. Quantity – Provide two (2) termination blocks at each telephone backboard (TBB) + fourteen (14) at the telephone backboard located at the minimum point of entry (MPOE).

B. Copper Cable Protection

1. 100-pair, 66 block input and output, fully loaded with solid state primary telecommunications protector modules, wall mountable.
2. Manufacturer: Circa Telecom model 1890 ECT 1-100

## 2.3 TELECOMMUNICATION HORIZONTAL CABLE TERMINATIONS

A. Horizontal Voice Cable Termination Blocks (Interconnection to Voice Backbone)

1. Materials – Siemon 66 type punch down block w/50 pair capacity (66M1-50), wall mounted, with 400 pair capacity backboards (Allen Tel P/N 183B2) complete with brackets and cross-connect spools (Allen Tel P/N 187B1). Punch down blocks shall be of high impact flame-retardant thermoplastic, which secure and organize groups of 25 UTP pairs of 22-26 gauge each.
2. Manufacturer – The Siemon Company (66-Type), Allen Tel.

- B. Horizontal Data Cable Patch Panels
  - 1. Materials – 48-port, 2U Category 6 patch panel, fully loaded with Mini-com TX6 Jack modules. Rack mountable (19") w/ integrated rear cable management bar. Color: Black.
  - 2. Manufacturer – Panduit (P/N DP486X88TGY)
  - 3. Quantity – Provide seven (7) horizontal data cable patch panels in each IDF + seven (7) horizontal data cable patch panels in the MDF.
  
- C. Combination Voice & Data Outlets
  - 1. Station Jack Modules –
    - a. Voice: Materials – Two (2) 6-position RJ11, Category 3 rated jack modules. USOC wired. Color: Gray. Manufacturer – Panduit (P/N CJ66UIWY)
    - b. Data: Materials – Two (2) 8-position RJ45, Category 6 rated jack modules. Color: Blue. Manufacturer – Panduit (P/N CJ6X88TGBU)
  - 2. Outlet Box and Faceplate - Materials - 4 or 6-port, single-gang angled faceplate shall be mounted to a two-gang outlet box fitted with a single-gang reducer. Blanks shall be installed in each unused port. Panduit (Mini-com Series 4 or 6 module)
  
- D. Data Outlets
  - 1. Station Jack Modules – Materials – 8-position RJ45, Category 6 rated jack modules. Color: Blue. Manufacturer – Panduit (P/N CJ6X88TGBU). Quantity – Three (3) to six (6) as indicated by symbol subscript.
  - 2. Outlet Box and Faceplate - Materials - 4 or 6-port, single-gang angled faceplate shall be mounted to a two-gang outlet box fitted with a single-gang reducer. Blanks shall be installed in each unused port. Panduit (Mini-com Series 4 or 6 module).
  
- E. Wireless Access Points
  - 1. Wireless Access Point Connectors – Materials – 8-position RJ45, Category 6A rated plug connector module. Color: Clear. Manufacturer – Panduit (P/N SP6X88-C). Quantity – One at location of wireless access point.

## 2.4 LABELS

- A. Materials: Vinyl plastic type that meet UL 969 requirements, preprinted or laser printed type, and easily distinguishable.
- B. Manufacturers – Panduit, W.H. Brady, Ideal.

## PART 3 - EXECUTION

### 3.1 INSTALLATION:

- A. The Contractor shall install all cables, trays, supports, racks, cabinets, frames, backboards, blocks, cable management, connectors, manhole cable rack hardware, and all appropriate termination and mounting hardware.
- B. The Contractor shall utilize conduits and cable trays for the placement of voice and data backbone cables.
- C. The Contractor shall utilize conduits and cable trays for the placement of horizontal voice and data cables. Cables which exit cable trays shall be supported by J-hooks that are attached to the structure independently from ceiling or lighting fixture supports.
- D. Where penetrations through fire rated walls, acoustical or other walls are made for cable pass-thru, such penetrations shall be sealed by the Contractor in compliance with code requirements.

### 3.2 BONDING AND GROUNDING

- A. The Contractor shall provide ground continuity by properly bonding all appropriate cabling, closures, cabinets, service boxes, conduit, cable trays, and framework. All grounds shall consist of #6 AWG stranded copper wire and shall be attached to an approved building ground, which is bonded to the main electrical ground. Grounding shall be in accordance with J-STD-607-A, CEC, NFPA and all local codes and practices.

### 3.3 IDENTIFICATION & LABELING

- A. The Contractor shall obtain the room numbers that will appear on door signage prior to assigning origin and destination identification for labels.
  - 1. Backbone cables shall be labeled at each endpoint and at all pull boxes, access points or junction boxes. Labels shall indicate origination and destination identification, sheath identification, and strand or pair count.
  - 2. Horizontal cables shall be labeled at each endpoint. Labels shall indicate origination and destination identification.
  - 3. All label printing will be machine generated by system software using indelible ink ribbons or cartridges. Self-laminating labels will be used on cable jackets, appropriately sized to the OD of the cable, and placed within view at the termination point on each end

### 3.4 ACCEPTANCE TESTING AND CERTIFICATION

- A. All distribution cables shall meet or exceed all performance specifications designated by ANSI/EIA/TIA-568-B.1, and IEEE for telephone and data communications.
- B. No later than five days after testing, Contractor shall furnish the Owner with a documentation binder and electronic disks of all test results from OTDR and power meter test equipment. Electronic copies of test results must be presented in format acceptable to the Owner (runtime software application included if necessary). The content requirements for these forms are described in the following sections.

- C. Copper Cables: Testing of all copper wiring shall be performed prior to system cut-over. 100 percent of the OSP and horizontal wiring pairs shall be tested for opens, shorts, polarity reversals, transposition and presence of AC voltage. Test shall include length, mutual capacitance, characteristic impedance, attenuation, and near-end and far end cross-talk. The Contractor, at no charge shall bring any pairs not meeting the requirements of the standard into compliance with the standards and specifications. Complete, end to end test results must be submitted to the Owner. Test results for each of the above tests and associated cable lengths shall be generated by an automated testing device. Test results must be permanently recorded and presented for review in both hardcopy and in a computer-readable format.
- D. Fiber Optic Cables - No later than five days after testing, Contractor shall furnish the Owner with a documentation binder and electronic disks of all test results from OTDR and power meter test equipment. Electronic copies of test results must be presented in a readable format (runtime software application included in necessary). The content requirements for these forms are described in the following sections.
1. OTDR Test Results
    - a. Contractor shall furnish on disc with application software, electronic strip charts and/or tracer recordings on each and every fiber strand in each and every cable in one direction at both 850 and 1300 nanometer wavelengths for multimode fiber, 1310 and 1550 for singlemode, with the following information:
      - 1) Date of test
      - 2) Name of test personnel
      - 3) Test wavelength
      - 4) Pulse duration(s) and scale range(s)
      - 5) Index of refraction
      - 6) Fiber cable type and part number
      - 7) Fiber tube and/or fiber strand number
      - 8) Direction of test
      - 9) Overall distance in meters
      - 10) Attenuation in dB or dBm
  2. Power Meter Test Results
    - a. Contractor shall furnish attenuation assessments for both 850 and 1300 nanometer wavelengths for multimode fiber and 1310 and 1550 for singlemode on each and every fiber in each and every cable, in both directions with the following information:
      - 1) Date of test
      - 2) Name of test personnel
      - 3) Fiber cable type and part number
      - 4) Fiber number
      - 5) TX wavelength
      - 6) TX location
      - 7) RX location

- 8) TX model and serial number
  - 9) RX model and serial number
  - 10) Attenuation dB or dBm
3. Contractor may be required to perform additional testing as required by Owner to ensure compliance with mated pair connection loss, splice loss and overall link loss. Any cables failing to meet above indicated standards must be removed and replaced, at no cost to the Owner, with cables, which prove, in testing, to meet the standards. The installation will not be accepted until testing has reported that all pairs meet the appropriate standards.

### 3.5 PROJECT RECORD DOCUMENTATION

- A. The Contractor shall provide a database of cable records, both hard copy and on floppy disk, using Owner approved format (Excel spreadsheet or otherwise specified) for use by the Owner for cable and facilities management. The cable records format must include, at a minimum, the following information about each cable:
  1. Distribution Cable Pair Assignments.
  2. Test Results.
- B. Three (3) sets of reproducible as-built floor plans plus vertical rack elevations and wall mounted termination field details in digital format (AutoCAD v.14) showing all installed cables, pair and strand assignments, routing, terminal and outlet locations, patch panels and labeling conventions.
- C. These documents shall be delivered to the Owner no more than 20 working days after completion and acceptance of the Contractor's work.

END OF SECTION 272000

SECTION 283100  
FIRE ALARM SYSTEM

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 shall form a part of this Section, with the same force and effect as though repeated here.

1.2 DESCRIPTION:

- A. This section of the specifications includes the furnishing, installation, connection and programming of new fire alarm equipment to form a complete coordinated system ready for operation. It shall include, but not be limited to a fire alarm NAC booster panel, alarm initiating devices, alarm notification appliances, auxiliary monitoring and control devices.
- B. This Section includes the furnishing of all labor, equipment, materials, and performance of all operations associated with the installation of the Fire Alarm / Emergency Voice Alarm Communication System as required by the drawings and specified herein.

1.3 SCOPE:

- A. The Contractor shall furnish and install booster power panels, initiation devices and circuits, notification appliances and circuits, control relays, monitor modules and supervisory devices, as required to accomplish this intent whether or not specifically shown or specified.
- B. The complete installation shall conform to the applicable sections of NFPA 72, state code requirements and the 2019 California Electrical Code with particular attention to Article 760.
- C. The work specified herein shall be coordinated with the related work as specified elsewhere under the project specifications.

1.4 SUBMITTALS

- A. Submittals for this Section shall be made according to the Conditions of the Contract, Division 01 Specification Sections and Specification Section 260100.
- B. General:
  - 1. Five copies of all submittals shall be submitted to the Architect/Engineer for review.
  - 2. For equipment other than that specified, the contractor shall supply proof that such substitute equipment equals or exceeds the features, functions, performance, and quality of the specified equipment.

- C. Shop Drawings:
  - 1. Sufficient information, clearly presented, shall be included to determine compliance with drawings and specifications.
  - 2. Include manufacturer's name(s), model numbers, ratings, power requirements, equipment layout, device arrangement, complete wiring point-to-point diagrams, and conduit layouts.
  - 3. Show remote annunciator(s) layout, configurations, and terminations.
  - 4. Shop drawings shall show valid Contractor's C-10 license, wet-signed by C-10 license holder.
  
- D. Manuals:
  - 1. Submit simultaneously with the shop drawings, complete operating and maintenance manual listing the manufacturer's name(s) including technical data sheets.
  - 2. Wiring diagrams shall indicate internal wiring for each item of equipment and the interconnections between the items of equipment.
  - 3. Provide a clear and concise description of operation that gives, in detail, the information required to properly operate the equipment and system.
  
- E. Certifications:
  - 1. Together with the shop drawing submittal, submit a certification from the major equipment manufacturer indicating that the proposed supervisor of installation and the proposed performer of contract maintenance is an authorized representative of the major equipment manufacturer. Include names and addresses in the certification.

## 1.5 WARRANTY

- A. All work performed and all material and equipment furnished under this Contract shall be free from defects and shall remain so for a period of at least one (1) year from the date of acceptance. The full cost of maintenance, labor and materials required to correct any defect during this one-year period shall be included in the submittal bid and is part of this Contract.

## 1.6 APPLICABLE STANDARDS:

- A. The specifications and standards listed below form a part of this specification. The system shall fully comply with these standards.
  - 1. 2016 NFPA 72 National Fire Alarm Code
  - 2. 2019 California Electrical Code (CEC)
  - 3. 2019 California Fire Code (CFC)
  - 4. 2019 California Mechanical Code (CMC)
  - 5. 2019 California Building Code (CBC)



6. Underwriters Laboratories Inc. (UL) - USA:
7. California State Fire Marshal
8. All requirements of the Authority Having Jurisdiction (AHJ).

#### 1.7 APPROVALS:

- A. The system shall have proper listing and/or approval from the following nationally recognized agencies:
  1. UL Underwriters Laboratories Inc.
  2. CSFM California State Fire Marshal

### PART 2 - PRODUCTS

#### 2.1 MANUFACTURERS:

- A. This fire alarm system design is based on the use of microprocessor-based addressable emergency voice alarm communication and fire alarm control equipment, initiation devices and notification appliances equipment manufactured by Gamewell-FCI and/or devices that can communicate with the FCI 72 fire alarm control panel.

