

AMENDMENT NO. 0005 TO ADVERTISED RFP DACW31-03-R-0025
EFFECTIVE OCT 10, 2003

SPECIFICATIONS:

1) Specification Section 01330, Submittal Register: Delete the Submittal Register in its entirety as originally issued and substitute the attached revised Submittal Register revised 10/03/03.

2) Page 02882-2, Paragraph 1.1: Add the following at the end of the paragraph:

“All equipment must meet or exceed requirements established by the American Society for Testing & Materials (ASTM) and equipment must conform to the U.S. Consumer Product Safety Commission’s (CPSC) Playground Handbook for Safety.

- a. Manufacturer qualifications: An approved “3rd Party Certification” is required to guarantee compliance with ASTM Standards, per requirements of ASTM F 1487, Sec. 12.6.1.

Approved third parties include the International Play Equipment Manufacturer’s Association (IPEMA) and JMP Inc. Consultant Engineers. For alternate third party, submit a statement specifying certifier including contact or other reference information.”

3) Page 02882-7, Paragraph 1.12: Delete paragraph text as originally issued and substitute therefore the following:

“Provide 100 YEAR WARRANTY on Structural Components including Posts, Decks, and railings, etc. under normal use and proper maintenance against structural failure due to corrosion, deterioration or weathering; not subjected to vandalism, negligence or acts of God.

Provide 15 YEAR WARRANTY on STAINLESS STEEL HARDWARE and PLASTIC BORDERS under normal use and proper maintenance against structural failure due to corrosion, deterioration or weathering; not subjected to vandalism, negligence or acts of God.

Provide 10 YEAR WARRANTY on STEEL COMPONENTS and WOOD BORDERS against structural failure due to corrosion, rotting or deterioration.

Provide 3 YEAR WARRANTY on all POLYETHYLENE SLIDES, ENCLOSURES and other PLASTIC COMPONENTS, BOUNCY ANIMALS (not including springs), TROLLEYS and SWING HANGERS against structural failure due to weathering, deterioration or manufacturing defects.

Provide FIRST YEAR WARRANTY on MOVING PARTS and all other MATERIALS not mentioned above for one year from the date of the signed Warranty Registration and Safety Certification against structural failure or manufacturing defects.”

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4) Page 02882-7, Paragraph 2.1: Delete paragraph text as originally issued and substitute therefore the following: "Composite play structures are to be according to layout shown on the Drawings and specified herein. Decks are to be designed to support the number of simultaneous users as defined in ASTM f1487-98, article 12.4 All posts shall have a "finish grade marker" positioned on the post identifying the bury line as recommended by the manufacturer for the correct installation and the top of the resilient surfacing. All caps are to be factory installed with self-sealing rivet.

At Play Area G63, Pre-school age group, play structure 14 shall be handicapped accessible and shall include two (2) 36" platforms, one (1) 42" platform, two (2) straight slides, one (1) curved ladder, one (1) set of perforated wide steps. Play Structure 14 shall accommodate up to 23 children.

At Play Area G64, School age group, play structure 13 shall be handicapped accessible and shall include four (4) platforms with heights of 36", 36", 60" and 72", one (1) swinging bridge, two (2) straight slides, one (1) curved slide, one (1) spiral slide, one (1) set of perforated wide steps, one (1) pole. Play structure 13 shall accommodate up to 39 children.

At Play Area G65, Pre-teen age group, play structure 11 shall be handicapped accessible and shall include seven platforms at heights of 14", 16", 30", 44", 44", 65" and 68", one (1) tube zigzag slide, one (1) spiral slide, one tube bridge, one (1) tree climber, one (1) horizontal ladder, one (1) trapeze ring, one (1) pole, one (1) ladder, one (1) chain ladder. Play structure 11 shall accommodate up to 45 children. Play structure 10 shall be a handicapped accessible teeter set including four (4) sets of teeters. Play structure 10 shall accommodate up to 8 children. Play structure 9 shall be a handicapped accessible swing set including four (4) swings. Play structure 9 shall accommodate up to 4 children."

5) Page 02882-10, Paragraph 2.2.2.4: Delete paragraph text as originally issued and substitute therefore the following:

"All posts for mini system shall be 4" x 4" O.D. recycled plastic with galvanized inner core meeting structural requirements with molded in, round ball-cap. Color of all posts shall be dark brown.

All posts for mega system shall be 6" x 6" O.D. recycled plastic with galvanized inner core meeting structural requirements with molded in, round ball-cap. Color of all posts shall be dark brown.

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6) Page 02882-12, Paragraph 2.2.3: Delete paragraph text, including all subparagraphs, as originally issued and substitute therefore the following:

“2.2.3.1 Structural components

100% Recycled Structural Plastic:

All RSP components must comply with ASTM-F 1487.12 for structural integrity. Composite: 95% high density polyethylene (HDPE), 4% polypropylene, .25% recyclo stabilizer additive, .25% UV protectant additive. Structural bend resistance rate shall meet a maximum deflection rate of 1/240 for deck systems. Horizontal structural members with steel inserts shall meet a stress level of 2610.00 psi.

2.2.3.2 Hardware

Refer to ASTM B-117 and ASTM D-1654

ASTM-F 1487 6.2, CPSC 9.1-9.4: all hardware shall be assembled such that no protrusion hazards or sharp edges exist.

All hardware shall be either stainless steel, plated or coated. All standard and primary fasteners shall be a minimum of grade 304 Stainless Steel.

Hardware should employ a vandal-resistant lock system.

2.2.3.3 Pipes & Galvanized Steel products

Refer to ASTM B-117 and ASTM D-1654

Inside/Outside triple-coated, uniform zinc galvanized finish preferred.
Powder-coating, plastisol or other coating required to prevent corrosion.

2.2.3.4 Plastic Components: Rotomolded

Refer to ASTM D 1248 type 2 class A category 3 and Federal Specification LP-390 type 1, class M, grade 2: rotationally molded using polyethylene resin with wall thickness varying with the specific component's size and stress design from 1/4", 5/16", and 3/8" with the tolerances being plus or minus 1/16".

All polyethylene shall contain a UV-8 maximum ultra violet stabilization package.

2.2.3.5 Plastic Components: Roofs, panels, post-cap's

Refer to ASTM-F 1487 4.1, 4.1.1: Designed for commercial playground equipment industry

ASTM-D 257: Graffiti-resistant finish, non-delaminating.

ASTM-D 570: Moisture Resistant

ASTM-F 1487 4.1.1 UV Stabilized for Outdoor Applications

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ASTM-D 638 – ½” – ¾” in thickness.”

- 7) Page 02882-14, Paragraph 2.2.6: Delete paragraph text as originally issued and substitute therefore the following: “Color of all posts shall be dark brown. Colors of play components shall be a mixture of primary colors for each play equipment.”
- 8) Section 10100A: Delete this section in its entirety as originally issued and substitute the attached revised Section 10100A revised 10/03/03.
- 9) Section 10110: Delete this section in its entirety as originally issued and substitute the attached revised Section 10110 revised 10/03/03.
- 10) Page 11400A-19, Paragraph 2.4: Add the following at the end of the paragraph: “Refer to Drawing Sheet M-14 for specification for the kitchen hood with fire suppression system.”
- 11) Page 11480-3, Paragraph 2.2: Delete paragraph text as originally issued and substitute therefore the following: “Scoreboard shall be single-sided, lightweight aluminum, wall mounted. Height shall be 6’-0”, width 8’-0”, depth 6” (1829 mm, 2439 mm, 152 mm). Weight shall be approximately 180 pounds (82kg). Clock and score digits are 13” (330 mm) high. T.O.L. digits are 7 “ (178 mm) high. All other digits are 10” (254 mm) high. Clock digits, time-outs left (T.O.L.) and PERIOD indicator are amber. PLAYER/FOUL/MATCH digits are amber. All other digit indicators are red. HOME and GUEST captions are white vinyl, applied directly to the display face. Power requirements shall be 120 V AC (200 W; 1.7 A).”
- 12) Page 12320A-2, Paragraph SD-06: Add the following at the end of the paragraph: “Millwork provider may be certified with AWI or KCMA, either one is acceptable.”
- 13) Page 12485-1, Paragraph 2.1: Delete paragraph text as originally issued and substitute therefore the following: “Entrance mats at new construction shall be resilient top quality virgin vinyl links, 7/16" x 1/2" wide, 2" long. Provide ten wiping blades on each side of links. Space openings between links not to exceed 1/16" x 1/2 " unless using EAGLE pattern which has 1/2" x 3/4" openings. Mat framework shall be 13 gauge, double galvanized spring, steel wire. Maximum width is 8 feet, although mats should be made in units easy to handle while being cleaned. Nosing shall be 2" wide around the perimeter of the mat. Approach nosing shall be spring steel reinforced and completely encased in vinyl. Recessed mats must have stub nosing supplied in matching link color. Provide beveled nosing for surface. Weight: approx. 2.3 lbs./sq. ft. Color of vinyl links shall be maroon.
- 14) Page 15080-16, Paragraph 3.2.2.1: Add the following at the end of Table I: “MF, Mineral Fiber (fiberglass) is acceptable for use on condensate water, cold domestic water and roof drains.”

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DRAWINGS:

- 15) Sheets A-12-05, A14-01, A14-02, A14-03, A14-04, A14-05 and A14-06: Delete these sheets in their entirety as originally issued and substitute the attached, revised like numbered sheets, dated October 3, 2003.
- 16) Sheet EFC-8: Immediately after this sheet, add the attached new Sheet SP-1 dated 05-01-2003.

ATTACHMENTS:

- 1) Revised Submittal Register, dated 10/03/03.
- 2) Revised Sections 10100A and 10110, dated 10/03/03.
- 3) Revised Sheets A-12-05, A14-01, A14-02, A14-03, A14-04, A14-05 and A14-06, dated October 3, 2003
- 4) New Sheet SP-1, dated 05-01-2003

SUBMITTAL REGISTER (REVISED 10/03/03)

CONTRACT NO.