#### 2.2 FIRE ALARM BOOSTER PANEL (FABP):

- A. The Fire Alarm Control Panel shall be the Fire Control Instruments HPFF8 Fire Alarm Notification Appliance Circuit Booster Panel. The Fire Alarm Control Panel shall have the capacity to support a minimum of (2) NACs. The fire alarm control panel shall be complete with cabinets, batteries, battery charger and all miscellaneous components required for a complete and fully functional networked fire alarm system.
- B. Batteries:
  1. Shall be maintenance free, VRLA AGM lead-acid type.
  2. Batteries shall have sufficient capacity to power the fire alarm system for not less than twenty-four hours plus 15 minutes of alarm upon a normal AC power failure.
  3. The batteries are to be completely maintenance free. No liquids are required. Fluid level checks refilling, spills and leakage shall not be required.

#### 2.3 INITIATION DEVICES

- A. Smoke Detectors
  1. Addressable Photoelectric Smoke Detectors
    - a. Smoke detectors shall be addressable and shall connect with two wires to the Fire Alarm Control Panel Signaling Line Circuit.
    - b. The detectors shall use the photoelectric (light-scattering) principal to measure smoke density.

- c. The detectors shall be low profile ceiling-mount and shall include a twist-lock base.
- d. The detectors shall provide a test means whereby they will simulate an alarm condition and report that condition to the control panel. Such a test may be initiated at the detector itself (by activating a switch) or initiated remotely on command from the control panel.
- e. The detectors shall store an internal identifying code that the control panel shall use to identify the type of detector.
- f. The detectors shall provide an alarm and power LED. The LED shall flash under normal conditions, indicating that the detector is operational and in regular communication with the control panel. The LED is placed into steady illumination by the control panel indicating that an alarm condition has been detected. An output connection shall also be provided in the base to connect an external remote alarm LED.

B. Duct Smoke Detectors

- 1. Duct smoke detectors shall be the 120VAC type. Each duct smoke detector shall be individually monitored by the fire alarm system through an addressable monitor module.
- 2. A listed remote test and reset switch shall be furnished and installed for each duct smoke detector.

C. Heat Detectors

- 1. Kitchen Heat Detectors
  - a. Kitchen Heat Detectors shall be the fixed high temperature (200-deg F) type for use in ambient conditions that are regularly expected to have steam and smoke from cooking related activities.
- 2. Attic Heat Detectors
  - a. Attic Heat Detectors shall be the fixed high temperature (200-deg F) type approved for 50ft spacing.

2.4 ADDRESSABLE MODULES, CONTROL RELAYS, AND AUXILIARY DEVICES

A. Addressable Monitor Module

- 1. Addressable Monitor modules shall be provided to connect one supervised IDC (zone) of conventional Alarm Initiating Devices (any N.O. dry contact device) to the Fire Alarm Control Panel Signaling Line Circuit (SLC) Loop.
- 2. The monitor module shall be mounted in a 4-inch square, 2-1/8" deep electrical box.
- 3. The IDC (zone) may be wired for Style D (Class A) or Style B (Class B) operation. The Monitor module shall provide address-setting means using decimal switches and shall also store an internal identifying code that the Fire Alarm Control Panel shall use to identify the type of device. An LED shall be provided that shall flash under normal conditions, indicating that the Monitor module is operational and in regular communication with the control panel.

B. Addressable Control Module

1. Addressable Control Modules shall be provided to supervise and control the operation of one conventional Notification Appliance Circuit (NAC) of compatible, 24 VDC powered, polarized Audio/Visual appliances or audio speakers.
2. The Control Module shall be mounted in a standard 4-inch square, 2-1/8" deep electrical box.
3. The NAC shall wire in a Class B (Style Y) or Class A (Style Z) fashion. Each control module shall support up to 1 Amp of Inductive or 2 Amps of Resistive Audible/Visual signals.
4. Audible/Visual power shall be provided by a separate notification appliance circuit from the main Fire Alarm Control Panel or from a fire alarm expander panel.
5. The Control Module shall provide address-setting means using decimal switches and shall also store an internal identifying code that the Control Panel shall use to identify the type of device. An LED shall be provided that shall flash under normal conditions, indicating that the Control Module is operational and is in regular communication with the control panel.
6. A magnetic test switch shall be provided to test the module without opening or shorting its NAC circuit wiring.

C. Auxiliary Relays

1. Auxiliary relay coils shall be rated at 120V and contacts shall be rated for 120V, 20A, and shall conform to UL 864.
2. Auxiliary relays shall be listed with the California State Fire Marshal (CSFM).

## 2.5 NOTIFICATION APPLIANCES

A. Strobes

1. Strobes are visual notification appliances for the hearing impaired.
2. Strobes shall operate on 24 VDC nominal.
3. Strobes shall meet the requirements of the ADA (Americans with Disabilities Act) as well as UL Standard 1971 and CBC.
4. Strobes shall be flush mounted in an electrical box in accordance with the manufacturer's installation instructions.

B. Combination Horn/Strobes

1. ADA/NFPA/ANSI compliant
2. Complies with OSHA 29 Part 1910.165
3. Ceiling mount strobe models are available with field selectable candela settings of 15/30/75/95cd or 115/177cd (Multi-candela models)
4. Strobes produce 1 flash per second over the regulated voltage range
5. 24 VDC with wide UL "Regulated Voltage" using filtered DC or unfiltered VRMS input voltage

6. Fast installation with IN/OUT screw terminals using #12 to #18 AWG wires
7. Optional Extender (E60 Ext) is for mounting to 4" backboxes with no extension ring.

## PART 3 - EXECUTION

### 3.1 EQUIPMENT INSTALLATION

- A. Installation shall be in accordance with the CEC, NFPA 72, local and state codes, as shown on the drawings, and as recommended by the equipment manufacturer.
- B. All fire detection and alarm system devices, control panels and remote annunciators shall be flush mounted when located in finished areas and may be surface mounted when located in unfinished areas.

### 3.2 WIRING INSTALLATION

- A. Fire Alarm System initiation device circuits and notification appliance circuits shall be installed in conduit. The minimum conduit size shall be  $\frac{3}{4}$ ".
- B. All conduit, junction boxes, conduit supports and hangers shall be concealed in finished areas and may be exposed in unfinished areas. Smoke detectors shall not be installed prior to the system programming and test period. If construction is ongoing during this period, measures shall be taken to protect smoke detectors from contamination and physical damage.
- C. Power-Limited Circuits: CEC, Types FPL, FPLR, or FPLP, as recommended by manufacturer.
- D. Each Fire Alarm Control Panel and Fire Alarm Booster Power Panel shall be connected to a separate dedicated 120V, 20A branch circuit with a dedicated neutral conductor and an equipment grounding conductor. Provide a circuit breaker lock-on devices on each circuit breaker supplying fire alarm system equipment and provide a red label that reads: "FIRE ALARM / ECS" adjacent to the circuit breaker.
- E. Fire Alarm Booster Power Panel Primary Power wiring shall be 12 AWG.
- F. Where the new fire alarm control panel is tied to an existing fire alarm control panel, the Contractor shall provide, install and connect all wiring, addressable control relays and addressable monitor modules at both the new and existing control panels and program to allow each fire alarm panel to accept and respond to alarm, trouble and supervisory initiation signals from the other fire alarm control panel.

### 3.3 GROUNDING

- A. Ground cable shields and equipment according to system manufacturer's written instructions to eliminate shock hazard and to minimize, to the greatest extent possible, ground loops, common-mode returns, noise pickup, cross talk, and other impairments.
- B. Signal Ground Terminal: Locate at main equipment rack or cabinet. Isolate from power system and equipment grounding.
- C. The Fire Alarm Panel cabinet shall be grounded with an equipment grounding conductor that is run with the primary power wiring. Cabinet doors shall be bonded to cabinets with braided grounding straps of sufficient length to allow the cabinet door to fully open.

### 3.4 PROGRAMMING

- A. The Contractor shall provide all programming of the Fire Alarm System to result in a complete and functional Fire Alarm System in accordance with all applicable codes and standards, and as specified herein.
- B. Zone Programming:
  - 1. The Contractor shall provide zone programming for the Fire Alarm System as follows:
    - a. Each building shall be programmed as a separate zone.
    - b. Each floor of a multi-story building shall be programmed as a separate zone.
    - c. Each section of a floor in a building that is separated by area separation walls or by horizontal exits shall be programmed as a separate zone.
    - d. Additional zones shall be programmed where deemed necessary by the authority having jurisdiction.
  - 2. Zone programming for the Fire Alarm System shall match the zone map (refer to Article titled, IDENTIFICATION AND DOCUMENTATION, for zone map requirements.)
- C. LCD Annunciation
  - 1. The Contractor shall program the LCD annunciator at the Fire Alarm Control Panel and remote LCD annunciators to annunciate the following information:
    - a. The zone that is in alarm.
    - b. The type of alarm initiating device:
      - 1) Smoke Detector.
      - 2) Other.
    - c. The location of the device that is in alarm (refer to Article titled, IDENTIFICATION AND DOCUMENTATION, for device map location requirements.)
- D. Controls
  - 1. The Contractor shall utilize addressable control relays and auxiliary relays and shall program the fire alarm system control panel to cause the closure of fire/smoke dampers and provide a signal for HVAC units to shut down.

E. Remote Monitoring Station

1. Contractor shall coordinate with the Remote Monitoring Station and program the system to report the number of points purchased by the Owner. Prior to the start of programming, Contractor shall verify how many point signals, above and beyond minimum code requirements, shall be transmitted to the monitoring station with Owner.
2. Where the new fire alarm control panel is tied to an existing fire alarm control panel, the Contractor shall program the existing fire alarm panel to accept and respond to alarm and trouble initiation signals from the new fire alarm control panel.

3.5 IDENTIFICATION AND DOCUMENTATION

- A. Zone Map – The Contractor shall create an 11"x17" site plan identifying each building and identifying the zones. The zone map shall be created by a CAD program and shall be posted under plastic cover at the location of the fire alarm control panel.
- B. Device Location Map – For each building the Contractor shall create an 11"x17" floor plan of the building showing the location of each device and the device address as it is annunciated at the control panel and remote annunciator. The device location map shall be created by a CAD program and shall be posted under plastic cover at the location of the fire alarm control panel or fire alarm booster power supply within each building.
- C. Documentation Cabinet – Provide and install a documentation cabinet marked "FIRE ALARM SYSTEM RECORD DOCUMENTS" located adjacent to each fire alarm control unit.
- D. Provide a red label at each branch circuit breaker that supplies power to the Fire Alarm Control Panel and Fire Alarm Booster Power Panels that reads: "FIRE ALARM / ECS".
- E. Provide a label on the inside of the cabinet door of each fire alarm cabinet that is supplied by a branch circuit that identifies the panel, circuit number and location of the power panel that is supplying that fire alarm cabinet.

3.6 FIRE WATCH

- A. The Contractor shall provide a fire watch during the course of construction where any portion of the campus is rendered unprotected by the fire alarm system. The Contractor shall provide a 24-hour fire watch each day until the fire alarm system is fully operational. All costs of the fire watch shall be borne by the Contractor.

3.7 ACCEPTANCE TESTING AND CERTIFICATION

- A. Prior to the final acceptance test provide the service of a competent, factory-trained engineer or technician authorized by the manufacturer of the fire alarm equipment to technically supervise and participate during all of the adjustments and tests for the system:
  1. Before energizing the cables and wires, check for correct connections and test for short circuits, ground faults, continuity, and insulation.