TITLE AND LOCATION						CONTRACTOR											
Wheatley Elementary School Modernization and Addition																	
ACTIVITY NO	TRANSMITTAL NO	SPEC SECT	DESCRIPTION ITEM SUBMITTED	PARAGRAPH	GOVT CLASSIFICATION	CONTRACTOR: SCHEDULE DATES			CONTRACTOR ACTION		APPROVING AUTHORITY				MAILED TO CONTR/ DATE RCD FRM APPR AUTH	REMARKS	
						SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	ACTION CODE	DATE OF ACTION	DATE FWD TO APPR AUTH/ DATE RCD FROM CONTR	DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACTION CODE			DATE OF ACTION
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)	(q)	(r)
		01000	SD-01 Preconstruction Submittals														
			Hazmat Materials	1.15	G AR												
			SD-03 Product Data														
			Cost or Pricing Data	1.8	G AR												
			Equipment Data	1.9	G AR												
			SD-10 Operation and Maintenance Data														
			O and M Data	1.10	G AR												
			Commissioning Activity for HVAC	1.4.5	G AR												
		01050	SD-07 Certificates														
			Operations Statement	1.11.2	G AR												
		01060	SD-01 Preconstruction Submittals														
			Safety Supervisor	1.4	G AR												
			Activity Phase Hazard Analysis Plan	1.4	G AR												
			Site Safety and Health Plan		G AR												
			Qualifications		G AR												
			SD-02 Shop Drawings														
			Work Layout Drawings		G AR												
			SD-07 Certificates														
			Language Certification	1.4	FIO												
			SD-09 Manufacturer's Field Reports														
			Activity Hazard Analyses in accordance with EM 385-1-1, paragraph 01.A.09		G AR												

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(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)	(q)	(r)
		01060	Outline Report		FIO												
			OSHA Log		FIO												
			Slte Control Log		G AR												
		01110	SD-01 Preconstruction Submittals														
			Connection Requests		FIO												
			Borrow Permits	1.7.1	FIO												
			Excavation Permits	1.7.1	FIO												
			Welding Permits	1.7.1	FIO												
		01200	SD-04 Samples														
			Sample Tags	1.7.2.2	FIO												
		01315	SD-01 Preconstruction Submittals														
			Project Submittal Schedule	1.5	FIO												
			Monthly Progress Report	1.5	FIO												
		01320	SD-01 Preconstruction Submittals														
			Initial Project Schedule		G AR												
			Preliminary Project Schedule		G AR												
			Periodic Schedule Updates		G AR												
			Qualifications	1.3	G AR												
			Narrative Report	3.5.2	G AR												
			Schedule Reports	3.5.4	G AR												
		01356	SD-07 Certificates														
			Mill Certificate or Affidavit	2.1.3	FIO												
		01460	SD-01 Preconstruction Submittals														
			Site Security Plan	1.5	G AR												
		01510	SD-02 Shop Drawings														
			Temporary Electrical Work		G AR												

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		01520	SD-01 Preconstruction Submittals														
			Prints with Original Negatives		FIO												
			Electronic Format	1.5	G AR												
			Videotape Recordings	1.6	FIO												
		01561	SD-05 Design Data														
			Facility Plan	1.9.4	G AR												
			Temporary Plan	1.9.5	G AR												
		01720	SD-01 Preconstruction Submittals														
			Progress Prints		G AR												
			Final Requirements	1.6	G AR												
			CADD Files		FIO												
		02220	SD-03 Product Data														
			Work Plan		G A/E												
			SD-07 Certificates														
			Demolition plan	1.9	G A/E												
			Notifications	1.4.1	G A/E												
			Notification of Demolition and	1.4.1	G A/E												
			Renovation forms														
			SD-11 Closeout Submittals														
			Receipts	1.4.2	G A/E												
		02231	SD-04 Samples														
			Tree wound paint	2.1	G A/E												
			Herbicide	2.2	G A/E												
		02300a	SD-03 Product Data														
			Earthwork		G A/E												
			SD-06 Test Reports														

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		02300a	Testing	3.12	G A/E												
			SD-07 Certificates														
			Testing	3.12	FIO												
		02316a	SD-06 Test Reports														
			Field Density Tests	3.4.3	G A/E												
			Testing of Backfill Materials	3.4.2	G A/E												
		02370a	SD-03 Product Data														
			Geosynthetic Binders		G A/E												
			Hydraulic Mulch	2.2.4	G A/E												
			Geotextile Fabrics	2.3	G A/E												
		02510a	SD-03 Product Data														
			Installation	3.1	G A/E												
			Waste Water Disposal Method		G A/E												
			Satisfactory Installation		G A/E												
			SD-06 Test Reports														
			Bacteriological Disinfection		G A/E												
			SD-07 Certificates														
			Manufacturer's Representative		FIO												
			Installation	3.1	FIO												
			Meters	2.8.5	FIO												
		02531	SD-02 Shop Drawings														
			Precast concrete manhole		G A/E												
			Metal items	2.3.3	G A/E												
			Frames, covers, and gratings	2.3.3.1	G A/E												
			SD-03 Product Data														
			Pipeline materials	2.1	G A/E												

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		02630a	SD-03 Product Data														
			Placing Pipe	3.3	G A/E												
			SD-07 Certificates														
			Resin Certification		FIO												
			Pipeline Testing	3.8	FIO												
			Hydrostatic Test on Watertight Joints	2.6	FIO												
			Determination of Density	3.7.5	FIO												
			Frame and Cover for Gratings	2.2.5	FIO												
		02741N	SD-06 Test Reports														
			Trial batch	1.3.4	G A/E												
			Mix design	1.3.5	G A/E												
			Asphalt concrete	2.1	G A/E												
			Density	3.3.2.2	G A/E												
			Density	3.3.2.3	G A/E												
			Thickness	3.3.2.2	G A/E												
			Thickness	3.3.2.3	G A/E												
			Straightedge test	3.3.2.2	G A/E												
			SD-07 Certificates														
			mix delivery record	1.3.3	FIO												
			Asphalt concrete and material sources		FIO												
			Asphalt concrete	2.1	FIO												
			Traffic signs	2.7	FIO												
		02770a	SD-03 Product Data														
			Concrete	2.1	G A/E												

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		02770a	SD-06 Test Reports														
			Field Quality Control	3.8	G A/E												
		02791	SD-02 Shop Drawings														
			Shop Drawings	3.1.2.2	G A/E												
			SD-03 Product Data														
			Synthetic Surfacing	2.2	G A/E												
			Geotextile Fabric	2.4	G A/E												
			Manufacturer's Qualification	1.7	G A/E												
			Wood	2.6.1	G A/E												
			Wood Treatment	2.6.1.2	G A/E												
			Adhesive	2.2.8	G A/E												
			Color	2.2.4	G A/E												
			SD-04 Samples														
			Synthetic Surfacing	2.2	G A/E												
			SD-06 Test Reports														
			Percolation Test	3.1.4	G A/E												
			Recycled Plastic	2.5	G A/E												
			Synthetic Surfacing	2.2	G A/E												
			SD-07 Certificates														
			Materials	2.1	G A/E												
			Manufacturer's Qualification	1.7	G A/E												
			Manufacturer's Representative	1.11	G A/E												
			Installer's Qualification	1.8	G A/E												
			Substitution	3.1.5	G A/E												
			Child Safety and Accessibility Evaluation	3.4.1	G A/E												

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		02791	SD-10 Operation and Maintenance Data														
			Maintenance Instruction	3.4.3	G A/E												
		02870a	SD-02 Shop Drawings														
			Site Furnishing Standards	2.5	FIO												
			SD-03 Product Data														
			Site Furnishings	1.4	FIO												
			Installation	3.1	FIO												
			Materials	2.1	FIO												
			SD-04 Samples														
			Finish	2.4	FIO												
			SD-06 Test Reports														
			Recycled Material	2.1.2	FIO												
			Testing	3.1.5	FIO												
		02882	SD-02 Shop Drawings														
			Configuration	2.3.1	FIO												
			Shop Drawings	3.1.2.2	FIO												
			Fall Height	3.2.7	FIO												
			Finished Grade and Underground Utilities		FIO												
			SD-03 Product Data														
			Equipment	2.3	FIO												
			Equipment Identification	1.6	FIO												
			Delivery, Storage and Handling	1.5	FIO												
			Manufacturer Qualification	1.10	FIO												
			Spare Parts	3.4.2	FIO												

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		02882	Materials	2.2	FIO												
			SD-04 Samples														
			Color	2.2.6	FIO												
			SD-06 Test Reports														
			Recycled Plastic	2.2.3	FIO												
			SD-07 Certificates														
			Materials	2.2	FIO												
			Manufacturer Qualification	1.10	FIO												
			Installer Qualification	1.11	FIO												
			Manufacturer's Representative	1.14	FIO												
			Substitution	2.3.2	FIO												
			Play Event Modification	3.2.1	FIO												
			Child Safety and Accessibility	3.4.1	FIO												
			Evaluation														
			SD-10 Operation and Maintenance														
			Data														
			Maintenance Instruction	3.4.3	FIO												
		02921a	SD-03 Product Data														
			Equipment		G A/E												
			Surface Erosion Control Material	2.8	G A/E												
			Delivery	1.4.1	G A/E												
			Topsoil	2.2	G A/E												
			Seed Establishment Period	3.9	G A/E												
			Maintenance Record	3.9.3.5	G A/E												
			Application of Pesticide	3.6	G A/E												
			SD-06 Test Reports														

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TITLE AND LOCATION						CONTRACTOR											
Wheatley Elementary School Modernization and Addition																	
ACTIVITY NO	TRANSMITTAL NO	SPEC SECT	DESCRIPTION ITEM SUBMITTED	PARAGRAPH #	GOVT CLASSIFICATION REVIEWER	CONTRACTOR: SCHEDULE DATES			CONTRACTOR ACTION		APPROVING AUTHORITY				MAILED TO CONTR/ DATE RCD FRM APPR AUTH	REMARKS	
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(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)	(q)	(r)
		02921a	Soil Test	3.1.4	FIO												
			SD-07 Certificates														
			Seed	2.1	FIO												
			Topsoil	2.2	FIO												
			pH Adjuster	2.3.1	FIO												
			Fertilizer	2.3.2	FIO												
			Organic Material	2.3.3	FIO												
			Soil Conditioner	2.3.4	FIO												
			Mulch	2.4	FIO												
			Asphalt Adhesive	2.5	FIO												
			Pesticide	2.7	FIO												
		02922a	SD-03 Product Data														
			Delivery	1.4.1	FIO												
			Finished Grade and Topsoil	3.2.1	FIO												
			Topsoil	2.2	FIO												
			Sod Establishment Period	3.9	FIO												
			Maintenance Record	3.9.3.5	FIO												
			Application of Pesticide	3.6	FIO												
			SD-06 Test Reports														
			Soil Test	3.1.4	FIO												
			SD-07 Certificates														
			Sod	2.1	FIO												
			Topsoil	2.2	FIO												
			pH Adjuster	2.3.1	FIO												
			Fertilizer	2.3.2	FIO												
			Organic Material	2.3.4	FIO												

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		02922a	Soil Conditioner	2.3.5	FIO												
			Pesticide	2.5	G A/E												
		02930a	SD-03 Product Data														
			Delivery	1.4.1	FIO												
			Plant Establishment Period	3.9	FIO												
			Maintenance Record	3.9.2.6	FIO												
			Application of Pesticide	3.7	FIO												
			SD-04 Samples														
			Delivered Topsoil	1.4.1.3	FIO												
			SD-06 Test Reports														
			Soil Test	3.1.4.2	FIO												
			Percolation Test	3.1.4.1	FIO												
			SD-07 Certificates														
			Plant Material	2.1	FIO												
			Topsoil	2.2	FIO												
			pH Adjuster	2.3.1	FIO												
			Fertilizer	2.3.2	FIO												
			Organic Material	2.3.3	FIO												
			Soil Conditioner	2.3.4	FIO												
			Organic Mulch		FIO												
			Mycorrhizal Fungi Inoculum	2.12	FIO												
			Pesticide	2.14	FIO												
			SD-10 Operation and Maintenance Data														
			Maintenance Instructions	3.9.5	FIO												
		03100a	SD-02 Shop Drawings														