2. Open initiating device circuits and verify that the trouble signal actuates.
  3. Open and short signaling line circuits and verify that the trouble signal actuates.
  4. Open and short Notification Appliance Circuits and verify that trouble signal actuates.
  5. Ground all circuits and verify response of trouble signals.
  6. Check presence and audibility of tone at all alarm notification devices.
  7. Check installation, supervision, and operation of all addressable smoke detectors using the Walk Test.
  8. Each of the alarm conditions that the system is required to detect should be introduced on the system. Verify the proper receipt and the proper processing of the signal at the FACP and the correct activation of the control points.
  9. When the system is equipped with optional features, the manufacturer's manual should be consulted to determine the proper testing procedures. This is intended to address such items as verifying the controls performance by individually addressed or grouped devices, sensitivity monitoring, verification functionality and similar.
- B. At the final inspection a manufacturer-trained representative shall demonstrate that the system functions properly in every respect.
- C. Upon completion of the installation, a test of the entire system shall be performed in the presence of the Inspector of Record and the local authority having jurisdiction. The local Fire Marshal shall be notified and invited to witness the test a minimum of 72 hours prior to the test. Components and functions of the system shall be tested and an Inspection and Testing Record Form shall be generated in accordance with NFPA 72 indicating the proper functioning of each component of the system.
- D. If devices or other components of the system fail during testing the defective devices or components shall be removed and immediately replaced with functional units and the test shall be repeated.
- E. Complete the NFPA 72 Record of Completion, testing all devices and appliances. Provide a copy of the completed Record of Completion to the Owner (School District), Architect, Local Fire Authority and DSA via the Project Inspector.

### 3.8 INSTRUCTION

- A. Provide instruction as required for operating the system. "Hands-on" demonstrations of the operation of all system components and the entire system including program changes and functions shall be provided. The Contractor and/or the Systems Manufacturer's representatives shall provide a typewritten "Sequence of Operation" to the Owner.
- B. The Contractor shall furnish a reduced set of "as-built" record drawings on 11"x17" bond paper in a plastic cover showing locations of all devices and the proper address of the device as it is displayed on the LCD annunciator at the fire alarm control panels and/or remote annunciators. This reduced set shall be located adjacent to the fire alarm control panel for the reference of the Authority Having Jurisdiction.

### 3.9 CLOSEOUT SUBMITTAL

- A. The Contractor shall submit closeout submittal documentation consisting of the following items:
1. Full size fire alarm "as-built" record drawings; drawings shall show valid Contractor's C-10 license, wet-signed by C-10 license holder.
  2. Device cut sheets and CSFM listing services;
  3. A copy of the Fire Alarm System Record of Completion signed by the Installer and the Inspector of Record;
  4. Owner's Manuals and Operating Instructions.

END OF SECTION 283100



SECTION 284200  
CARBON MONOXIDE DETECTION SYSTEM

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 shall form a part of this Section, with the same force and effect as though repeated here.

1.2 DESCRIPTION:

- A. This section of the specifications includes the furnishing, installation, connection and programming of carbon monoxide detection system equipment to form a complete coordinated system ready for operation. It shall include, but not be limited to an UL listed alarm panel, power supplies, wiring, and UL 2075 listed carbon monoxide detectors.
- B. This section includes the furnishing of all labor, equipment, materials, and performance of all operations associated with the installation of the carbon monoxide detection system as required by the drawings and specified herein.

1.3 SCOPE:

- A. The Contractor shall furnish and install a UL listed alarm panel, UL 2075 listed carbon monoxide detector devices and circuits as required to accomplish this intent whether or not specifically shown or specified.
- B. The complete installation shall conform to the applicable sections of NFPA 720, state code requirements and the 2019 California Fire Code with particular attention to Article 915.
- C. The work specified herein shall be coordinated with the related work as specified elsewhere under the project specifications.

1.4 SUBMITTALS

- A. Submittals for this Section shall be made according to the Conditions of the Contract, Division 01 Specification Sections and Specification Section 260100.
- B. General:
  - 1. Five copies of all submittals shall be submitted to the Architect/Engineer for review.
  - 2. For equipment other than that specified, the contractor shall supply proof that such substitute equipment equals or exceeds the features, functions, performance, and quality of the specified equipment.

- C. Shop Drawings:
  - 1. Sufficient information, clearly presented, shall be included to determine compliance with drawings and specifications.
  - 2. Include manufacturer's name(s), model numbers, ratings, power requirements, equipment layout, device arrangement, complete wiring point-to-point diagrams, and conduit layouts.
  - 3. Show remote annunciator(s) layout, configurations, and terminations.
  - 4. Shop drawings shall show valid Contractor's C-10 license, wet-signed by C-10 license holder.
  
- D. Manuals:
  - 1. Submit simultaneously with the shop drawings, complete operating and maintenance manual listing the manufacturer's name(s) including technical data sheets.
  - 2. Wiring diagrams shall indicate internal wiring for each item of equipment and the interconnections between the items of equipment.
  - 3. Provide a clear and concise description of operation that gives, in detail, the information required to properly operate the equipment and system.
  
- E. Certifications:
  - 1. Together with the shop drawing submittal, submit a certification from the major equipment manufacturer indicating that the proposed supervisor of installation and the proposed performer of contract maintenance is an authorized representative of the major equipment manufacturer. Include names and addresses in the certification.

## 1.5 WARRANTY

- A. All work performed and all material and equipment furnished under this Contract shall be free from defects and shall remain so for a period of at least one (1) year from the date of acceptance. The full cost of maintenance, labor and materials required to correct any defect during this one-year period shall be included in the submittal bid and is part of this Contract.

## 1.6 APPLICABLE STANDARDS:

- A. The specifications and standards listed below form a part of this specification. The system shall fully comply with these standards.
  - 1. 2015 NFPA 720 Standard for the Installation of Carbon Monoxide(CO) Detection and Warning Equipment
  - 2. 2019 California Electrical Code (CEC)
  - 3. 2019 California Fire Code (CFC)
  - 4. 2019 California Mechanical Code (CMC)

5. 2019 California Building Code (CBC)
6. Underwriters Laboratories Inc. (UL) - USA:
7. California State Fire Marshal
8. All requirements of the Authority Having Jurisdiction (AHJ).

1.7 APPROVALS:

- A. The system shall have proper listing and/or approval from the following nationally recognized agencies:
  1. UL Underwriters Laboratories Inc.
  2. CSFM California State Fire Marshal

PART 2 - PRODUCTS

2.1 MANUFACTURERS:

- A. This carbon monoxide detection system design is based on the use of carbon monoxide detector equipment manufactured by Gamewell FCI.

2.2 CARBON MONOXIDE CONTROL PANEL:

- A. The carbon monoxide panel shall be a UL listed Fire/Burg Control Panel
  1. Electrical Specification:
    - a. Primary Input Power: 120V, 20A branch circuit
    - b. System Output Voltage: 24 VDC nominal (Class 2);
    - c. Battery Backup: 24VDC
- B. Batteries:
  1. Shall be maintenance free, VRLA AGM lead-acid type.
  2. Batteries shall have sufficient capacity to power the carbon monoxide detection system for not less than twenty-four hours plus 15 minutes of alarm upon a normal AC power failure.
  3. The batteries are to be completely maintenance free. No liquids are required. Fluid level checks refilling, spills and leakage shall not be required.
- C. Digital Alarm Communicator Transmitter (DACT)
  1. Listed and labeled under UL 864 and NFPA 72.
  2. Functional Performance: Unit receives an alarm, supervisory, or trouble signal from the Carbon Monoxide Control Panel, and automatically captures one or two telephone lines and dials a preset number for a remote central station. When contact is made with the central station(s), the signal is transmitted. The unit

supervises up to two telephone lines. Where supervising two lines, if service on either line is interrupted for longer than 45 seconds, the unit initiates a local trouble signal and transmits a signal indicating loss of telephone line to the remote alarm receiving station over the remaining line. When telephone service is restored, unit automatically reports that event signal to the central station. If service is lost on both telephone lines, the local trouble signal is initiated.

3. The DACT shall be Carrier Information Code (CIC) compliant and shall transmit all popular transmission formats and shall have a sixteen digit telephone number field. The Contractor shall coordinate with the District's UL Listed central monitoring station and ensure compatible transmission format.
4. Self Test: Conducted automatically every 24 hours with report transmitted to central station.

## 2.3 CARBON MONOXIDE DETECTORS

### A. Carbon Monoxide Detectors

1. Carbon monoxide detectors shall be Honeywell/Gamewell FCI Model MCS-COF, or equivalent.
2. Carbon monoxide detectors shall be listed to UL standard 2075.
3. Carbon monoxide detectors shall have a local temporal 4 tone sounder.
4. Carbon monoxide detectors shall be capable of being monitored individually as a single unit, single zone using a 4-conductor cable and as a multiple unit, single zone using a 4-conductor cable from the panel to the first detector and a 6-conductor cable between the detectors within the zone.
5. Electrical Specification:
  - a. System Voltage: 12/24 VDC nominal; with 10VDC min and 30VDC max.
  - b. Standby Current: 20mA
  - c. Maximum Alarm Current: 40mA
  - d. Audible Signal: Temporal 4 tone; 85dBA at 10-feet
6. Physical Specification:
  - a. Operating Temperature Range: 0-degC to 40-degC
  - b. Operating Humidity Range: 22-90% relative humidity
  - c. Diameter: 6"; Height: 1.25"; Weight 7oz
  - d. Wire Gauge Terminal: 14-22 AWG
  - e. Mounting: Single-gang outlet box

## PART 3 - EXECUTION

### 3.1 EQUIPMENT INSTALLATION

- A. Installation shall be in accordance with the CFC, NFPA 720, local and state codes, as shown on the drawings, and as recommended by the equipment manufacturer.

- B. All carbon monoxide detector outlet boxes and control panels shall be flush mounted when located in finished areas and may be surface mounted when located in unfinished areas.
- C. Ceiling mounted detectors shall be installed at least 12-inches from any wall.
- D. Wall mounted detectors shall be installed no less than 48-inches above finished floor and at least 6-inches below the ceiling.

### 3.2 WIRING INSTALLATION

- A. Class 2 power limited carbon monoxide detector circuits shall be run free-air above the ceiling within attic spaces and supported from J-hooks or support wires and in wiremold surface mounted raceway where exposed.
- B. All raceways, junction boxes, supports and hangers shall be concealed in finished areas and may be exposed in unfinished areas. Carbon monoxide detectors shall not be installed prior to the system programming and test period. If construction is ongoing during this period, measures shall be taken to protect carbon monoxide detectors from contamination and physical damage.
- C. Power-Limited Circuits: CEC, Types FPL, FPLR, or FPLP, as recommended by manufacturer.
- D. Each Alarm Control Panel shall be connected to a separate dedicated 120V, 20A branch circuit with a dedicated neutral conductor and an equipment grounding conductor. Power wiring shall be 12 AWG and the alarm controller cabinet shall be grounded.

### 3.3 GROUNDING

- A. Ground cable shields and equipment according to system manufacturer's written instructions to eliminate shock hazard and to minimize, to the greatest extent possible, ground loops, common-mode returns, noise pickup, cross talk, and other impairments.
- B. Signal Ground Terminal: Locate at main equipment rack or cabinet. Isolate from power system and equipment grounding.

### 3.4 ACCEPTANCE TESTING AND CERTIFICATION

- A. Prior to the final acceptance test provide the service of a competent technician authorized to technically supervise and participate during all of the adjustments and tests for the system:
  - 1. Before energizing the cables and wires, check for correct connections and test for short circuits, ground faults, continuity, and insulation.
  - 2. Open and short alarm and supervisory contacts and verify that the trouble signal actuates.
  - 3. Ground all circuits and verify response of trouble signals.
  - 4. Check presence and audibility of tone at carbon monoxide detectors.

5. Verify receipt of alarm, trouble and supervisory signals at off-premise monitoring station.
  6. Disconnect all main (primary) power supplies and verify trouble indication for loss of primary power. Measure or verify the system's alarm and standby current draw and verify battery capacity is sufficient to meet alarm and standby current requirements. Operate general alarm systems for a minimum of 5-minutes. Re-connect primary power supply at end of test.
- B. At the final inspection a manufacturer-trained representative shall demonstrate that the system functions properly in every respect.
  - C. Provide functional gas testing at each detector per NFPA 720.
  - D. Upon completion of the installation, a test of the entire system shall be performed in the presence of the Inspector of Record and the local authority having jurisdiction. The local Fire Marshal shall be notified and invited to witness the test a minimum of 72 hours prior to the test. Components and functions of the system shall be tested and an Inspection and Testing Record Form shall be generated in accordance with NFPA 720 indicating the proper functioning of each component of the system.
  - E. If devices or other components of the system fail during testing the defective devices or components shall be removed and immediately replaced with functional units and the test shall be repeated.
  - F. Complete the NFPA 720 Record of Completion, testing all devices and appliances. Provide a copy of the completed Record of Completion to the Owner (School District), Architect, Local Fire Authority and DSA via the Project Inspector.

### 3.5 INSTRUCTION

- A. Provide instruction as required for operating the system. "Hands-on" demonstrations of the operation of all system components and the entire system including program changes and functions shall be provided. The Contractor and/or the Systems Manufacturer's representatives shall provide a typewritten "Sequence of Operation" to the Owner.
- B. The Contractor shall furnish a reduced set of "as-built" record drawings on 11"x17" bond paper in a plastic cover showing locations of all devices.

### 3.6 CLOSEOUT SUBMITTAL

- A. The Contractor shall submit closeout submittal documentation consisting of the following items:
  1. Full size "as-built" record drawings; drawings shall show valid Contractor's C-10 license, wet-signed by C-10 license holder.
  2. Device cut sheets and CSFM listing services;
  3. A copy of the Carbon Monoxide Detection System Record of Completion signed by the Installer and the Inspector of Record;

4. Owner's Manuals and Operating Instructions.

END OF SECTION 284200





SECTION 311000  
SITE CLEARING

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:

1. Remove existing pavement structural section and concrete improvements.
2. Protecting existing vegetation to remain.
3. Removing existing vegetation.
4. Clearing and grubbing.
5. Stripping and stockpiling topsoil.
6. Removing above and below-grade site improvements.
7. Disconnecting, capping or sealing, and removing site utilities.

B. Related Sections:

1. Division 01 Section "Sustainable Design Requirements" for requirements and procedures for USGBC LEED certification requirements indicated.
2. Division 01 Section "Construction Waste Management" for management of waste materials.
3. Division 02 Section "Selective Demolition" for removal partial removal of buildings or structures.
4. Division 31 Section "Earthwork."
5. Appendix; Geotechnical Report.

1.3 DEFINITIONS

- A. Subsoil: All soil beneath the topsoil layer of the soil profile, and typified by the lack of organic matter and soil organisms.
- B. Surface Soil: Soil that is present at the top layer of the existing soil profile at the Project site. In undisturbed areas, the surface soil is typically topsoil; but in disturbed areas such as urban environments, the surface soil can be subsoil.
- C. Topsoil: Top layer of the soil profile consisting of existing native surface topsoil or existing in-place surface soil and is the zone where plant roots grow.
- D. Plant-Protection Zone: Area surrounding individual trees, groups of trees, shrubs, or other vegetation to be protected during construction, and indicated on Drawings.

1. Tree protection shall be defined by a circle concentric with each tree with a radius 1.5 times the diameter of the drip line unless otherwise indicated

E. Vegetation: Trees, shrubs, groundcovers, grass, and other plants.

#### 1.4 MATERIALS OWNERSHIP

- A. Except for stripped topsoil and other materials indicated to be stockpiled or otherwise remain Owner's property, cleared materials shall become Contractor's property and shall be removed from Project site.

#### 1.5 SUBMITTALS

- A. Existing Conditions: Digital photographic documentation of existing trees and plantings, adjoining construction, and site improvements that establishes preconstruction conditions that might be misconstrued as damage caused by site clearing.
- B. Record Drawings: Identifying and accurately showing locations of capped utilities and other subsurface structural, electrical, and mechanical conditions.

#### 1.6 QUALITY ASSURANCE

- A. Preinstallation Conference: Conduct conference at Project site.

#### 1.7 PROJECT CONDITIONS

- A. Traffic: Minimize interference with adjoining roads, streets, walks, and other adjacent occupied or used facilities during site-clearing operations.
  1. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction.
  2. Provide alternate routes around closed or obstructed traffic ways if required by Owner or authorities having jurisdiction.
- B. Improvements on Adjoining Property: Authority for performing site clearing indicated on property adjoining Owner's property will be obtained by Owner before award of Contract.
  1. Do not proceed with work on adjoining property until directed by Architect.
- C. Salvable Improvements: Carefully remove items indicated to be salvaged and store on Owner's premises at location directed by Architect.
- D. Utility Locator Service: Notify utility locator service for area where Project is located before site clearing.

- E. Do not commence site clearing operations until temporary erosion and sedimentation control and plant-protection measures are in place.
- F. The following practices are prohibited within protection zones:
  - 1. Storage of construction materials, debris, or excavated material.
  - 2. Parking vehicles or equipment.
  - 3. Foot traffic.
  - 4. Erection of sheds or structures.
  - 5. Impoundment of water.
  - 6. Excavation or other digging unless otherwise indicated.
  - 7. Attachment of signs to or wrapping materials around trees or plants unless otherwise indicated.
- G. Do not direct vehicle or equipment exhaust towards protection zones.
- H. Prohibit heat sources, flames, ignition sources, and smoking within or near protection zones.
- I. Soil Stripping, Handling, and Stockpiling: Perform only when the topsoil is dry or slightly moist.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 PREPARATION

- A. Comply with requirements of referenced Geotechnical Report for site clearing operations.
- B. Protect and maintain benchmarks and survey control points from disturbance during construction.
- C. Protect existing site improvements to remain from damage during construction.
  - 1. Restore damaged improvements to their original condition, as acceptable to Owner.
- D. Locate and clearly identify trees, shrubs, and other vegetation to remain or to be relocated. Identify trees to remain by wrapping a 1-inch blue vinyl tie tape flag around each tree trunk at 54 inches above the ground.
- E. Protect trees, plant growth, and vegetation not specifically designated for removal.
- F. Verify that existing plant life to be removed has been authorized for removal.
- G. Examine site and compare individual work areas with the Drawings and Specifications.

- H. Thoroughly investigate and verify conditions under which the work is to be performed.

### 3.2 TEMPORARY EROSION AND SEDIMENTATION CONTROL

- A. Comply with Storm Water Pollution Prevention Plan (SWPPP) and requirements of authorities having jurisdiction.
- B. Provide temporary erosion and sedimentation-control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways, according to requirements of authorities having jurisdiction.
- C. Verify that flows of water redirected from construction areas or generated by construction activity do not enter or cross protection zones.
- D. Inspect, maintain, and repair erosion and sedimentation-control measures during construction until permanent vegetation has been established.
- E. Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.

### 3.3 EXISTING UTILITIES

- A. Utilities to Remain: Locate, identify, and protect utilities that are to remain from damage.
- B. Interrupting Existing Utilities: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary utility services according to requirements indicated:
  - 1. Notify Architect not less than two days in advance of proposed utility interruptions.
  - 2. Do not proceed with utility interruptions without Architect's written permission.
- C. Utility Termination: Locate, identify, disconnect, and seal or cap utilities indicated to be removed or abandoned in place. Arrange with utility companies to shut off affected utilities and notify Owner not less than 48 hours in advance of utility termination.
  - 1. Excavate for and remove underground utilities indicated to be removed.

### 3.4 CLEARING AND GRUBBING

- A. Clear only limited areas required for execution of work at proposed improvement location.
- B. Remove obstructions, trees, shrubs, and other vegetation to permit installation of new construction.
  - 1. Do not remove trees, shrubs, and other vegetation indicated to remain or to be relocated.

2. Grind down stumps and remove roots, obstructions, and debris to a depth of not less than 24 inches below the bottom of the lowest structure footing or 2 feet below finished subgrade whichever depth is lower. Root systems deeper than indicated above shall be excavated to allow no roots larger than 2 inches in diameter.
  3. Use only hand methods for grubbing within protection zones.
  4. Chip removed tree branches
- C. Fill depressions caused by clearing and grubbing operations with satisfactory soil material unless further excavation or earthwork is indicated.
1. Place fill material in horizontal layers not exceeding a loose depth of 8 inches, and compact each layer to a density equal to adjacent original ground.

### 3.5 TOPSOIL EXCAVATION

- A. Remove sod, grass, and similar vegetation before stripping topsoil.
- B. Strip topsoil to depth of 6 inches or as indicated in the geotechnical report in a manner to prevent intermingling with underlying subsoil or other waste materials.
1. Remove subsoil and nonsoil materials from topsoil, including clay lumps, gravel, and other objects more than 2 inches in diameter; trash, debris, weeds, roots, and other waste materials.
- C. Stockpile topsoil away from edge of excavations without intermixing with subsoil. Grade and shape stockpiles to drain surface water. Cover to prevent windblown dust and erosion by water.
1. Limit height of topsoil stockpiles to 72 inches.
  2. Do not stockpile topsoil within protection zones.
  3. Dispose of surplus topsoil. Surplus topsoil is that which exceeds quantity indicated to be stockpiled or reused.

### 3.6 SITE IMPROVEMENTS

- A. Remove existing above and below-grade improvements as indicated and necessary to facilitate new construction.
- B. Remove slabs, paving, curbs, gutters, and aggregate base as indicated. Remove paving only where authorized and necessary to execute the Work.
1. Neatly saw-cut along line of existing pavement to remain before removing adjacent existing pavement. Saw-cut faces vertically.
  2. Remove concrete slabs, paving, walks, gutters, and curbs to nearest joint locations.
  3. Paint cut ends of steel reinforcement in concrete to remain with two coats of antirust coating, following coating manufacturer's written instructions. Keep paint off surfaces that will remain exposed.

### 3.7 DISPOSAL OF SURPLUS AND WASTE MATERIALS

- A. Remove surplus soil material, unsuitable topsoil, obstructions, demolished materials, and waste materials including trash and debris, and legally dispose of them off Owner's property.
- B. Separate recyclable materials produced during site clearing from other nonrecyclable materials. Store or stockpile without intermixing with other materials and transport them to recycling facilities. Do not interfere with other Project work.

END OF SECTION

SECTION 312000  
EARTHWORK

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:

1. Excavating and filling for rough grading the Site.
2. Preparing subgrades for slabs-on-grade, walks, pavements, turf and grasses, and plants.
3. Over excavation of building pad and pavement area.
4. Excavating soil and other material for surface improvements.
5. Placing fill.
6. Compaction of existing ground and fill.
7. Preparation of subgrade for other improvements.
8. Grading of soil.

B. Related Sections:

1. Division 31 Section "Site Clearing.

1.3 REFERENCES

- A. ASTM D 1557.

1.4 DEFINITIONS

- A. Backfill: Soil material or controlled low-strength material used to fill an excavation.

1. Initial Backfill: Backfill placed beside and over pipe in a trench, including haunches to support sides of pipe.
2. Final Backfill: Backfill placed over initial backfill to fill a trench.

- B. Base Course: Aggregate layer placed between the subbase course and hot-mix asphalt paving.

- C. Bedding Course: Aggregate layer placed over the excavated subgrade in a trench before laying pipe.
- D. Borrow Soil: Satisfactory soil imported from off-site for use as fill or backfill.
- E. Excavation: Removal of material encountered above subgrade elevations and to lines and dimensions indicated.
- F. Fill: Soil material used to raise existing grades.
- G. Structures: Buildings, footings, foundations, retaining walls, slabs, tanks, curbs, mechanical and electrical appurtenances, or other man-made stationary features constructed above or below the ground surface.
- H. Subgrade: Uppermost surface of an excavation.
- I. Utilities: On-site underground pipes, conduits, ducts, and cables, as well as underground services within buildings.

#### 1.5 SUBMITTALS

- A. Material Test Reports: Classification according to ASTM D 2487 for each borrow soil material proposed for fill and backfill.

#### 1.6 QUALITY ASSURANCE

- A. Preinstallation Conference: Conduct pre-excavation conference at Project site.

#### 1.7 FIELD CONDITIONS

- A. Utility Locator Service: Notify utility locator service for area where Project is located before beginning earth moving operations.
- B. Do not commence earth moving operations until temporary erosion and sedimentation control measures required by authorities having jurisdiction are in place.
- C. Traffic: Minimize interference with adjoining roads, streets, walks, and other adjacent occupied or used facilities during earth moving operations.
  - 1. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction.
  - 2. Provide alternate routes around closed or obstructed traffic ways if required by Owner or authorities having jurisdiction.
- D. Do not commence earth moving operations until plant-protection measures are in place.
- E. The following practices are prohibited within protection zones:



1. Storage of construction materials, debris, or excavated material.
  2. Parking vehicles or equipment.
  3. Foot traffic.
  4. Erection of sheds or structures.
  5. Impoundment of water.
  6. Excavation or other digging unless otherwise indicated.
  7. Attachment of signs to or wrapping materials around trees or plants unless otherwise indicated.
- F. Do not direct vehicle or equipment exhaust towards protection zones.
- G. Prohibit heat sources, flames, ignition sources, and smoking within or near protection zones.