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		03100a	Formwork	3.1.1	G A/E												
			SD-03 Product Data														
			Design	1.3	FIO												
			Form Materials	2.1	FIO												
			Form Releasing Agents	2.1.7	FIO												
			SD-04 Samples														
			Fiber Voids	2.1.8	FIO												
			SD-07 Certificates														
			Fiber Voids	2.1.8	FIO												
		03131	SD-02 Shop Drawings														
			Fabrication Drawings	1.7	G A/E												
			Installation Drawings	1.7	G A/E												
			SD-03 Product Data														
			Steel Sheets	2.1	FIO												
			Steel Sheets	2.1	FIO												
			Steel Sheets	2.2	FIO												
			Welding Electrodes	2.3	FIO												
			Galvanizing Repair Coating	2.4	FIO												
			Flexible Closure Strips	2.5	FIO												
			Flexible Closure Strips	2.5	FIO												
			Flexible Closure Strips	3.8	FIO												
			Metal Form Units	1.5	FIO												
			Metal Form Units	1.7	FIO												
			Metal Form Units	2.6.1	FIO												
			Metal Form Units	3.1	FIO												
			Metal Form Units	3.3	FIO												

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		03131	Metal Form Units	3.4	FIO												
			Metal Form Units	3.5	FIO												
			Metal Form Units	3.6	FIO												
			Metal Closure Strips	2.6.2	FIO												
			SD-04 Samples														
			Flexible Closure Strips	2.5	FIO												
			Flexible Closure Strips	2.5	FIO												
			Flexible Closure Strips	3.8	FIO												
			SD-08 Manufacturer's Instructions														
			Metal Form Units	1.5	FIO												
			Metal Form Units	1.7	FIO												
			Metal Form Units	2.6.1	FIO												
			Metal Form Units	3.1	FIO												
			Metal Form Units	3.3	FIO												
			Metal Form Units	3.4	FIO												
			Metal Form Units	3.5	FIO												
			Metal Form Units	3.6	FIO												
			Accessories	3.1	FIO												
			SD-07 Certificates														
			Welding Procedures	3.2	FIO												
			Welder Qualifications		FIO												
			Galvanizing Repair Coating	2.4	FIO												
			Flexible Closure Strips	2.5	FIO												
			Flexible Closure Strips	2.5	FIO												
			Flexible Closure Strips	3.8	FIO												
			Steel Sheets	2.1	FIO												

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		03131	Steel Sheets	2.1	FIO												
			Steel Sheets	2.2	FIO												
			Welding Electrodes	2.3	FIO												
		03300	SD-03 Product Data														
			Mixture Proportions	1.7	FIO												
			Dry Shake Finish		FIO												
			SD-06 Test Reports														
			Testing and Inspection for Contractor Quality Control	3.14	FIO												
			SD-07 Certificates														
			Qualifications	1.4	FIO												
		03413A	SD-02 Shop Drawings														
			Architectural Concrete System		G A/E												
			SD-03 Product Data														
			Calculations	1.4.5	G A/E												
			Mix Design		G A/E												
			Manufacturer's Qualifications		G A/E												
			SD-04 Samples														
			Precast Concrete Units	2.2	G A/E												
			SD-06 Test Reports														
			Materials	2.1	FIO												
		03900	SD-01 Preconstruction Submittals														
			Existing Conditions	1.4	FIO												
			SD-03 Product Data														
			Restoration and Cleaning	2.1	G A/E												
			Materials														

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		03900	SD-07 Certificates														
			A List of Product Installations	1.5	FIO												
			Restoration and Cleaning	2.1	FIO												
			Materials														
			SD-08 Manufacturer's Instructions														
			Surface Preparation	3.1	FIO												
			Patching	3.2	G A/E												
		04200	SD-02 Shop Drawings														
			Masonry Work		G A/E												
			SD-03 Product Data														
			Clay or Shale Brick	2.2	FIO												
			Concrete Brick	2.3	FIO												
			Insulation	2.14	FIO												
			Flashing	2.16	FIO												
			Water-Repellant Admixture	2.8	FIO												
			Cold Weather Installation	3.1.2	FIO												
			SD-04 Samples														
			Concrete Masonry Units (CMU)	2.4	G A/E												
			Concrete Brick	2.3	G A/E												
			Stone Items		G A/E												
			Clay or Shale Brick	2.2	G A/E												
			Anchors, Ties, and Bar	2.10	G A/E												
			Positioners														
			Expansion-Joint Materials	2.15	G A/E												
			Joint Reinforcement	2.11	G A/E												
			Insulation	2.14	G A/E												

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		04200	Portable Panel	1.3	G A/E												
			SD-05 Design Data														
			Pre-mixed Mortar	2.7.5	G A/E												
			Unit Strength Method	1.5.2	G A/E												
			SD-06 Test Reports														
			Efflorescence Test	3.23.3	FIO												
			Field Testing of Mortar	3.23.1	FIO												
			Field Testing of Grout	3.23.2	FIO												
			Prism tests	3.23.4	FIO												
			Masonry Cement	2.7.4	FIO												
			Fire-rated CMU	2.4.3	FIO												
			Special Inspection	1.5.1	FIO												
			SD-07 Certificates														
			Clay or Shale Brick	2.2	FIO												
			Concrete Brick	2.3	FIO												
			Concrete Masonry Units (CMU)	2.4	FIO												
			Control Joint Keys	2.13	FIO												
			Anchors, Ties, and Bar Positioners	2.10	FIO												
			Expansion-Joint Materials	2.15	FIO												
			Joint Reinforcement	2.11	FIO												
			Reinforcing Steel Bars and Rods	2.12	FIO												
			Masonry Cement	2.7.4	FIO												
			Mortar Coloring	2.7.2	FIO												
			Insulation	2.14	FIO												
			Insulation	2.14	FIO												

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		04200	Precast Concrete Items	2.5	FIO												
			Admixtures for Masonry Mortar	2.7.1	FIO												
			Admixtures for Grout	2.9.1	FIO												
			SD-08 Manufacturer's Instructions														
			Masonry Cement	2.7.4	FIO												
		05120	SD-02 Shop Drawings														
			Erection drawings		G A/E												
			Fabrication drawings	1.6.1	G A/E												
			SD-03 Product Data														
			Shop primer	2.4	FIO												
			Load indicator washers		FIO												
			SD-06 Test Reports														
			Class B coating	2.4	FIO												
			Bolts, nuts, and washers	2.2	FIO												
			SD-07 Certificates														
			Steel	2.1	FIO												
			Bolts, nuts, and washers	2.2	FIO												
			Shop primer	2.4	FIO												
			Welding electrodes and rods	2.3.1	FIO												
			Nonshrink grout	2.3.2	FIO												
			Galvanizing	2.5	FIO												
			AISC Quality Certification	1.5	FIO												
			Overhead, top running crane rail beam	1.6.2.1	FIO												
			Welding procedures and qualifications	1.6.2.3	FIO												

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		05210a	SD-02 Shop Drawings														
			Steel Joists	1.3	G A/E												
			SD-07 Certificates														
			Steel Joists	1.3	FIO												
		05300a	SD-02 Shop Drawings														
			Deck Units	2.1	G A/E												
			Accessories	2.5	G A/E												
			Attachments	3.2	G A/E												
			Holes and Openings	3.3	G A/E												
			SD-03 Product Data														
			Deck Units	2.1	FIO												
			Attachments	3.2	FIO												
			SD-07 Certificates														
			Deck Units	2.1	FIO												
			Attachments	3.2	FIO												
		05500A	SD-02 Shop Drawings														
			Miscellaneous Metal Items	1.6	G A/E												
			SD-04 Samples														
			Miscellaneous Metal Items	1.6	G A/E												
		05510	SD-02 Shop Drawings														
			Iron and Steel Hardware	2.1	FIO												
			Steel Shapes, Plates, Bars and Strips	2.1	FIO												
			Metal Stairs	2.13	G A/E												
			Metal Stairs	2.15.1	G A/E												
			SD-03 Product Data														

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		05510	Structural Steel Plates, Shapes, and Bars	2.2	FIO												
			Structural Steel Tubing	2.3	FIO												
			Hot-Rolled Carbon Steel Sheets and Strips	2.6	FIO												
			Cold-Rolled Carbon Steel Sheets	2.7	FIO												
			Galvanized Carbon Steel Sheets	2.8	FIO												
			Cold-Drawn Steel Tubing	2.9	FIO												
			Masonry Anchorage Devices	2.11	FIO												
			Protective Coating	2.14	FIO												
			Steel Pan Stairs	2.15	G A/E												
			SD-07 Certificates														
			Welding Procedures		FIO												
			Welder Qualification		FIO												
			SD-08 Manufacturer's Instructions														
			Structural Steel Plates, Shapes, and Bars	2.2	FIO												
			Structural Steel Tubing	2.3	FIO												
			Hot-Rolled Carbon Steel Sheets and Strips	2.6	FIO												
			Cold Finished Steel Bars		FIO												
			Hot-Rolled Carbon Steel Bars		FIO												
			Cold-Rolled Carbon Steel Sheets	2.7	FIO												
			Galvanized Carbon Steel Sheets	2.8	FIO												
			Cold-Drawn Steel Tubing	2.9	FIO												
			Protective Coating	2.14	FIO												

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		05510	Masonry Anchorage Devices	2.11	FIO												
		05700	SD-01 Preconstruction Submittals														
			Existing Conditions	1.5	FIO												
			SD-02 Shop Drawings														
			Fabrication Drawings		FIO												
			Ornamental Metal Items	2.4	FIO												
			Ornamental Metal Items	2.4	FIO												
			Installation Drawings	2.4	FIO												
			Shop and Field Connections	2.4	FIO												
			Construction Details	2.4	FIO												
			SD-03 Product Data														
			Installation Materials	2.1	FIO												
			Metals for Fabrication	2.2	FIO												
			Ornamental Metal Items	2.4	G A/E												
			SD-04 Samples														
			Manufacturer's Standard Color Charts	2.4	G A/E												
			Shop Paint	2.4	G A/E												
			Finish Paint	2.4	G A/E												
			Aluminum Finishes	2.4.4	G A/E												
			Anchorage Devices and Fasteners	3.3	FIO												
			Architectural Metal Items	1.4	G A/E												
			Architectural Metal Items	2.4.4	G A/E												
			SD-06 Test Reports														
			Welding Tests		FIO												