## PART 2 - PRODUCTS

### 2.1 SOIL MATERIALS

- A. General: Provide borrow soil materials when sufficient satisfactory soil materials are not available from excavations.
1. Any borrow soil materials proposed to be brought on-site are subject to inspection and testing by Owner's geotechnical testing agency to verify they are in compliance with referenced standards. Owner shall determine if testing of materials is required prior to any material being brought onto the site. Testing of materials may take up to two weeks to verify compliance with standards.
- B. Soil Types:
1. Soil Type S1: Excavated and re-used material, graded, free of lumps larger than 3 inches, rocks larger than 2 inches, and debris.
  2. Soil Type S2: Excavated and reused material, graded, free of roots, lumps greater than one inch, rocks larger than 1/2 inch, debris, weeds and foreign matter.
  3. Soil Type S3: Imported topsoil, friable loam; reasonably free of roots, rocks larger than 1/2 inch, debris, weeds, and foreign matter.
  4. Soil Type S4: Imported borrow, suitable for purposes intended, free of vegetable matter and other unsatisfactory material, meeting the following characteristics:
    - a. Maximum Particle Size (inches): 3 inches.
    - b. Maximum Plasticity Index: 9.
    - c. Percentage Passing #4 Sieve: 60-100%.
    - d. Percentage Passing #200 Sieve: 20-70%.
    - e. Expansion Index: Less than 20 (very low expansion).
    - f. R-Value (in paved areas): Minimum 50.
    - g. Corrosion Potential:
      - 1) Soluble Sulfates: Less than 2,000 mg/Kg.
      - 2) Soluble Chlorides: Less than 500 mg/Kg.

- 3) Soil Resistivity: Greater than 5,000 ohm-cm
  5. Soil Type S5: Imported sand. Natural river or bank sand (sand equivalent greater than 30), washed; free of silt, clay, loam, friable or soluble materials, and organic matter.
- C. Soil for Fills:
1. Fill in Turf or Planting Areas: Excavated soils that have been graded and cleansed of excessive organics, debris, rocks, and lumps.
  2. Fill in Turf or Other Planting Areas: Type S2 or S3.
  3. Fill in Non-planting Areas: Type S1, S2 or S4.

### PART 3 - EXECUTION

#### 3.1 EXAMINATION

- A. Contractor shall thoroughly examine the project site prior to submitting his bid to familiarize himself with the conditions of the site and the conditions in which he will be required to work.
- B. Contractor shall thoroughly examine contract documents prior to bid.
  1. Documents do not necessarily indicate a balanced site.
  2. Contractor shall be responsible for importing materials from an off-site location or exporting excess material to an off-site location.

#### 3.2 PREPARATION

- A. Site clearing specified in Division 31 Section "Site Clearing" shall be performed prior to beginning earthwork.
- B. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earth moving operations. Coordinate excavations near existing utilities with utility companies.
- C. Protect and maintain erosion and sedimentation controls during earth moving operations.
- D. Identify required lines, levels, contours and datum.
- E. Locate, identify, and protect existing above and below grade utilities from damage.
- F. Protect plant life, lawns, trees, shrubs, and other features not authorized for removal.
- G. Employ equipment and methods appropriate to the work site.

- H. Protect excavated areas from drainage inflow, and provide drainage to all excavated areas.

### 3.3 DEWATERING

- A. Prevent surface water and ground water from entering excavations, from ponding on prepared subgrades, and from flooding Project site and surrounding area.
- B. Protect subgrades from softening, undermining, washout, and damage by rain or water accumulation.
  - 1. Reroute surface water runoff away from excavated areas. Do not allow water to accumulate in excavations. Do not use excavated trenches as temporary drainage ditches.
- C. Dispose of water removed by dewatering in a manner that avoids endangering public health, property, and portions of work under construction or completed. Dispose of water and sediment in a manner that avoids inconvenience to others.

### 3.4 STORAGE OF SOIL MATERIALS

- A. Stockpile excavated satisfactory soil and materials borrow soil materials without intermixing. Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust. Stockpile soil materials away from edge of excavations. Do not store within drip line of trees to remain.

### 3.5 EXCAVATION

- A. Earthwork shall comply with requirements and recommendations in referenced Geotechnical Report.
  - 1. A representative from the Owner's geotechnical testing agency shall be present during earthwork operations.
- B. Excavate to indicated elevations and dimensions within a tolerance of plus or minus 1 inch. If applicable, extend excavations a sufficient distance from structures for placing and removing concrete formwork, for installing services and other construction, and for inspections.
- C. Excavations at Edges of Tree and Plant-Protection Zones: Excavate by hand to indicated lines, cross sections, elevations, and subgrades. Use narrow-tine spading forks to comb soil and expose roots.
  - 1. Do not break, tear, or chop exposed roots. Do not use mechanical equipment that rips, tears, or pulls roots.
  - 2. Where authorized to cut roots, cut roots with a saw.
- D. Excavation for Structures: Following the stripping operations, the exposed surface in the area of the planned building improvements and structural concrete slabs-on-grade

shall be over excavated to a minimum depth of [18] inches below stripped ground surface or [6] inches below the bottom of proposed footings, whichever is deeper. The over excavation shall extend at least 5 feet horizontally beyond perimeter exterior edges of proposed footings or structural concrete slabs-on-grade. The exposed ground surface shall be reviewed by a field representative of the Owner's Geotechnical Engineer to evaluate if any loose or soft zones are present that will require additional over excavation. Any areas encountered with debris fill in the subgrade of the over excavation shall be excavated an additional depth equal to the depth of the debris fill and the exact depth shall be determined by a field representative of the Owner's Geotechnical Engineer. The bottom of the over excavation shall be scarified to a depth of 6 inches, moisture conditioned to near optimum moisture content, and compacted as required under the "Compaction" Article.

1. Excavations for Footings and Foundations: Do not disturb bottom of excavation. Excavate by hand to final grade just before placing concrete reinforcement. Trim bottoms to required lines and grades to leave solid base to receive other work.

- E. Excavation for Pavements and Flatwork: Following the stripping operations, the exposed surface in the area of proposed paved areas shall be over excavated to a minimum depth of [6] inches below stripped ground surface or [6] inches below the proposed pavement subgrade, whichever is deeper. The exposed ground surface shall be reviewed by a field representative of the Owner's Geotechnical Engineer to evaluate if any loose or soft zones are present that will require additional over excavation. Any areas encountered with debris fill in the subgrade of the over excavation shall be excavated an additional depth equal to the depth of the debris fill and the exact depth shall be determined by a field representative of the Owner's Geotechnical Engineer. The bottom of the over excavation shall be scarified to a depth of 6 inches, moisture conditioned to near optimum moisture content, and compacted as required under the "Compaction" Article.

### 3.6 SUBGRADE INSPECTION

- A. If representative of Owner's geotechnical testing agency determines that unsatisfactory soil is present, continue excavation and replace with compacted backfill or fill material as directed.
- B. Proof-roll subgrade below building slabs, pavements, and walks with equipment of type, size, and weight recommended by representative of Owner's geotechnical testing agency to identify soft pockets and areas of excess yielding. Do not proof-roll wet or saturated subgrades.
1. Completely proof-roll subgrade in one direction, repeating proof-rolling in direction perpendicular to first direction. Limit vehicle speed to 3 mph.
  2. Excavate soft spots, unsatisfactory soils, and areas of excessive pumping or rutting, as determined by Architect, and replace with compacted backfill or fill as directed.

### 3.7 FILLING, BACKFILLING, AND COMPACTING

- A. After excavation and just prior to filling, the bottom of excavations shall be scarified to a depth of 6 inches, moisture conditioned to a minimum of 2 percent above optimum moisture content, and compacted to a minimum of 90 percent of maximum density based on ASTM Method D 1557.
- B. Uniformly moisten or aerate subgrade and each subsequent fill or backfill soil layer before compaction to within 2 percent of optimum moisture content.
- C. Fills shall be placed in lifts approximately [6][8] inches thick, moisture conditioned to a minimum of 2 percent above optimum moisture content, and compacted to values indicated.
- D. Place soil fill materials evenly on all sides of structures to required elevations, and uniformly along the full length of each structure.
- E. Compact soil materials to not less than the following percentages of maximum dry unit weight according ASTM D 1557:
  - 1. Under structures, building slabs, steps, and pavements: 95 percent.
  - 2. Under walkways: 92 percent.
  - 3. Under turf or unpaved areas: 85 percent.

### 3.8 GRADING

- A. General: Uniformly grade areas to a smooth surface, free of irregular surface changes. Comply with compaction requirements and grade to cross sections, lines, and elevations indicated on Drawings.
  - 1. Provide a smooth transition between adjacent existing grades and new grades.
  - 2. Cut out soft spots, fill low spots, and trim high spots to comply with required surface tolerances.
- B. Site Rough Grading: Slope grades to direct water away from buildings and to prevent ponding. Finish subgrades to required elevations within the following tolerances:
  - 1. Turf or Unpaved Areas: Plus or minus 1 inch.
  - 2. Walks: Plus or minus 1/2 inch.
  - 3. Pavements: Plus or minus 1/2 inch.
- C. Grading inside Building Lines: Finish subgrade to a tolerance of 1/2 inch when tested with a 10-foot straightedge.

### 3.9 FIELD QUALITY CONTROL

- A. Testing and Inspecting Agency: Owner will engage and pay for a qualified independent testing and inspecting agency to perform tests and inspections as applicable and prepare reports.
  - 1. Testing and Inspection Agency shall be acceptable to the Architect and the Division of the State Architect.

- B. The Architect and the Division of the State Architect shall have the right to order the testing of any materials used in the construction to determine if they are of the quality specified.
- C. Contractor Responsibilities:
  - 1. The Contractor shall maintain control of the quality of materials and workmanship in order to conform with the Drawings and Specifications.
  - 2. To facilitate testing and inspection, the Contractor shall:
    - a. Schedule tests and inspections with the Testing and Inspection Agency sufficiently in advance of operations to allow for the assignment of personnel and for the completion of testing and inspecting responsibilities.
    - b. Provide access to the Work for the designated Testing and Inspection Agency.
    - c. Furnish all necessary materials and labor to assist the designated Testing and Inspection Agency in obtaining and handling samples at the project or other sources of materials.
    - d. Provide and maintain for the sole use of the Testing and Inspection Agency adequate facilities for safe storage of test specimens on the project site.
  - 3. The Contractor shall correct deficiencies in Work that test reports and inspections indicate does not comply with the Contract Documents.
- D. Testing and Inspection Services:
  - 1. Testing and inspections shall be performed by the designated Testing and Inspection Agency.
  - 2. Testing and inspections shall be in accordance with the 2016 California Building Code, Section 1705.6 and Table 1705.6.
  - 3. Testing and inspections shall be in accordance with the 2016 California Building Code, Section 1705A.6 and Table 1705A.6, DSA Testing and Inspections form DSA 103, and Structural Drawings Special Inspection Criteria.
- E. Allow testing agency to inspect and test subgrades and each fill or backfill layer. Proceed with subsequent earth moving only after test results for previously completed work comply with requirements.
- F. Compaction testing will be performed in accordance with ASTM D 1557-78 (Method A).
- G. If tests indicate work does not meet specified requirements, recompact, or remove and replace, and retest.

### 3.10 PROTECTION

- A. Protecting Graded Areas: Protect newly graded areas from traffic, freezing, and erosion. Keep free of trash and debris.

- B. Repair and reestablish grades to specified tolerances where completed or partially completed surfaces become eroded, rutted, settled, or where they lose compaction due to subsequent construction operations or weather conditions.
  - 1. Scarify or remove and replace soil material to depth as directed by Architect; reshape and recompact.
- C. Where settling occurs before Project correction period elapses, remove finished surfacing, backfill with additional soil material, compact, and reconstruct surfacing.
  - 1. Restore appearance, quality, and condition of finished surfacing to match adjacent work, and eliminate evidence of restoration to greatest extent possible.

### 3.11 CLEANING AND DISPOSAL OF SURPLUS MATERIALS

- A. Rake Clean.
- B. Remove surplus satisfactory soil and waste materials, including unsatisfactory soil, trash, and debris, and legally dispose of them off Owner's property.
- C. Adjacent roadways shall be kept clean during the progress of this work.

END OF SECTION





SECTION 321313  
CONCRETE PAVING AND WALKS

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.
- B. SSCDOT – Standard Specifications, State of California, Department of Transportation (Caltrans) latest edition, except references to method of payment, and references to any state furnished materials.

1.2 SUMMARY

- A. Section Includes: Concrete paving for the following:
  - 1. Driveways.
  - 2. Parking lots.
  - 3. Curbs, gutters, walks and pedestrian paving.
- B. Related Sections:
  - 1. Division 03 Section "Cast-in-Place Concrete" for general building applications of concrete.
  - 2. Division 31 Section "Earthwork."
  - 3. Division 32 Section "Paving Specialties" for pavement markings, wheel stops, detectable warning surfaces, and site signage.

1.3 DEFINITIONS

- A. Cementitious Materials: Type II gray Portland Cement conforming to the specifications of ASTM C150-02a and the requirements of Caltrans Specification Section 90 for "Type II Modified" portland cement.

1.4 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Design Mixtures: For each concrete paving mixture. Include alternate design mixtures when characteristics of materials, Project conditions, weather, test results, or other circumstances warrant adjustments.
- C. Material Test Reports: For each of the following:

1. Aggregates. Include service-record data indicating absence of deleterious expansion of concrete due to alkali-aggregate reactivity.

D. Delivery Tags: Delivery tags for all concrete.

## 1.5 QUALITY ASSURANCE

- A. All improvements within property owned by a City, County, or State Entity shall be in accordance with the Standards and Specifications of the authority having jurisdiction.
- B. Installer Qualifications: A qualified installer who employs on Project personnel who shall be thoroughly familiar with the specified requirements, completely trained and experienced in the necessary skills required for work performed under this Section. In actual installation of the work of this Section, use adequate numbers of skilled workmen to insure installation in strict accordance with the contract documents design.
- C. Concrete Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM C 94/C 94M requirements for production facilities and equipment.
- D. Source Limitations: Obtain each type or class of cementitious material of the same brand from the same manufacturer's plant, obtain aggregate from single source, and obtain admixtures from single source from single manufacturer.
- E. ACI Publications: Comply with the following unless modified by requirements in the Contract Documents:
  1. ACI 301, "Specifications for Structural Concrete," Sections 1 through 5.
  2. ACI 318-14, "Building Code Requirements for Structural Concrete" with amendments per 2019 California Building Code, Chapter 19, Section 1905.
  3. ACI 318-14, "Building Code Requirements for Structural Concrete" with amendments per 2019 California Building Code, Chapter 19A, Section 1905A.
  4. ACI 117, "Specifications for Tolerances for Concrete Construction and Materials."

## 1.6 ACCESSIBILITY REQUIREMENTS FOR PEDESTRIAN PAVING

- A. Concrete paving for accessible pedestrian routes for persons with disabilities shall comply with the following per 2019 California Building Code (CBC) requirements:
  1. Changes in Level: 1/4 inch maximum vertical change in level; changes greater than 1/4 inch to not more than 1/2 inch shall be beveled with a slope not exceeding 1:2 vertical to horizontal; offsets exceeding 1/2 inch shall be by a ramp (CBC 11B-303).
  2. Cross Slope of Walks and Ramps: 1/4:12 maximum (CBC 11B-403.3).
  3. Slope of Pedestrian Pavements: 1/4:12 maximum in any direction where there is no defined direction of travel (CBC 11B-403.3).
  4. Slope of Door and Ramp Landings: 1/4:12 maximum in any direction (CBC 11B-404.2.4.4 and 11B-405.7.1). Changes in level are not permitted within door and ramp landings.

5. Slope of Parking Stalls and Access Aisles for Persons with Disabilities: 1/4:12 maximum in any direction (CBC 11B-502.4). Changes in level are not permitted within accessible parking stalls and access aisles.
6. Slope of walks in the direction of travel: 1:20 (5%) maximum (CBC 11B-403.3).
7. Slope of Ramps in the Direction of Travel: 1:12 (8.33%) maximum (CBC 11B-405.2).
8. Width of Walks and Ramps: 48 inches minimum clear width (CBC 11B-403.5.1 and 11B-405.5).

## PART 2 - PRODUCTS

### 2.1 FORMS MATERIALS

- A. Form Materials: Plywood, metal, metal-framed plywood, or other approved panel-type materials to provide full-depth, continuous, straight, and smooth exposed surfaces.
  1. Use flexible or uniformly curved forms for curves with a radius of 100 feet or less. Do not use notched and bent forms.
- B. Form-Release Agent: Commercially formulated form-release agent that will not bond with, stain, or adversely affect concrete surfaces and that will not impair subsequent treatments of concrete surfaces.

### 2.2 STEEL REINFORCEMENT

- A. Plain-Steel Welded Wire Reinforcement: ASTM A 185/A 185M, fabricated from steel wire into flat sheets.
- B. Reinforcing Bars: ASTM A 615/A 615M, Grade 60; deformed.
- C. Joint Dowel Bars: ASTM A 615/A 615M, Grade 60 plain-steel bars. Cut bars true to length with ends square and free of burrs.
- D. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars, welded wire reinforcement, and dowels in place. Manufacture bar supports according to CRSI's "Manual of Standard Practice" from steel wire, plastic, or precast concrete of greater compressive strength than concrete specified, and as follows:
  1. Equip wire bar supports with sand plates or horizontal runners where base material will not support chair legs.

### 2.3 CONCRETE MATERIALS

- A. Cementitious Material: Use the following cementitious materials, of same type, brand, and source throughout Project:

1. Portland Cement: Type II gray Portland Cement conforming to the specifications of ASTM C150-02a and the requirements of Caltrans Specification Section 90 for "Type II Modified" Portland Cement.
- B. Normal-Weight Aggregates: ASTM C 33, uniformly graded. Provide aggregates from a single source with documented service-record data of at least 10 years' satisfactory service in similar paving applications and service conditions using similar aggregates and cementitious materials.
  1. Maximum Coarse-Aggregate Size: 1 inch nominal.
  2. Fine Aggregate: Free of materials with deleterious reactivity to alkali in cement.
- C. Water: Potable and complying with ASTM C 94/C 94M.

#### 2.4 CURING MATERIALS

- A. Moisture-Retaining Cover: ASTM C 171, polyethylene film or white burlap-polyethylene sheet.
- B. Water: Potable.
- C. Evaporation Retarder: Waterborne, monomolecular, film forming, manufactured for application to fresh concrete.
- D. Clear, Waterborne, Membrane-Forming Curing Compound: ASTM C 309, Type 1, Class B, dissipating. It shall be the Contractor's responsibility to verify that all curing compounds used comply with the VOC Emission requirements of the San Joaquin Valley Air Pollution Control District.

#### 2.5 RELATED MATERIALS

- A. Joint Fillers: ASTM D 1751, asphalt-saturated cellulosic fiber in preformed strips.

#### 2.6 CONCRETE MIXTURES

- A. General: Concrete mixtures shall comply with requirements of authorities having jurisdiction.
- B. Mixtures for concrete pavements, gutters and curbs subject to vehicular traffic:
  1. Concrete shall be Class 2 (Previous years denoted as Class A) and shall contain 590 pounds minimum (6 sacks) of Portland Cement per cubic yard conforming to the requirements of Section 90 of the Caltrans Specifications.
    - a. Use a qualified independent testing agency for preparing and reporting proposed concrete design mixtures for the trial batch method.
  2. Proportion mixtures to provide normal-weight concrete with the following properties:

- a. Compressive Strength (28 Days): 3000 psi minimum.
  - b. Maximum Water-Cementitious Materials Ratio at Point of Placement: 0.50.
  - c. Slump Limit: 4 inches maximum.
- C. Mixtures for concrete walks, gutters and curbs subject to only pedestrian traffic:
- 1. Concrete shall be Class 3 (Previous years denoted as Class B) and shall contain 505 pounds minimum (5 sacks) of Portland Cement per cubic yard conforming to the requirements of Section 90 of the Caltrans Specifications unless noted otherwise on the drawings.
    - a. Use a qualified independent testing agency for preparing and reporting proposed concrete design mixtures for the trial batch method.
  - 2. Proportion mixtures to provide normal-weight concrete with the following properties:
    - a. Compressive Strength (28 Days): 2500 psi minimum.
    - b. Maximum Water-Cementitious Materials Ratio at Point of Placement: 0.58.
    - c. Slump Limit: 5 inches maximum.
- D. Limit water-soluble, chloride-ion content in hardened concrete to 0.15 percent by weight of cement.

## 2.7 CONCRETE MIXING

- A. Ready-Mixed Concrete: Measure, batch, and mix concrete materials and concrete according to ASTM C 94/C 94M. Furnish batch certificates for each batch discharged and used in the Work.
- 1. When air temperature is between 85 and 90 deg F, reduce mixing and delivery time from 1-1/2 hours to 75 minutes; when air temperature is above 90 deg F, reduce mixing and delivery time to 60 minutes.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine exposed subgrades and base surfaces for compliance with requirements for dimensional, grading, and elevation tolerances.
- B. Proof-roll prepared base surface below concrete paving to identify soft pockets and areas of excess yielding.
- 1. Completely proof-roll subbase in one direction and repeat in perpendicular direction. Limit vehicle speed to 3 mph.
  - 2. Proof-roll with a pneumatic-tired and loaded, 10-wheel, tandem-axle dump truck weighing not less than 15 tons.

3. Correct subbase with soft spots and areas of pumping or rutting exceeding depth of 1/2 inch according to requirements in Division 31 Section "Earth Moving."

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

### 3.2 PREPARATION

A. Remove loose material from compacted subbase surface immediately before placing concrete.

### 3.3 EDGE FORMS AND SCREED CONSTRUCTION

A. Set, brace, and secure edge forms, bulkheads, and intermediate screed guides to required lines, grades, and elevations. Install forms to allow continuous progress of work and so forms can remain in place at least 24 hours after concrete placement.

B. Clean forms after each use and coat with form-release agent to ensure separation from concrete without damage.

### 3.4 STEEL REINFORCEMENT

A. General: Comply with CRSI's "Manual of Standard Practice" for fabricating, placing, and supporting reinforcement.

B. Clean reinforcement of loose rust and mill scale, earth, ice, or other bond-reducing materials.

C. Arrange, space, and securely tie bars and bar supports to hold reinforcement in position during concrete placement. Maintain minimum cover to reinforcement.

D. Install welded wire reinforcement in lengths as long as practicable. Lap adjoining pieces at least one full mesh, and lace splices with wire. Offset laps of adjoining widths to prevent continuous laps in either direction.

### 3.5 JOINTS

A. General: Form construction, isolation, and contraction joints and tool edges true to line, with faces perpendicular to surface plane of concrete. Construct transverse joints at right angles to centerline unless otherwise indicated.

1. When joining existing paving, place transverse joints to align with previously placed joints unless otherwise indicated.

B. Construction Joints: Set construction joints at side and end terminations of paving and at locations where paving operations are stopped for more than one-half hour unless paving terminates at isolation joints.

1. Continue steel reinforcement across construction joints unless otherwise indicated. Do not continue reinforcement through sides of paving strips unless otherwise indicated.
  2. Provide tie bars at sides of paving strips where indicated.
  3. Keyed Joints: Provide preformed keyway-section forms or bulkhead forms with keys as shown on the Drawings.
  4. Doweled Joints: Install dowel bars and support assemblies at joints where indicated. Lubricate or coat with asphalt one-half of dowel length to prevent concrete bonding to one side of joint.
- C. Isolation Joints: Form isolation joints of preformed joint-filler strips where noted on the Drawings.
1. Extend joint fillers full width and depth of joint.
  2. Terminate joint filler not less than 1/2 inch or more than 1 inch below finished surface if joint sealant is indicated.
  3. Place top of joint filler flush with finished concrete surface if joint sealant is not indicated.
  4. Furnish joint fillers in one-piece lengths. Where more than one length is required, lace or clip joint-filler sections together.
  5. During concrete placement, protect top edge of joint filler with metal, plastic, or other temporary preformed cap. Remove protective cap after concrete has been placed on both sides of joint.
- D. Contraction Joints: Form weakened-plane contraction joints, sectioning concrete into areas as indicated. Construct contraction joints for a depth equal to at least one-fourth of the concrete thickness, as follows:
1. Grooved Joints: Form 1/4-inch wide contraction joints after initial floating by grooving and finishing each edge of joint with grooving tool to a 1/4-inch radius unless noted otherwise on the drawings. Repeat grooving of contraction joints after applying surface finishes. Eliminate grooving-tool marks on concrete surfaces.
    - a. Tolerance: Ensure that grooved joints are within 3 inches either way from centers of dowels.
  2. Sawed Joints: Sawed joints shall not be used where concrete is permanently exposed to view.
    - a. Sawed Joints: Form contraction joints with power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut 1/8-inch- wide joints into concrete when cutting action will not tear, abrade, or otherwise damage surface and before developing random contraction cracks.
      - 1) Tolerance: Ensure that sawed joints are within 3 inches either way from centers of dowels.
- E. Edging: After initial floating, tool edges of paving, gutters, curbs, and joints in concrete with an edging tool to a 1/4-inch radius unless noted otherwise on the Drawings. Repeat tooling of edges after applying surface finishes. Eliminate edging-tool marks on concrete surfaces.