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		05700	SD-07 Certificates														
			Welding Procedures		FIO												
			Ornamental Metal Items	2.4	FIO												
			Welder Qualifications		FIO												
			SD-08 Manufacturer's Instructions														
			Preventative Maintenance and Inspection	2.4.4	FIO												
			Cleaning Materials	2.4.4	FIO												
			Application Methods	2.4.4	FIO												
		06100a	SD-02 Shop Drawings														
			Structural Wood Members		FIO												
			Installation of Framing	3.1	FIO												
			Nailers and Nailing Strips	3.6.3	FIO												
			SD-03 Product Data														
			Structural Wood Members		FIO												
			Product Installations		FIO												
			SD-07 Certificates														
			Grading and Marking	2.1.1	FIO												
			Insulation		FIO												
		06200a	SD-02 Shop Drawings														
			Finish Carpentry		G A/E												
			SD-04 Samples														
			Moldings	2.1.6	G A/E												
			Fascias and Trim	2.1.5	G A/E												
		06650	SD-02 Shop Drawings														
			Shop Drawings		FIO												

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		06650	Installation	3.2	FIO												
			SD-03 Product Data														
			Solid polymer material	2.1	FIO												
			Qualifications	1.6	FIO												
			Fabrications	2.3	FIO												
			SD-04 Samples														
			Material	2.1	FIO												
			G/AE		FIO												
			Countertops		FIO												
			SD-06 Test Reports														
			Solid polymer material	2.1	FIO												
			SD-07 Certificates														
			Fabrications	2.3	FIO												
			Qualifications	1.6	FIO												
			SD-10 Operation and Maintenance														
			Data														
			Solid polymer material	2.1	FIO												
			Celean-up		FIO												
		07110a	SD-07 Certificates														
			Materials		FIO												
		07131	SD-03 Product Data														
			Elastomeric waterproofing sheet	2.1	FIO												
			material														
			Protection board	2.5	FIO												
			Primers, adhesives, and mastics	2.1	FIO												
			SD-06 Test Reports														

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		07131	Elastomeric waterproofing sheet material	2.1	FIO												
		07210	SD-03 Product Data														
			Glass Fiber Insulation Board		FIO												
			Batts and Rolls	2.1.1.1	FIO												
			Rigid Polystyrene Board	2.1.4	FIO												
			Vapor Barrier	2.1.5	FIO												
			Vapor Barrier Tape	2.1.6	FIO												
			Water-Vapor Barrier Subgrade	2.1.7	FIO												
			Covers														
			Fasteners	2.2.1	FIO												
			Adhesive	2.2.2	FIO												
			Staples	2.2.3	FIO												
			Vapor-Barrier Adhesive	2.2.4	FIO												
			Spray On Acoustical Treatment		FIO												
			Acoustical Ceiling Tiles		FIO												
			Acoustical Wall and Ceiling		FIO												
			Panels														
			SD-04 Samples														
			Glass-Fiber Insulation Board		G A/E												
			Mineral Fiber Batts		G A/E												
			Vapor-Barrier	2.1.5	G A/E												
			Vapor Barrier Tape	2.1.6	FIO												
			Water-Vapor Barrier Subgrade	2.1.7	FIO												
			Covers														
			Rigid Polystyrene Board	2.1.4	FIO												

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		07210	Fasteners	2.2.1	FIO												
			Adhesive	2.2.2	FIO												
			Spray On Acoustical Treatment		FIO												
			Acoustical Ceiling Tiles		FIO												
			Acoustical Wall and Ceiling Panels		FIO												
			SD-06 Test Reports														
			Test Reports	3.8	FIO												
			SD-07 Certificates														
			Glass Fiber Insulation Board		FIO												
			Rigid Polystyrene Board	2.1.4	FIO												
			Vapor Barrier	2.1.5	FIO												
			Vapor Barrier Tape	2.1.6	FIO												
			Water-Vapor Barrier Subgrade Covers	2.1.7	FIO												
			Staples	2.2.3	FIO												
			Spray On Acoustical Treatment		FIO												
			Acoustical Ceiling Tiles		FIO												
			Acoustical Wall and Ceiling Panels		FIO												
			SD-08 Manufacturer's Instructions														
			Fasteners	2.2.1	FIO												
			Vapor-Barrier Adhesive	2.2.4	FIO												
			Exterior Insulation and Finish System		FIO												
			Spray On Acoustical Treatment		FIO												

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		07210	Acoustical Ceiling Tiles		FIO												
			Acoustical Wall and Ceiling Panels		FIO												
		07220	SD-03 Product Data														
			Thermal Insulation Materials	2.1	FIO												
			Vapor Barrier	2.2	FIO												
			Fastening Materials	2.3	FIO												
			Bituminous Plastic Cement		FIO												
			Asphalt-Base Emulsion		FIO												
			SD-04 Samples														
			Fasteners	2.3.2	FIO												
			Adhesives	2.3.1	FIO												
			Vapor Barrier	2.2	FIO												
			Insulation		FIO												
			SD-06 Test Reports														
			Vapor Barrier	2.2	FIO												
			SD-07 Certificates														
			Fiberboard Roof Insulation		FIO												
			Polyisocyanurate Roof Insulation		FIO												
			SD-08 Manufacturer's Instructions														
			Vapor Barrier	2.2	FIO												
			Roof Insulation	3.1	FIO												
		07240	SD-02 Shop Drawings														
			Shop drawings	3.3	G A/E												
			SD-03 Product Data														
			Thermal insulation	2.6	FIO												

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		07240	Accessories	2.12	FIO												
			Base coat	2.7	FIO												
			Portland cement	2.8	FIO												
			Reinforcing fabric	2.9	FIO												
			Finish coat	2.10	FIO												
			Joint Sealant	2.13	FIO												
			Primer	2.11	FIO												
			Bond breaker	2.14	FIO												
			Backer Rod	2.15	FIO												
			Insulation Board	1.4.4	FIO												
			Warranty	1.7	FIO												
			SD-04 Samples														
			Sample Boards	1.2.3.7	G A/E												
			SD-06 Test Reports														
			Abrasion resistance	1.2.3.1	FIO												
			Accelerated weathering	1.2.3.2	FIO												
			Impact resistance	1.2.2.3	FIO												
			Mildew resistance	1.2.3.3	FIO												
			Salt spray resistance	1.2.3.4	FIO												
			Water vapor transmission		FIO												
			Absorption-freeze-thaw	1.2.3.6	FIO												
			Flame spread		FIO												
			Surface Burning Characteristics	1.2.2.1	FIO												
			Radiant heat	1.2.2.2	FIO												
			substrate	3.1	FIO												
			SD-07 Certificates														

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		07240	Qualifications of EIFS Manufacturer	1.4.1	FIO												
			Qualification of EIFS Installer	1.4.2	FIO												
			Qualification of Sealant Applicator	1.4.3	FIO												
			Qualifications of Third Party Inspector		FIO												
			Inspection Check List	3.5.2	FIO												
			SD-08 Manufacturer's Instructions Installation	3.3	FIO												
			SD-10 Operation and Maintenance Data														
			EIFS	1.7	FIO												
		07412A	SD-02 Shop Drawings														
			Metal Roofing	1.7.1	G A/E												
			SD-04 Samples														
			Accessories	2.2	G A/E												
			Roof Panels	2.1	G A/E												
			Fasteners	2.3	G A/E												
			Gaskets and Insulating Compounds	2.9	G A/E												
			Sealant	2.8	G A/E												
			SD-07 Certificates														
			Roof Panels	2.1	FIO												
			Installation	3.1	FIO												
			Accessories	2.2	FIO												
			Insulation	2.6	FIO												

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		07412A	Installer	1.3.3	FIO												
			Warranties	1.7	FIO												
		07413a	SD-02 Shop Drawings														
			Siding	2.1	FIO												
			SD-04 Samples														
			Accessories	2.3	FIO												
			Siding	2.1	FIO												
			Fasteners	2.4	FIO												
			Insulation	2.5	FIO												
			Gaskets and Insulating Compounds	2.8	FIO												
			Sealant	2.7	FIO												
			Wall Liners		FIO												
			SD-07 Certificates														
			Siding	2.1	FIO												
			Installation	3.1	FIO												
			Accessories	2.3	FIO												
			Insulation	2.5	FIO												
		07511	SD-03 Product Data														
			Asphalt Primer	2.2	FIO												
			Base Sheets	2.3	FIO												
			Roofing Felts	2.4	FIO												
			Cap Sheets	2.5	FIO												
			Sheathing Paper	2.6	FIO												
			Bituminous Plastic Cement	2.7	FIO												
			Fasteners		FIO												

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		07511	Aggregate Surfacing	2.9	FIO												
			Roof Walkways	2.10	FIO												
			Adhesive	2.1	FIO												
			Asphalt Base Emulsion	2.11	FIO												
			SD-07 Certificates														
			Adhesive	2.1	FIO												
		07600a	SD-02 Shop Drawings														
			Materials	2.1	FIO												
		07810	SD-03 Product Data														
			Fireproofing Material	3.3	FIO												
			SD-06 Test Reports														
			Fire Resistance Rating	1.7	FIO												
			Field Tests	3.5	FIO												
			SD-07 Certificates														
			Installer Qualifications	1.5	FIO												
			Surface Preparation Report	3.1	FIO												
			Manufacturer's Inspection Report	3.5.4	FIO												
		08110	SD-02 Shop Drawings														
			Doors	2.1	G A/E												
			Frames	2.6	G A/E												
			Accessories	2.4	FIO												
			SD-03 Product Data														
			Doors	2.1	G A/E												
			Frames	2.6	G A/E												
			Accessories	2.4	FIO												
			SD-04 Samples														

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		08110	Factory-applied enamel finish		G A/E												
		08120	SD-02 Shop Drawings														
			Doors and frames	2.1	G A/E												
			SD-08 Manufacturer's Instructions														
			Doors and frames	2.1	FIO												
		08210	SD-02 Shop Drawings														
			Doors	2.1	FIO												
			SD-03 Product Data														
			Doors	2.1	FIO												
			Accessories		FIO												
			Water-resistant sealer	2.3.6	FIO												
			warranty	1.4	FIO												
			Sound transmission class rating	2.1.5	FIO												
			Fire resistance rating	2.1.6	FIO												
			SD-04 Samples														
			Doors	2.1	FIO												
			Door finish colors	2.3.5.4	FIO												
			SD-06 Test Reports														
			Split resistance	2.4	FIO												
			Cycle-slam	2.4	FIO												
			Hinge loading resistance	2.4	FIO												
		08330a	SD-02 Shop Drawings														
			Approved Detail Drawings	3.1	G A/E												
			Installation	3.1	G A/E												
			SD-03 Product Data														
			Overhead Rolling Doors	2.1	G A/E												

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		08330a	SD-06 Test Reports														
			Tests	3.3	FIO												
			SD-04 Samples														
			Overhead Rolling Doors	2.1	G A/E												
			SD-07 Certificates														
			Fire Doors		FIO												
			SD-10 Operation and Maintenance														
			Data														
			Operation and Maintenance	1.6	FIO												
			Manuals														
		08520a	SD-02 Shop Drawings														
			Aluminum Windows		G A/E												
			Insect Screens		G A/E												
			SD-03 Product Data														
			Aluminum Windows		G A/E												
			SD-04 Samples														
			Aluminum Windows		G A/E												
			SD-06 Test Reports														
			Aluminum Windows		FIO												
			SD-07 Certificates														
			Aluminum Windows		FIO												
		08550	SD-02 Shop Drawings														
			Wood windows	2.1	FIO												
			SD-03 Product Data														
			Wood windows	2.1	FIO												
			SD-08 Manufacturer's Instructions														

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		08550	Wood windows	2.1	FIO												
			SD-10 Operation and Maintenance Data														
			Wood windows	2.1	FIO												
		08600	SD-02 Shop Drawings														
			Shop Drawings	3.2	FIO												
			SD-03 Product Data														
			Skylights		FIO												
			Warranty	1.6	FIO												
			SD-06 Test Reports														
			Test Reports		FIO												
			SD-07 Certificates														
			Skylights		FIO												
			Qualifications	1.4	FIO												
		08710	SD-02 Shop Drawings														
			Hardware schedule	1.3	G A/E												
			Keying system	2.3.7	FIO												
			SD-03 Product Data														
			Hardware items	2.3	G A/E												
			SD-08 Manufacturer's Instructions														
			Installation	3.1	FIO												
			SD-10 Operation and Maintenance Data														
			Hardware Schedule	1.3	G A/E												
			SD-11 Closeout Submittals														
			Key biting	1.4	FIO												

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		08810a	SD-02 Shop Drawings														
			Installation	3.2	G A/E												
			SD-03 Product Data														
			Insulating Glass	2.3	G A/E												
			Glazing Accessories	2.6	FIO												
			A/E		FIO												
			SD-04 Samples														
			Insulating Glass	2.3	G A/E												
			SD-07 Certificates														
			Insulating Glass	2.3	FIO												
		09250	SD-03 Product Data														
			Cementitious backer units	2.1.7	FIO												
			Glass Mat Water-Resistant	2.1.4	FIO												
			Gypsum Tile Backing Board														
			Water-Resistant Gypsum Backing Board	2.1.3	FIO												
			Glass Mat Covered or Reinforced	2.1.5	FIO												
			Gypsum Sheathing														
			Glass Mat Covered or Reinforced	2.1.5.1	FIO												
			Gypsum Sheathing Sealant														
			Impact Resistant Gypsum Board	2.1.6	FIO												
			Accessories	2.1.13	FIO												
			SD-04 Samples														
			Predecorated gypsum board		FIO												
			SD-07 Certificates														
			Asbestos Free Materials	2.1	FIO												

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		09310	SD-03 Product Data														
			Tile	2.1	FIO												
			Setting-Bed	2.2	FIO												
			Mortar, Grout, and Adhesive	2.4	FIO												
			SD-04 Samples														
			Tile	2.1	FIO												
			Accessories	2.1.7	FIO												
			Marble Thresholds	2.5	FIO												
			SD-06 Test Reports														
			Testing	3.7	FIO												
			SD-07 Certificates														
			Tile	2.1	FIO												
			Mortar, Grout, and Adhesive	2.4	FIO												
		09510	SD-02 Shop Drawings														
			Approved Detail Drawings	1.3	FIO												
			SD-03 Product Data														
			Acoustical Ceiling Systems		FIO												
			SD-04 Samples														
			Acoustical Units	2.1	FIO												
			SD-06 Test Reports														
			Fire Resistive Ceilings		FIO												
			Ceiling Attenuation Class and Test		FIO												
			SD-07 Certificates														
			Acoustical Units	2.1	FIO												
		09640A	SD-03 Product Data														

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		09640A	Installation	3.2	FIO												
			SD-04 Samples														
			Strip Flooring	2.1	FIO												
		09650	SD-02 Shop Drawings														
			Sheet Flooring		FIO												
			Tile Flooring	2.2	FIO												
			SD-03 Product Data														
			Tile Flooring	2.2	FIO												
			Sheet Flooring		FIO												
			Accessories for Sheet Vinyl		FIO												
			Integral Coved Base		FIO												
			Adhesive for Sheet Vinyl		FIO												
			Adhesive for Vinyl Composition	2.2.4	FIO												
			Tile														
			Adhesive for Wall Base	2.2.5	FIO												
			SD-04 Samples														
			Tile Flooring	2.2	FIO												
			Sheet Flooring		FIO												
			Seaming Bead		FIO												
			Wall Base	2.4	FIO												
			SD-06 Test Reports														
			Moisture Test	3.3	FIO												
			SD-08 Manufacturer's Instructions														
			Sheet Flooring		FIO												
			Tile Flooring	2.2	FIO												

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		09650	SD-10 Operation and Maintenance Data														
			Data Package 1		FIO												
		09675	SD-02 Shop Drawings														
			Fabrication Drawings	1.4.3	FIO												
			SD-03 Product Data														
			Epoxy-Resin Binder/Matrix	2.1.1	FIO												
			Cured Epoxy Binder	2.1.2	FIO												
			Walnut Shell Aggregate	2.1.3	FIO												
			Surface Sealing Coat	2.1.4	FIO												
			SD-04 Samples														
			Hardboard or Transite Panels	1.4.2	FIO												
			SD-05 Design Data														
			Epoxy-Resin Binder/Matrix	2.1.1	FIO												
			Cured Epoxy Binder	2.1.2	FIO												
			Surface Sealing Coat	2.1.4	FIO												
			SD-06 Test Reports														
			Records of Inspection	1.4	FIO												
			SD-07 Certificates														
			Listing of Product Installations	1.4.1	FIO												
			Epoxy-Resin Binder/Matrix	2.1.1	FIO												
			Cured Epoxy Binder	2.1.2	FIO												
			Walnut Shell Aggregate	2.1.3	FIO												
			Surface Sealing Coat	2.1.4	FIO												
		09680A	SD-02 Shop Drawings														
			Installation	3.4	FIO												

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		09680A	Molding	2.3	FIO												
			SD-03 Product Data														
			Carpet		FIO												
			Surface Preparation	3.1	FIO												
			Installation	3.4	FIO												
			Regulatory Requirements	1.3	FIO												
			SD-04 Samples														
			Carpet		FIO												
			Molding	2.3	FIO												
			SD-06 Test Reports														
			Moisture and Alkalinity Tests	3.2	FIO												
			SD-07 Certificates														
			Carpet		FIO												
			Regulatory Requirements	1.3	FIO												
			SD-10 Operation and Maintenance														
			Data														
			Carpet		FIO												
			Cleaning and Protection	3.5	FIO												
		09900	SD-02 Shop Drawings														
			Piping identification	3.10	FIO												
			stencil	3.10	FIO												
			SD-03 Product Data														
			Coating	2.1	FIO												
			Manufacturer's Technical Data	2.1	FIO												
			Sheets														
			Sealant		FIO												

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		09900	SD-04 Samples														
			Color		FIO												
			SD-07 Certificates														
			Applicator's qualifications	1.3	FIO												
			Qualification Testing	1.4.1.2	FIO												
			SD-08 Manufacturer's Instructions														
			Application instructions		FIO												
			Mixing	3.6.2	FIO												
			Manufacturer's Material Safety	1.7.2	FIO												
			Data Sheets														
			SD-10 Operation and Maintenance														
			Data														
			Coatings:	2.1	FIO												
		10100A	SD-03 Product Data														
			Visual Display Boards		FIO												
			Video Projection System		FIO												
			SD-04 Samples														
			Aluminum	2.2.3	FIO												
			Porcelain Enamel	2.2.1	FIO												
			Materials	2.2	FIO												
			SD-06 Test Reports														
			07 Certificates		FIO												
			Visual Display Boards		FIO												
		10110	SD-03 Product Data														
			Theatre Rigging		G A/E												
			Theatre Lighting System		G G												

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		10110	Sound System		G G												
			07 Certificates		FIO												
		10165	SD-02 Shop Drawings														
			Partitions	3.2	FIO												
			Urinal Screens	3.3.2	FIO												
			Installation Drawings	3.1	FIO												
			SD-03 Product Data														
			Fabric		FIO												
			Core		FIO												
			Adhesive	2.3	FIO												
			Pilasters, Supports, and Hangers	2.4	FIO												
			Anchoring Devices and Fasteners	2.5	FIO												
			Hardware and Fittings	2.6	FIO												
			Brackets	2.7	FIO												
			SD-04 Samples														
			Hardware and Fittings	2.6	FIO												
			Hardware and Fittings	2.6	FIO												
			Anchoring Devices and Fasteners	2.5	FIO												
			Panels	3.1	FIO												
			Fabric		FIO												
			Partitions	3.2	FIO												
			Screens	3.3	FIO												
			SD-07 Certificates														
			Certification	1.5	FIO												
		10430	SD-02 Shop Drawings														
			Approved Detail Drawings	3.1	FIO												

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		10430	SD-03 Product Data														
			Modular Exterior Signage System		FIO												
			Installation	3.1	FIO												
			Exterior Signs		FIO												
			Wind Load Requirements	1.3	FIO												
			SD-04 Samples														
			Exterior Signs		FIO												
			SD-10 Operation and Maintenance														
			Data														
			Protection and Cleaning	3.1.2	FIO												
		10440	SD-02 Shop Drawings														
			Detail Drawings	3.1	FIO												
			SD-03 Product Data														
			Installation	3.1	FIO												
			SD-04 Samples														
			Interior Signage	1.3	FIO												
			SD-10 Operation and Maintenance														
			Data														
			Approved Manufacturer's	3.1	FIO												
			Instructions														
			Protection and Cleaning	3.1.2	FIO												
		10505N	SD-02 Shop Drawings														
			Types	2.1	G A/E												
			Location	2.1	G A/E												
			Installation	3.1	FIO												
			Numbering system	3.2	FIO												

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		10505N	SD-03 Product Data														
			Material	2.2	FIO												
			Finish	2.2.3	FIO												
			components	2.3	FIO												
			Assembly	3.1	FIO												
			SD-04 Samples														
			Color chips	1.5.1	G A/E												
		10523	SD-02 Shop Drawings														
			Fire Extinguishers	2.1	FIO												
			Fire Extinguishers	3.1	FIO												
			Adjuncts	2.4	FIO												
			Cabinets	2.5	FIO												
			Wall Brackets	2.6	FIO												
			SD-03 Product Data														
			Fire Extinguishers	2.1	FIO												
			Fire Extinguishers	3.1	FIO												
			Adjuncts	2.4	FIO												
			Cabinets	2.5	FIO												
			Wall Brackets	2.6	FIO												
			Replacement Parts	3.2.1	FIO												
			SD-04 Samples														
			Fire Extinguishers	2.1	FIO												
			Fire Extinguishers	3.1	FIO												
			Cabinets	2.5	FIO												
			Wall Brackets	2.6	FIO												
			Accessories	2.6	FIO												