### 3.6 CONCRETE PLACEMENT

- A. Before placing concrete, inspect and complete formwork installation, steel reinforcement, and items to be embedded or cast-in.
- B. Remove snow, ice, or frost from subbase surface and steel reinforcement before placing concrete. Do not place concrete on frozen surfaces.
- C. Moisten subbase to provide a uniform dampened condition at time concrete is placed. Do not place concrete around manholes or other structures until they are at required finish elevation and alignment.
- D. Comply with ACI 301 requirements for measuring, mixing, transporting, and placing concrete.
- E. Do not add water to concrete during delivery or at Project site. Do not add water to fresh concrete after testing.
- F. Deposit and spread concrete in a continuous operation between transverse joints. Do not push or drag concrete into place or use vibrators to move concrete into place.
- G. Consolidate concrete according to ACI 301 by mechanical vibrating equipment supplemented by hand spading, rodding, or tamping.
  - 1. Consolidate concrete along face of forms and adjacent to transverse joints with an internal vibrator. Keep vibrator away from joint assemblies, reinforcement, or side forms. Use only square-faced shovels for hand spreading and consolidation. Consolidate with care to prevent dislocating reinforcement and dowels.
- H. Screed paving surface with a straightedge and strike off.
- I. Commence initial floating using bull floats or darbies to impart an open-textured and uniform surface plane before excess moisture or bleed water appears on the surface. Do not further disturb concrete surfaces before beginning finishing operations or spreading surface treatments.
- J. Cold-Weather Placement: Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing, or low temperatures. Comply with ACI 306.1 and the following:
  - 1. When air temperature has fallen to or is expected to fall below 40 deg F, uniformly heat water and aggregates before mixing to obtain a concrete mixture temperature of not less than 50 deg F and not more than 80 deg F at point of placement.
  - 2. Do not use frozen materials or materials containing ice or snow.
  - 3. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators unless otherwise specified and approved in design mixtures.



K. Hot-Weather Placement: Comply with ACI 301 and as follows when hot-weather conditions exist:

1. Cool ingredients before mixing to maintain concrete temperature below 90 deg F at time of placement. Chilled mixing water or chopped ice may be used to control temperature, provided water equivalent of ice is calculated in total amount of mixing water. Using liquid nitrogen to cool concrete is Contractor's option.
2. Cover steel reinforcement with water-soaked burlap so steel temperature will not exceed ambient air temperature immediately before embedding in concrete.
3. Fog-spray forms, steel reinforcement, and subgrade just before placing concrete. Keep subgrade moisture uniform without standing water, soft spots, or dry areas.

### 3.7 CONCRETE FINISHING

A. Float Finish: After initial floating during placement, begin the second floating operation when bleed-water sheen has disappeared and concrete surface has stiffened sufficiently to permit operations. Float surface with power-driven floats or by hand floating if area is small or inaccessible to power units. Finish surfaces to true planes. Cut down high spots and fill low spots. Refloat surface immediately to uniform granular texture.

1. Medium-to-Fine-Textured Broom Finish: Draw a soft-bristle broom across float-finished concrete surface perpendicular to line of traffic to provide a uniform, fine-line texture.
2. Ramps: Finish ramps with medium broom finish with direction perpendicular to the direction of travel.

B. Curbs: Provide monolithic finish to interior curbs by stripping forms while concrete is still green and by steel-troweling surfaces to a hard, dense finish with corners, intersections, and terminations slightly rounded.

### 3.8 CONCRETE PROTECTION AND CURING

A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Comply with ACI 306.1 for cold-weather protection and ACI 305 for hot-weather protection during curing.

B. Evaporation Retarder: Apply evaporation retarder to concrete surfaces if hot, dry, or windy conditions cause moisture loss approaching 0.2 lb/sq. ft. x h before and during finishing operations. Apply according to manufacturer's written instructions after placing, screeding, and bull floating or darbying concrete but before float finishing.

C. Begin curing after finishing concrete but not before free water has disappeared from concrete surface.

D. Curing Methods: Cure concrete by moisture curing, moisture-retaining-cover curing, curing compound or a combination of these as follows:

1. Moisture Curing: Keep surfaces continuously moist for not less than seven days with the following materials:
  - a. Water.
  - b. Continuous water-fog spray.
  - c. Absorptive cover, water saturated and kept continuously wet. Cover concrete surfaces and edges with 12-inch lap over adjacent absorptive covers.
2. Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover, placed in widest practicable width, with sides and ends lapped at least 12 inches and sealed by waterproof tape or adhesive. Immediately repair any holes or tears occurring during installation or curing period using cover material and waterproof tape.
3. Curing Compound: Apply uniformly in continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas that have been subjected to heavy rainfall within three hours after initial application. Maintain continuity of coating, and repair damage during curing period.

### 3.9 PAVING TOLERANCES

#### A. Comply with tolerances in ACI 117 and as follows:

1. Elevation: 1/4 inch.
2. Thickness: Plus 3/8 inch, no minus.
3. Surface: Gap below 10-foot- long, unlevelled straightedge not to exceed 1/4 inch
4. Alignment of Tie-Bar End Relative to Line Perpendicular to Paving Edge: 1/2 inch per 12 inches of tie bar.
5. Lateral Alignment and Spacing of Dowels: 1 inch.
6. Vertical Alignment of Dowels: 1/4 inch.
7. Alignment of Dowel-Bar End Relative to Line Perpendicular to Paving Edge: 1/4 inch per 12 inches of dowel.
8. Joint Spacing: 3 inches.
9. Contraction Joint Depth: Plus 1/4 inch, no minus.
10. Joint Width for Grooved Joints: Plus 1/8 inch, no minus.

#### B. Comply with tolerances per CBC Chapter 11B for accessible routes for persons with disabilities. Refer to regulatory requirements referenced in Part 1 Article "Accessibility Requirements for Pedestrian Paving" of this specification section.

### 3.10 FIELD QUALITY CONTROL

#### A. Testing and Inspecting Agency: Owner will engage and pay for a qualified independent testing and inspecting agency to perform tests and inspections as applicable and prepare reports.

1. Testing and Inspection Agency shall be acceptable to the Architect and the Division of the State Architect.

- B. The Architect and the Division of the State Architect shall have the right to order the testing of any materials used in the concrete construction to determine if they are of the quality specified.
- C. Contractor Responsibilities:
1. The Contractor shall maintain control of the quality of materials and workmanship in order to conform with the drawings and specifications.
  2. To facilitate testing and inspection, the Contractor shall:
    - a. Schedule tests and inspections with the Testing and Inspection Agency sufficiently in advance of operations to allow for the assignment of personnel and for the completion of testing and inspecting responsibilities.
    - b. Provide access to the Work for the designated Testing and Inspection Agency.
    - c. Furnish all necessary materials and labor to assist the designated Testing and Inspection Agency in obtaining and handling samples at the project or other sources of materials.
    - d. Provide and maintain for the sole use of the Testing and Inspection Agency adequate facilities for safe storage and proper curing of concrete test specimens on the project site for the first 24 hr. as required by ASTM C31.
  3. The Contractor shall correct deficiencies in Work that test reports and inspections indicate does not comply with the Contract Documents.
- D. Concrete Tests: Testing of composite samples of fresh concrete obtained according to ASTM C 172 shall be performed according to the following requirements:
1. Testing Frequency: Obtain at least one composite sample for each 5000 sq. ft. or fraction thereof of each concrete mixture placed each day.
    - a. When frequency of testing will provide fewer than five compressive-strength tests for each concrete mixture, testing shall be conducted from at least five randomly selected batches or from each batch if fewer than five are used.
  2. Slump: ASTM C 143/C 143M; one test at point of placement for each composite sample, but not less than one test for each day's pour of each concrete mixture. Perform additional tests when concrete consistency appears to change.
  3. Air Content: ASTM C 231/C 231M, pressure method; one test for each composite sample, but not less than one test for each day's pour of each concrete mixture.
  4. Concrete Temperature: ASTM C 1064/C 1064M; one test hourly when air temperature is 40 deg F and below and when it is 80 deg F and above, and one test for each composite sample.
  5. Compression Test Specimens: ASTM C 31/C 31M; cast and laboratory cure one set of three standard cylinder specimens for each composite sample.
  6. Compressive-Strength Tests: ASTM C 39/C 39M; test one specimen at seven days and two specimens at 28 days.

- a. A compressive-strength test shall be the average compressive strength from two specimens obtained from same composite sample and tested at 28 days.
- E. Strength of each concrete mixture will be satisfactory if the average of any three consecutive compressive-strength tests equals or exceeds specified compressive strength and no compressive-strength test value falls below specified compressive strength by more than 500 psi.
- F. Test results shall be reported in writing to Architect, concrete manufacturer, and Contractor within 48 hours of testing. Reports of compressive-strength tests shall contain Project identification name and number, date of concrete placement, name of concrete testing and inspecting agency, location of concrete batch in Work, design compressive strength at 28 days, concrete mixture proportions and materials, compressive breaking strength, and type of break for both 7- and 28-day tests.
- G. Nondestructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted by Architect but will not be used as sole basis for approval or rejection of concrete.
- H. Additional Tests: Testing and inspecting agency shall make additional tests of concrete when test results indicate that slump, compressive strengths, or other requirements have not been met, as directed by Architect.
- I. Concrete will be considered defective if it does not pass tests and inspections.
- J. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.
- K. Test and inspection reports are to be prepared and distributed by the testing agency.

### 3.11 REPAIRS AND PROTECTION

- A. Remove and replace concrete paving that is broken, damaged, or defective or that does not comply with requirements in this Section. Remove work in complete sections from joint to joint unless otherwise approved by Architect.
- B. Additional construction, testing, and replacement costs resulting from damaged or improperly installed infrastructure shall be paid for by the Contractor.
- C. Drill test cores, where directed by Architect, when necessary to determine magnitude of cracks or defective areas. Fill drilled core holes in satisfactory paving areas with portland cement concrete bonded to paving with epoxy adhesive.
- D. Protect concrete paving from damage. Exclude traffic from paving for at least 14 days after placement. When construction traffic is permitted, maintain paving as clean as possible by removing surface stains and spillage of materials as they occur.

- E. Maintain concrete paving free of stains, discoloration, dirt, and other foreign material. Sweep paving not more than two days before date scheduled for Substantial Completion inspections.

END OF SECTION



SECTION 321700  
PAVING SPECIALTIES

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:

- 1. Pavement-marking.
- 2. Wheel stops.
- 3. Tactile warning surfaces.
- 4. Traffic and pedestrian signage.

- B. Related Sections:

- 1. Division 32 Sections as applicable to asphalt paving, concrete paving and concrete walks.

1.3 SUBMITTALS

- A. Product Data: For each type of product indicated. Include technical data and tested physical and performance properties.

- A. Shop Drawings: For the following:

- 1. Pavement Markings: Indicate pavement markings, colors, lane separations, parking spaces, directional arrows, and accessibility markings.
- 2. Tactile Warning Surfaces: Indicate locations and extent of tactile warning surfaces.

- B. Qualification Data: For installer of tactile warning surfaces.

1.4 QUALITY ASSURANCE

- A. Installer Qualifications, Tactile Warning Surfaces: Installer shall be certified in writing by the tactile warning surface manufacturer as having successfully completed manufacturer's training for installation of units required for this Project.