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		10523	SD-07 Certificates														
			Fire Extinguishers	2.1	FIO												
			Fire Extinguishers	2.1	FIO												
			Fire Extinguishers	2.1	FIO												
			Fire Extinguishers	3.1	FIO												
			Fire Extinguishers	3.1	FIO												
			Fire Extinguishers	3.1	FIO												
		10650A	SD-02 Shop Drawings														
			Operable Partitions	2.2	FIO												
			SD-03 Product Data														
			Operable Partitions	2.2	FIO												
			SD-04 Samples														
			Operable Partitions	2.2	G A/E												
			SD-07 Certificates														
			Materials	2.1	FIO												
			Operable Partitions	2.2	FIO												
			SD-10 Operation and Maintenance														
			Data														
			Operable Partitions	2.2	FIO												
		10800	SD-03 Product Data														
			Finishes	2.1.2	FIO												
			Accessory Items	2.2	FIO												
			SD-04 Samples														
			Finishes	2.1.2	FIO												
			Accessory Items	2.2	FIO												
			SD-07 Certificates														

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		10800	Accessory Items	2.2	FIO												
		11165	SD-02 Shop Drawings														
			Dock Bumpers	2.1	FIO												
			SD-07 Certificates														
			Fastening Materials	2.2	FIO												
			Rubberized Fabric	2.1	FIO												
			Steel Angles	2.2	FIO												
			Hardware Items	2.3	FIO												
			SD-04 Samples														
			Fastening Materials	2.2	FIO												
			Angles	2.2	FIO												
			Rods	2.2	FIO												
			Nuts	2.2	FIO												
			Loading Dock Bumpers	3.1	FIO												
			Dock Bumpers	2.1	FIO												
			Rubber	2.1	FIO												
		11400A	SD-02 Shop Drawings														
			Food Service Equipment	2.1.6	FIO												
			Installation	3.1	FIO												
			SD-03 Product Data														
			Food Service Equipment	2.1.6	FIO												
			SD-06 Test Reports														
			Testing	3.3	FIO												
			SD-10 Operation and Maintenance														
			Data														
			Laundry Equipment		FIO												

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		11400A	Food Service Equipment	2.1.6	FIO												
		11480	SD-01 Preconstruction Submittals														
			Manufacturer's Equipment		FIO												
			Material, Equipment, and Fixture Lists	1.2	FIO												
			SD-02 Shop Drawings														
			Manufacturer's Equipment		FIO												
			Material, Equipment, and Fixtures		FIO												
		12320A	SD-02 Shop Drawings														
			Installation	3.1	G A/E												
			SD-03 Product Data														
			Cabinets	2.1	G A/E												
			Countertops and Backsplash	2.2	G A/D												
			SD-04 Samples														
			Cabinets	2.1	G A/E												
			Countertops and Backsplash	2.2	G A/E												
			SD-06 Test Reports														
			Cabinets and Countertops		FIO												
		12485	SD-04 Samples														
			Entrance Mats		FIO												
		12495	SD-02 Shop Drawings														
			Venetian Blinds		FIO												
			Window Shades		FIO												
			SD-04 Samples														
			Venetian Blinds		FIO												
			Window Shades		FIO												

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		12495	SD-07 Certificates														
			Venetian Blinds		FIO												
			Window Shades		FIO												
		13100A	SD-02 Shop Drawings														
			Drawings		FIO												
			SD-07 Certificates														
			Materials	2.1	FIO												
		13110A	SD-02 Shop Drawings														
			Drawings	1.3.9	FIO												
			Contractor's Modifications	1.3.2	FIO												
			SD-03 Product Data														
			Equipment		FIO												
			Spare Parts	3.9	FIO												
			SD-06 Test Reports														
			Tests and Measurements	3.5	FIO												
			Contractor's Modifications	1.3.2	FIO												
			SD-07 Certificates														
			Cathodic Protection System		FIO												
			Services of 'Corrosion Expert'	1.3.1	FIO												
			SD-10 Operation and Maintenance														
			Data														
			Cathodic Protection System		FIO												
			Training Course	3.6	FIO												
		13851	SD-02 Shop Drawings														
			Fire Alarm Reporting System	1.4.1	G A/E												
			SD-03 Product Data														

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		13851	Storage Batteries	2.2	FIO												
			Voltage Drop		FIO												
			Special Tools and Spare Parts	2.7.4	FIO												
			Technical Data and Computer Software	1.5	FIO												
			Training	3.6	FIO												
			Testing	3.5	FIO												
			SD-06 Test Reports														
			Testing	3.5	FIO												
			SD-07 Certificates														
			Equipment		FIO												
			Qualifications	1.3.7	FIO												
			SD-10 Operation and Maintenance Data														
			Technical Data and Computer Software	1.5	FIO												
		13930	SD-02 Shop Drawings														
			Sprinkler System Shop Drawings		FIO												
			As-Built Shop Drawings		G A/E												
			SD-03 Product Data														
			Fire Protection Related Submittals	3.1	FIO												
			Load Calculations for Sizing Sway Bracing		FIO												
			Components and Equipment Data		FIO												
			Hydraulic Calculations	1.7	FIO												
			Spare Parts		FIO												

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ACTIVITY NO	TRANSMITTAL NO	SPEC SECT	DESCRIPTION ITEM SUBMITTED	PARAGRAPH #	GOVT CLASSIFICATION REV NO	CONTRACTOR: SCHEDULE DATES			CONTRACTOR ACTION		APPROVING AUTHORITY				MAILED TO CONTR/ DATE RCD FRM APPR AUTH	REMARKS	
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		13930	Preliminary Tests Procedures		FIO												
			Final Acceptance Test Procedures		G A/E												
			On-site Training Schedule		G A/E												
			Preliminary Tests	3.9	G A/E												
			Final Acceptance Test		G A/E												
			Fire Protection Specialist Qualifications		G A/E												
			Sprinkler System Installer Qualifications	1.9	G A/E												
			SD-06 Test Reports														
			Preliminary Tests Report		FIO												
			Final Acceptance Test Report		FIO												
			SD-07 Certificates														
			Fire Protection Specialist Inspection		FIO												
			SD-10 Operation and Maintenance Data														
			Wet Pipe Sprinkler System		FIO												
		14240	SD-02 Shop Drawings														
			Detail Drawings	1.3	FIO												
			SD-03 Product Data														
			Passenger Elevators	2.1	G A/E												
			Freight Elevators		G A/E												
			Field Quality Control	3.2	G A/E												
			Logic Control	2.4.1	G A/E												
			SD-05 Design Data														

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		14240	Reaction Loads	1.3	G A/E												
			Heat Loads	1.3	G A/E												
			SD-06 Test Reports														
			Field Tests Reports	3.2.2	FIO												
			SD-07 Certificates														
			Qualifications	1.4	FIO												
			SD-10 Operation and Maintenance														
			Data														
			Operation and Maintenance	3.3	G A/E												
			Manuals														
			Maintenance and Diagnostic	1.5.3	G A/E												
			Tools														
			Maintenance and Repair Action	1.6	G A/E												
			Plan														
			Operation and Maintenance	3.3	G A/E												
			Training														
		15080	SD-04 Samples														
			Thermal Insulation Materials		FIO												
		15081	SD-03 Product Data														
			Insulation FIO		FIO												
			Jacket FIO		FIO												
			SD-08 Manufacturer's Instructions														
			field-applied insulation	1.2	FIO												
		15181	SD-02 Shop Drawings														
			Piping System	2.4	FIO												
			SD-03 Product Data														

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		15181	Piping System	2.4	FIO												
			Water Treatment Systems	2.12	FIO												
			Spare Parts		FIO												
			Qualifications	1.3	FIO												
			Field Tests	3.3	FIO												
			Demonstrations	3.4	FIO												
			Verification of Dimensions	1.6.1	FIO												
			SD-06 Test Reports														
			Field Tests	3.3	FIO												
			Condenser Water Quality Tests	3.3.3	FIO												
			One-Year Inspection	3.5	FIO												
			SD-07 Certificates														
			Service Organization	2.1	FIO												
			SD-10 Operation and Maintenance														
			Data														
			Operation Manuals		FIO												
			Maintenance Manuals	3.4	FIO												
			Water Treatment Systems	2.12	FIO												
		15182	SD-02 Shop Drawings														
			Refrigerant Piping System	2.3	G A/E												
			SD-03 Product Data														
			Refrigerant Piping System	2.3	G A/E												
			Spare Parts		FIO												
			Qualifications	1.3	FIO												
			Refrigerant Piping Tests	3.3	FIO												
			Demonstrations	3.4	FIO												

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		15182	Verification of Dimensions	1.6.1	FIO												
			SD-06 Test Reports														
			Refrigerant Piping Tests	3.3	FIO												
			SD-07 Certificates														
			Service Organization	2.1	FIO												
			SD-10 Operation and Maintenance Data														
			Operation Manuals		FIO												
			Maintenance Manuals	3.4	FIO												
		15190	SD-02 Shop Drawings														
			Gas Piping System	3.2	G A/E												
			SD-03 Product Data														
			Qualifications		FIO												
			SD-06 Test Reports														
			Pressure Tests	3.15.1	FIO												
			Test With Gas	3.15.2	FIO												
		15400	SD-02 Shop Drawings														
			Plumbing System	3.8.1	G A/E												
			SD-03 Product Data														
			Plumbing Fixture Schedule	3.9	FIO												
			SD-06 Test Reports														
			Tests, Flushing and Disinfection	3.8	FIO												
			Backflow Preventers		FIO												
			SD-07 Certificates														
			Materials and Fixtures		FIO												
			Bolts	2.1.1	FIO												

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		15400	Welding	1.5.1	FIO												
			SD-10 Operation and Maintenance Data														
			Plumbing System	3.8.1	G A/E												
		15645A	SD-03 Product Data														
			Cooling Tower	2.5	G A/E												
			Spare Parts		FIO												
			Posted Instructions	3.4	FIO												
			Performance Tests	3.3	FIO												
			Demonstrations	3.4	FIO												
			Verification of Dimensions	1.5.1	FIO												
			SD-06 Test Reports														
			Performance Tests	3.3	FIO												
			SD-07 Certificates														
			Service Organization	2.1	FIO												
			SD-10 Operation and Maintenance Data														
			Operation Manuals		FIO												
			Maintenance Manuals	3.4	FIO												
		15700	SD-02 Shop Drawings														
			Drawings		FIO												
			SD-03 Product Data														
			Unitary Equipment	2.4	FIO												
			Spare Parts Data		FIO												
			Posted Instructions	3.5	FIO												
			Verification of Dimensions	1.5.1	FIO												

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		15700	Demonstrations	3.5	FIO												
			SD-06 Test Reports														
			Refrigerant Tests, Charging, and Start-Up	3.3	FIO												
			SD-07 Certificates														
			Unitary Equipment	2.4	FIO												
			Service Organization	2.1	FIO												
			SD-10 Operation and Maintenance Data														
			Operation Manuals		FIO												
			Maintenance Manuals	3.5	FIO												
		15768	SD-02 Shop Drawings														
			Heater installation drawing		FIO												
			SD-03 Product Data														
			Electric unit heaters	2.1	FIO												
			Thermostat	2.1.6	G A/E												
			Unit thermostat		G A/E												
			SD-10 Operation and Maintenance Data														
			Electric unit heaters	2.1	FIO												
		15895	SD-02 Shop Drawings														
			Drawings		FIO												
			Installation	3.1	FIO												
			SD-03 Product Data														
			Components and Equipment	2.1	FIO												
			Test Procedures		FIO												

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		15895	Welding Procedures		FIO												
			System Diagrams		FIO												
			Testing, Adjusting and Balancing	3.2	FIO												
			Field Training	3.4	FIO												
			SD-06 Test Reports														
			Performance Tests	3.3	FIO												
			SD-10 Operation and Maintenance														
			Data														
			Operating and Maintenance	3.4	FIO												
			Instructions														
		15951	SD-02 Shop Drawings														
			HVAC Control System	3.1.1	G A/E												
			SD-03 Product Data														
			Service Organizations		FIO												
			Equipment Compliance Booklet	1.6	FIO												
			Commissioning Procedures	3.4	FIO												
			Performance Verification Test	1.6	FIO												
			Procedures														
			Training	3.6	G A/E												
			SD-06 Test Reports														
			Commissioning Report	3.6.2	FIO												
			Performance Verification Test	3.5.3	FIO												
			SD-10 Operation and Maintenance														
			Data														
			Operation Manual	1.5	FIO												
			Maintenance and Repair Manual	1.6	FIO												

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		15990	SD-02 Shop Drawings														
			TAB Schematic Drawings and Report Forms	3.3	FIO												
			SD-03 Product Data														
			TAB Related HVAC Submittals	3.2	FIO												
			TAB Procedures	3.5.1	FIO												
			Calibration	1.4	FIO												
			Systems Readiness Check	3.5.2	FIO												
			TAB Execution	3.5.1	FIO												
			TAB Verification	3.5.4	FIO												
			SD-06 Test Reports														
			Design Review Report	3.1	FIO												
			Systems Readiness Check	3.5.2	FIO												
			TAB Report	3.5.3	FIO												
			TAB Verification Report	3.5.4	FIO												
			SD-07 Certificates														
			Ductwork Leak Testing	3.4	FIO												
			TAB Firm	1.5.1	FIO												
			TAB Specialist	1.5.2	FIO												
		15995	SD-03 Product Data														
			Commissioning Team	3.1	FIO												
			Test Procedures		FIO												
			Test Schedule		FIO												
			SD-06 Test Reports														
			Test Reports		FIO												
		16264	SD-02 Shop Drawings														

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		16264	Layout		FIO												
			Drawings		FIO												
			Acceptance	3.9	FIO												
			SD-03 Product Data														
			Performance Tests	3.5.5	FIO												
			Sound Limitations		FIO												
			Generator		G A/E												
			Power Factor	3.5.1.2	FIO												
			Heat Rejected to Engine-Generator Space		FIO												
			Time-Delay on Alarms		FIO												
			Cooling System		FIO												
			Manufacturer's Catalog		FIO												
			Vibration Isolation		FIO												
			Instructions	3.8	FIO												
			Experience		FIO												
			Field Engineer		FIO												
			Site Welding		FIO												
			General Installation	3.1	FIO												
			Site Visit		FIO												
			SD-06 Test Reports														
			Onsite Inspection and Tests	3.5	FIO												
			SD-07 Certificates														
			Vibration Isolation		FIO												
			Prototype Tests		FIO												
			Reliability and Durability		FIO												

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		16264	Emissions		FIO												
			Sound limitations		FIO												
			Flywheel Balance		FIO												
			Materials and Equipment		FIO												
			Factory Inspection and Tests		FIO												
			Inspections	3.5.3	FIO												
			Cooling System		FIO												
		16375	SD-02 Shop Drawings														
			Fabrication Drawings	1.4	FIO												
			Conduit and Fittings	1.4	FIO												
			Conduit and Fittings	2.1	FIO												
			Separators	1.4	FIO												
			Separators	2.2	FIO												
			Markers	1.4	FIO												
			Markers	2.3	FIO												
			Grounding Conductor	1.4	FIO												
			Grounding Conductor	2.4	FIO												
			Manholes	1.4	FIO												
			SD-03 Product Data														
			Conduit and Fittings	1.4	FIO												
			Conduit and Fittings	2.1	FIO												
			Separators	1.4	FIO												
			Separators	2.2	FIO												
			Markers	1.4	FIO												
			Markers	2.3	FIO												
			Grounding Conductor	1.4	FIO												

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		16375	Grounding Conductor	2.4	FIO												
			Manholes	1.4	FIO												
			Manhole Frames and Covers		FIO												
			Sump Cover		FIO												
			Pulling Irons		FIO												
			Cable Supports		FIO												
			Material, Equipment, and Fixture Lists	1.5	FIO												
			SD-06 Test Reports														
			Test Reports	2.5	FIO												
			SD-08 Manufacturer's Instructions														
			Manufacturer's Instructions	1.5	FIO												
		16415	SD-02 Shop Drawings														
			Interior Electrical Equipment		FIO												
			SD-03 Product Data														
			Fault Current and Protective Device Coordination Study		FIO												
			Manufacturer's Catalog		FIO												
			Material, Equipment, and Fixture Lists		FIO												
			As-Built Drawings	1.2.7	FIO												
			Onsite Tests	3.21.2	FIO												
			SD-06 Test Reports														
			Factory Test Reports		FIO												
			Field Test Plan		FIO												
			Field Test Reports	3.19	FIO												

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		16415	SD-07 Certificates Materials and Equipment	1.4	FIO												
		16528	SD-02 Shop Drawings Lighting System Detail Drawings As-Built Drawings	1.3.1 3.7.2	FIO FIO FIO												
			SD-03 Product Data Equipment and Materials Spare Parts		FIO FIO												
			SD-06 Test Reports CCTV Assessment Lighting Operating Test	1.3.2 3.7.1	FIO FIO												
			SD-10 Operation and Maintenance Data Lighting System	1.3.1	FIO												
		16721	SD-02 Shop Drawings Intercommunication System Installation		G A/E FIO												
			SD-03 Product Data Spare Parts		FIO												
			SD-06 Test Reports Acceptance Tests		FIO												
			SD-10 Operation and Maintenance Data Intercommunication System		FIO												

SECTION 10100A

VISUAL COMMUNICATIONS AND THEATRE SPECIALTIES
07/02 (REVISED 10/03/03)

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

ANSI Z97.1 (1984; R 1994) Safety Performance Specifications and Methods of Testing for Safety Glazing Materials Used In Buildings

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM B 221 (2000) Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes

ASTM B 221M (2000) Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes (Metric)

ASTM C 1048 (1997b) Heat-Treated Flat Glass - Kind HS, Kind FT Coated and Uncoated Glass

ASTM D 3691 (1995; Rev. A) Woven, Lace, and Knit Household Curtain and Drapery Fabrics

ASTM E 84 (2001) Surface Burning Characteristics of Building Materials

ASTM F 148 (1995) Binder Durability of Cork Composition Gasket Materials

ASTM F 152 (1995; R 2002) Tension Testing of Nonmetallic Gasket Materials

ASTM F 793 (1993; R 1998) Wallcovering by Durability Characteristics

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 701 (1996) Fire Tests for Flame-Resistant Textiles and Films

UNDERWRITERS LABORATORIES (UL)

UL 214 (1997) Flame-Propagation of Fabrics and Films

1.2 GENERAL REQUIREMENTS

The term visual display board when used herein includes presentation boards, marker boards, tackboards, board cases, display track system and horizontal sliding units. Visual display boards shall be from manufacturer's standard product line.

1.3 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-03 Product Data

Visual Display Boards G A/E

Manufacturer's descriptive data and catalog cuts.
Manufacturer's installation instructions, and cleaning and maintenance instructions.

Video Projection System G A/E

SD-04 Samples

Aluminum

Sections of frame, map rail, and chalktray, and two map hooks.

Porcelain Enamel

Section showing porcelain enamel coating, steel, core material and backing.

Materials

Section of core material showing the lamination of colored cork, natural cork, woven fabric, non-woven fabric, and vinyl wall covering. Sample of hardwood and plastic laminate finish, and glass type. Samples shall be minimum 4 by 4 inches and show range of color.

SD-06 Test Reports

Flame Resistance

07 Certificates

Visual Display Boards

Certificate of compliance signed by Contractor attesting that visual display boards conform to the requirements specified.

SD-08 Manufacturer's Instructions

Drapery hardware

Special fabrication. Before fabrication, submit the manufacturer's instructions for fabrics requiring special fabrication.

SD-10 Operation and Maintenance Data

Drapery system, Data Package 1

Include laundering and dry cleaning instructions for fabrics requiring special care. Furnish separate instruction sheet for each material (one for fiberglass, one for Verel, etc.). For fabrics which are not permanently or inherently flame resistant, furnish instruction to include frequency and process required for retreating the fabric to renew the effectiveness of the flame resistant treatment. Head each sheet with name and number of room or rooms in which each material is hung. In lieu of instruction sheets, provide instructions on small, permanent labels (either iron-on type or sewn-on) affixed to back of the heading of each panel.

Video Projection System

1.4 DELIVERY, STORAGE AND HANDLING

A. Materials shall be delivered to the building site in the manufacturer's original unopened containers and shall be stored in a clean dry area with temperature maintained above 50 degrees F. Materials shall be stacked according to manufacturer's recommendations. Visual display boards shall be allowed to acclimate to the building temperature for 24 hours prior to installation.

B. The Contractor shall carefully control handling and installation of all items, which are not immediately replaceable, so that completion of the work will not be delayed by hardware or equipment losses before, during, and after installation. The Contractor is responsible for all items until final acceptance.

C. Prior to installation, protect exposed surfaces with material, which is easily removed without marring finishes.

D. Without cost to the Owner replace product damaged during storage or handling.

1.5 WARRANTY

Manufacturer's standard performance guarantees or warranties that extend beyond a one year period shall be provided.

1.6 STAGE CURTAINS

1.6.1 Scope of Work

All materials, components and services necessary to provide a complete working system indicated in this section, as specified herein and shown on related drawings including, but not limited to:

1. Dimensional drawings and schedules for specified curtains, track and appropriate hardware.
2. Shipment of equipment and supplies to the job site.
3. Installation in accordance with these specifications, related drawings, the equipment manufactures' recommendations, established trade criteria, and all applicable code requirements.
4. Inspection and demonstration of completed installation with the general contractor's engineering personnel and any necessary adjustments needed to comply with these specifications, related drawings, equipment manufactures' recommendations, established trade criteria, applicable code requirements, or proper operation.