- B. Regulatory Requirements: The following shall comply with requirements of the 2010 ADA Standards for Accessible Design and the 2019 California Building Code, Chapter 11B.
  - 1. Tactile warning surfaces.
  - 2. Pavement markings for disabled access parking stalls and access aisles.
  - 3. Signage for disabled access relating to parking stalls, parking lots, and accessible path of travel to building entrances including vertical clearance below post mounted signs located adjacent to walking surfaces.

#### 1.5 DELIVERY, STORAGE, AND HANDLING

- A. Deliver pavement-marking materials to Project site in original packages with seals unbroken and bearing manufacturer's labels containing brand name and type of material, date of manufacture, and directions for storage.
- B. Store pavement-marking materials in a clean, dry, protected location within temperature range required by manufacturer. Protect stored materials from direct sunlight.

#### 1.6 PROJECT CONDITIONS

- A. Pavement-Marking Paint: Proceed with pavement marking only on clean, dry surfaces and at a minimum ambient or surface temperature of 55 deg F for water-based materials, and not exceeding 95 deg F.

### PART 2 - PRODUCTS

#### 2.1 PAVEMENT MARKING PAINT

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. Dunn-Edwards Corporation.
  - 2. Ennis Traffic Safety Solutions.
  - 3. Frazee Paint, Comex Group.
  - 4. The Sherwin-Williams Company
- B. Pavement-Marking Paint: Latex, waterborne emulsion, lead and chromate free, ready mixed, complying with one of the following:
  - 1. FS TT-P-1952, Type II, with drying time of less than 45 minutes.
  - 2. MPI #97 Latex Traffic Marking Paint.
- C. Colors Unless otherwise indicated, provide colors as follows:
  - 1. White:



- a. Parking stall lines and text markings.
  - b. Figure and border of international symbol of accessibility (ISA) markings at accessible parking stalls.
  - c. Diagonal striping for accessible parking stall access aisles where marked on asphalt paving.
  - d. Traffic arrows.
2. Blue: Color equal to Color 15090 per Federal Standard 595B.
- a. Background of international symbol of accessibility (ISA) markings at accessible parking stalls.
  - b. Perimeter of accessible parking stall access aisles.
  - c. Diagonal striping for accessible parking stall access aisles where marked on concrete paving.
3. Red: Curbs of fire lanes, face and top of curb.
4. Black: For painting out existing pavement markings.
- a. Tint to match color of pavement.

## 2.2 TACTILE WARNING SURFACES

- A. Basis of Design: Drawings and Specifications are based on the following:
- 1. ADA Solutions, Inc.
    - a. Replaceable Wet-Set detectable warning tile panels.
    - b. Surface Mount detectable warning tile panels.
  - 2. Subject to compliance with requirements, provide product indicated or a comparable product subject to request for substitution.
- B. Description: Homogeneous fiberglass and carbon reinforced composite panels with ADA and CBC compliant truncated dome pattern on exposed surfaces, panels are colorfast and UV stable with uniform color throughout the thickness of the panel.
- 1. Replaceable Wet-Set Detectable Warning Tile Panels: Tile panels designed for setting in freshly poured concrete and mechanically anchored with stainless steel fasteners.
  - 2. Surface Mount Detectable Warning Tile Panels: Tile panels designed for surface application on existing concrete with mechanical and adhesive fastening.
  - 3. Standard Sizes: 24 by 36, 48, and 60 inches; 36 by 36 and 60 inches.
  - 4. Thickness:
    - a. Wet-Set Tiles: 1/4 inch nominal thickness with a 3/4 inch thick by 1 inch wide perimeter flange.
    - b. Surface Mount Tiles: 3/16 inch thick with 1/2 inch wide beveled edge at all edges.
  - 5. Physical Characteristics:

- a. Compressive Strength: 28,900 psi, ASTM D695.
  - b. Slip Resistance: 1.18 dry, 1.05 wet, ASTM C 1028.
  - c. Flame Spread Index: Less than 25, ASTM E 84.
  - d. Freeze/Thaw/Heat: No disintegration, ASTM C 1026.
6. Tactile Surface Domes (Regulatory Requirements per 2019 CBC 11B-705):
- a. Dome Size:
    - 1) Base Diameter: 0.90 inches minimum, 0.92 inches maximum.
    - 2) Top Diameter: 0.45 inches minimum, 0.47 inches maximum.
    - 3) Height: 0.2 inches.
  - b. Dome Configuration and Spacing: Square grid, 2.3 inches minimum, 2.4 inches maximum, center to center spacing. Base edge to base edge spacing of 0.65 inch minimum measured to the most adjacent domes on a square grid.
7. Color: Federal yellow, equal to SAE AMS-STD 595A (Formerly color 33538 per Federal Standard 595C).
- C. Accessory Materials: Accessory materials shall be recommended in writing by the tactile surface panel manufacturer.
- 1. Fasteners for Wet-Set Tile: Manufacturer's standard stainless steel inserts and matching bolts, 1/2 inch diameter, factory attached to tile panels.
  - 2. Fasteners for Surface Mounted Tile: Manufacturer's standard stainless steel sleeve anchors, 1/4 inch diameter.
  - 3. Adhesive/Sealant for Surface Mounted Tile: Solvent free polyether adhesive/sealant, ASTM C 920, Type S, Grade NS, Class 25, Uses NT, T, M, G, A & O.
    - a. Acceptable Product: ChemLink, Inc.; M-1 Structural Adhesive/Sealant

## 2.3 WHEEL STOPS

- A. Wheel Stops: Precast, air-entrained concrete, 2,500-psi minimum compressive strength, 6 inches high by 6 inches wide by 48 inches long, and reinforced with (4) #3 reinforcing bars. Provide chamfered corners and holes for anchoring to substrate.
- B. Dowels: Galvanized steel, 1/2 inch diameter, 10-inch minimum length.

## 2.4 TRAFFIC AND PEDESTRIAN SIGNAGE

- A. Traffic Signs: Provide traffic signs as indicated on Drawings complying with the following requirements:
  - 1. Material: Aluminum sheet, ASTM B 209, alloy and temper recommended by aluminum producer and finisher for type of use and finish indicated, and with at

- least the strength and durability properties of Alloy 5005-H32, 0.080 inch minimum thickness.
2. Corner Condition: Rounded to radius of 1-1/2 inches unless otherwise indicated.
  3. Finish: Manufacturer's standard powder coat or baked enamel reflectorized finish.
  4. Size: As indicated on Drawings.
  5. Color: As indicated on Drawings.
  6. Text and Graphics: As indicated on Drawings.
- B. Brackets: Extruded aluminum brackets and fittings to suit sign construction and mounting conditions for bracket-mounted signs.
- C. Fasteners: Non-corrosive fasteners compatible with sign and post materials; provide fasteners with vandal/theft resistant heads.
- D. Sign Posts: Galvanized steel pipe, ASTM A53, standard weight, Schedule 40, size as indicated on Drawings.
- E. Concrete for Sign Posts: Ready mixed concrete or prepackaged concrete mix for site mixing requiring only the addition of water at the project site; minimum 2000 psi compressive strength at 28 days.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine conditions in which products are to be applied or installed with installer/appliator present.
- B. Proceed with only after unsatisfactory conditions have been corrected.

### 3.2 PAVEMENT MARKING APPLICATION

- A. Preparation:
  1. Do not apply pavement-marking paint until layout, colors, and placement have been verified with Architect.
  2. Allow paving to age for time period recommended by paint manufacturer, but not less than 30 days before starting pavement marking.
  3. Test concrete paving for alkalinity, pH level shall be less than the maximum value recommended by paint manufacturer.
  4. Sweep and clean surface to eliminate loose material and dust. Surfaces shall be clean, dry, and free of oil, grease, and other foreign matter.
- B. Apply paint with mechanical equipment to produce pavement markings, of dimensions indicated, with uniform, straight edges. Apply at manufacturer's recommended rates to provide a minimum wet film thickness of 15 mils.
  1. Width of Lines: 4 inches unless otherwise indicated on Drawings.

- a. Where existing lines are to be painted out to match the color of the paving, paint over lines shall be 8 inches minimum in width.
  2. Graphics and Lettering: Apply graphic symbols and lettering with paint-resistant, die-cut stencils, firmly secured to concrete surface. Mask an extended area beyond edges of each stencil to prevent paint application beyond stencil. Apply paint so that it cannot run beneath stencil.
- C. Prohibit traffic until traffic paint is fully dry.

### 3.3 WHEEL STOP INSTALLATION

- A. Accurately locate and align wheel stops as indicated on Drawings. Where wheel stops are installed parallel to curbs or paving edge, wheel stops shall be aligned in a straight line.
- B. Securely attach wheel stops to pavement with not less than two galvanized-steel dowels embedded at one-quarter to one-third points. Securely install dowels into pavement and bond to wheel stop. Recess head of dowels beneath top of wheel stop and grout holes.

### 3.4 TACTILE WARNING SURFACE INSTALLATION

- A. General: Install tactile warning surface tile panels in accordance with manufacturer's written installation instructions.
- B. Wet-Set Tile Panels: Accurately place tile panel in position in freshly finished concrete, tamp unit using a rubber mallet and a block of wood, continue tamping until all air has been released and the surface of the tile panel is flush with the surrounding concrete surface. Provide 1/8 inch space between adjacent panels of multiple panel installations.
  1. Concrete shall have a smooth trowel finish prior to placement of tile panel(s).
  2. After installation of tile panel, finish concrete around perimeter of panel with a 1/4 inch edge trowel.
  3. When no further panel adjustment is needed, apply weight to panel until the concrete is set. Protect panels from traffic until concrete is cured.
  4. Remove protective film from panel after concrete has cured.
- C. Surface Mounted Tile Panels: Install panels using adhesive and mechanical fasteners. Provide 1/8 inch space between adjacent panels of multiple panel installations.
  1. Clean existing concrete surface of debris, oil, and grease.
  2. Lay out panels and confirm fit and panel location.
  3. Apply adhesive as follows using care in applying adhesive so that excessive amounts of adhesive will not be squeezed out from underneath panels.
    - a. Panels for Curb Ramps: Apply a 3/8 inch bead of adhesive to the flat framework on the bottom of panels.

- b. Panels for Other Locations: Apply full adhesive coverage to the bottom of the panel using a 3/16 by 3/16 inch or 1/4 by 1/4 inch square notch trowel.
- 4. Drill concrete through preformed fastener locations in the panel and install fasteners. If additional fastener locations are required, drill and install fasteners in accordance with manufacturer's written instructions.
- 5. Seal perimeter panel edges after anchoring panels. . Remove protective films and clean panels of concrete dust from drilling prior to sealing perimeters of panels.

### 3.5 SIGNAGE INSTALLATION

#### A. Sign Post Installation:

- 1. Post Excavation and Footings: Drill or hand-excavate holes for posts to diameters and depths indicated in firm, undisturbed soil; if footing diameters and depths are not indicated on Drawings, footings shall be not less than 10 inches diameter by 30 inches deep; tops of footings shall be established as 4 inches below finish grade.
- 2. Post Setting: Verify that posts are set plumb, aligned, and at correct height; hold in position during setting with concrete or mechanical devices; the bottom of posts shall be 3 inches above the bottom of footings. Place concrete around posts and vibrate or tamp for consolidation. Protect aboveground portion of posts from concrete splatter.
  - a. Posts in Paved Areas Installed Prior to Paving: Comply with the following:
    - 1) Posts in Concrete Paved Areas and Curbs: Coordinate top of paving elevation and pour concrete fill to approximately 6 inches below finish grade.
    - 2) Posts in Asphalt Concrete Paved areas: Concrete fill to be flush with adjacent paving and crowned to shed water away from posts. Coordinate top of paving elevation and form top 6 inches of footing with round concrete form of diameter matching post footing; pour concrete fill prior to paving operations.
  - b. Posts in Unpaved Areas: Concrete fill to be 2 inches above finish grade and crowned to shed water away from posts. Coordinate finish grade elevation and form top 6 inches of footing with round concrete form of diameter matching post footing.

#### B. Sign Installation: Attach signs to posts with appropriate brackets and theft resistant fasteners.

- 1. The bottom of signs shall be at least 80 inches above walking surfaces when located adjacent to pedestrian paths of travel.
- 2. Peen ends of exposed threads to prevent removal of fasteners.
- 3. Where signs are indicated to be fastened to buildings or fences, install as indicated on Drawings.

END OF SECTION