1.6.2 Work Included

A. Base Bid:

1. Theatre Curtains
2. Curtain Track and Hardware
3. Curtain Supports

B. The above list is for reference only and is not intended to define limits of the work for a complete installation. Carefully follow all written specifications and drawings and provide such work for a complete and operable system.

1.6.3 Qualifications

A. All equipment and installation shall be the responsibility of a single contractor, or subcontractor, who shall own and operate his own full time shop for the installation and assembly of stage equipment.

B. Bid submissions must identify any such subcontractors.

C. The contractor or subcontractor shall have at least 10 years experience in the installation of similar stage equipment and systems. If requested, the contractor or subcontractor shall submit a representative list of installations during the above period.

1.6.4 Submittals

A. Samples:

1. Within thirty (30) days of contract award, the contractor shall

submit to the architect for approval, prior to fabrication:

- a) Samples and color lines for all curtain fabrics.
- b) Samples of any equipment component requested by the Contracting Officer.

1.6.5 Standards

All equipment, where applicable standards have been established, shall be built to the standards of Underwriters Laboratories, Inc., the National Electric Code, and the United States Institute for Theatre Technology. Approved equipment shall be so labeled on delivery to the job site.

1.6.6 General Requirements

A. General Conditions of the project contract, work schedules, and site regulations apply to this work.

B. This work shall comply with all applicable local, state, and national codes.

C. All equipment shall be fully insured against loss or damage during shipment, installation and testing. Certification of such coverage shall be furnished to the architect.

D. The contractor shall warrant all equipment provided under this section to be free from defects in materials and workmanship for a period of at least twelve (12) months from the date of final acceptance of all work in this section.

E. All repairs and service during the warranty period shall be at the job site and include all necessary labor, materials and transportation of replacement materials and parts.

F. This warranty shall cover any manufacturer defects of equipment and unusual wear and tear caused by improper installation. Normal wear and tear and abuse of equipment are exempted.

1.7 A/V CONDUIT SYSTEM

System Description: Raceway and outlet box system suitable for installation of Audio and Video based systems equipment and cabling by others.

1.8 VIDEO PROJECTION SYSTEM

PART 1 - VIDEO PROJECTION SYSTEM GENERAL

1.01 SUB-SECTION INCLUDES

A. General: Comply with all Contract Documents, including Divisions 1 through 16 of the general contract specifications.

B. Statement of Work: The work of this section includes, but is not necessarily limited to, the following:

- 1. Provide, and install complete and operational Video Projection

System(s) as outlined in these specifications and related drawings and documentation requirements as set forth in this documentation.

2. It is the responsibility of the Contractor to provide all wiring, plates, connections, and miscellaneous equipment for a complete and operational system weather specified in this or other related documents or not.

C. Coordination, provision, installation, inspection, testing, instruction, and warranties of the Video Projection System.

D. All facilities, materials, equipment, transportation, and necessary labor for a complete and operational Video Projection System and Video Production System(s).

E. Additional Section information:

1. Required licenses and permits including any required bonding or insurance requirements that comply with General Conditions of specifications and contract documentations.

2. Verification of dimensions and conditions at the job site.

3. Installation in accordance with the contract documentation, applicable installation procedures or codes as set forth by the state or county of the project or manufactures recommendations.

4. Submittal information and provisions.

5. Documented Video Projection System testing procedures.

6. Instruction of operating personnel.

7. Manuals and provisions thereof.

8. Maintenance and warranties.

F. Definitions:

1. "Contractor" - Installer who has been awarded the contract to perform the work.

2. The term "shall" is mandatory, the term "will" is informative, and the term "should" is advisory.

3. "Provide and install" - To supply, install, and connect up complete and ready for safe and regular operation.

4. "Indicated", "shown", or "noted" - As indicated, shown or noted on drawings or specifications.

5. "Equivalent", "similar", or "equal" - Of base bid manufacturer, equal in materials, size, color, design, and efficiency of specified product, conforming to base bid manufacturers.

6. "Reviewed", "satisfactory", "accepted", "approved", "directed" - As reviewed, satisfactory, accepted, approved, or directed by the Owner.

7. "Professional grade" - Equipment that is intended for commercial, not residential, use and is rated for continuous duty.

8. "User-friendly controls" - Controls that are designed and laid out for ease of use, in a logical, easily recognizable format that utilizes industry standard symbols wherever applicable.

9. "Labels" - All labels on audio-visual equipment and racks shall be self-adhering black laminate with white engraved letters as specified in sections 3.3 and 3.4.

G. Below is a listing of specification standards, tests or recommended installation methods or procedures or applicable installation or safety codes:

1. National Electric Code (NEC)

2. National Electrical Manufacture's Association (NEMA)

3. Underwriters Laboratories (UL)
4. Electronics Industries Association (E.I.A.)
5. American National Safety Institute (ANSI)
6. Handbook of Computer-Video Interfacing and Video Distribution, by Extron Electronics

1.02 SCOPE OF WORK

- A. The Contractor shall provide Video Projection System and Video Production System(s) compatible with the Owner's communications systems (i.e. video, and computer systems) and operations.
- B. The Contractor shall provide equipment that, where required, shall conform to the applicable requirements of the Underwriter's Laboratories, Inc., local codes, the National Electrical Code and any other governing codes. Such items shall bear a label or mark indicating their conformance to the above requirements.
- C. The Contractor shall provide a complete and operational system configured and installed for user-friendly operation and low maintenance. Provide for two reprogrammings of the remote control software, as directed by the Owner, before Final Acceptance. Provide for two level adjustments and calibrations of video systems, as directed by the Owner, before Final Acceptance. On-site factory technical support shall be provided if necessary to assure performance.
- D. The Contractor shall restore finish hardware to original condition, including painting, ceiling modifications and attachments.
- E. Work shall be in compliance with all applicable standards listed above and all governing codes and regulations of the authorities having jurisdiction and the Contract Documents.
- F. Coordinate exact location and installation of the equipment, power, conduit, and raceway systems with the Architect.

1.03 SYSTEM DESCRIPTION AND REQUIREMENTS

- A. The following is for a basic system description and is not intended to be exhaustive in nature and is not complete for proper installation or operation of system.
- B. Provide a Video Projection and Video Production System for the Gym/Auditorium. One video projector shall be installed on a custom manufactured video projection stand in the projection booth and aligned and adjusted to provide full projected image to the 12'x16' screen mounted at the stage proscenium area. System controller shall be interfaced with the screen and video projector for remote control capabilities. Video input sources such as a VCR and DVD player and multiple computer interface devices shall be installed and interfaced into the video projection system for a complete and operational system. The video projection system shall be priced complete and operational for the Base Building Add Alternate.
- C. A small camera system shall be installed into the Gym/Auditorium. The camera system shall consist of two pan/tilt cameras that will be remote controlled from the booth location. These cameras shall be located as shown on the drawings and allow good quality video shots of both the stage and audience seating areas. Each camera shall be installed into a custom built, in wall cavity to offer protection. Each camera shall have

zoom-able lens in order to allow close up work of the students and actors on stage.

D. A small computer based video editing system shall be installed for professional grade post production video assembly and graphic over lay for the video projection systems

E. A matrix switcher shall be installer in order to control feeds to both the projection system and the editing system. The switcher shall allow easy source selection for either system.

F. A video production switcher shall be incorporated into the system for professional video source selection for either live events or production editing.

1.04 RELATED WORK

A. Conduits: Review all conduit runs, junction boxes, and electrical outlets provided and installed by the electrical contractor, and provide fit-up drawings based on these. Verify and inspect rough in of all necessary conduits and outlets. Provide a written acceptance of all field conditions, or a list of any discrepancies, within ten (10) working days from Notice To Proceed.

1.05 DELIVERY, STORAGE, AND HANDLING

A. The Contractor shall carefully control handling and installation of all items, which are not immediately replaceable, so that completion of the work will not be delayed by hardware or equipment losses before, during, and after installation. The Contractor is responsible for all items until final acceptance.

B. Prior to installation, protect exposed surfaces with material, which is easily removed without marring finishes.

C. Without cost to the Owner replace product damaged during storage or handling.

1.06 SCHEDULING

A. The Contractor shall submit a schedule to the Owner for approval. Show sequence of work, etc. from time of notice to proceed to final sign off of project. This schedule shall be submitted on Microsoft Project both paper and electronic form with submittals.

B. It shall be the responsibility of the Contractor to coordinate the installation of the system to be compatible with the work of other trades. The Contractor shall attend weekly progress meetings and provide continuous on-site project management.

C. It shall be the responsibility of the Contractor to arrange with The Owner a mutually acceptable time for Acceptance Testing, based upon the dates provided in the Solicitation.

D. The Contractor shall provide operating personnel with extensive training for each system type and room type as outlined in section 1.03.

1.07 BID/TECHNICAL PROPOSALS

- A. A mandatory pre-bid site visit will be utilized to allow the contractor to see the current jobsite conditions. This meeting will be scheduled in advance with the owner.
- B. The Video Projection System and Video Production System Contractor shall be experienced in the provisions of systems similar in complexity to those required for this project and at least meet the following criteria
1. The primary business of the contractor/installer shall be the installation of audio or video systems.
 2. At least five years experience with the specified equipment and systems.
 3. Experience with at least one project of similar size and complexity as outlined in these specifications
 4. Be a franchised dealer and service facility for the products furnished.
 5. Maintain a fully staffed installation crew and service crew for maintainance and installation of the specified systems.
 6. Video Projection System shall be approved by the Owner, Architect and Consultant.
 7. At the request of the Owner, Contractor shall demonstrate that he has:
 - a. Adequate facilities and equipment for this work.
 - b. Adequate staff with the appropriate technical expertise and experience for this project.
- C. Provide a list of five (5) references with locations, names of contacts, and contact phone information with brief system descriptions and dollar amounts for each reference. References shall be no more then three (3) years old.
- D. A detailed list in Microsoft Excel format (both hard copy and disk) showing Item Number, Item Description, Manufacturer, Part Number, Quantity, and Price. Include manufacturer's specification sheets for each piece submitted. This shall be generated from this document and related drawings.

1.08 SUBMITTALS

- A. Provide the following for approval sixty days after Notice to Proceed and prior to commencement of Work:
1. A complete list of all products to be incorporated within the work with all quantities listed. Each product shall be listed with specification section references in Excel format.
 2. Complete functional diagrams of each system required for a complete and operational system with descriptive narratives of any deviations from the specified system design.
 3. All shop drawings as defined in this section.
- B. Shop Drawings:
1. Shall not be smaller then 24"x36" and shall be sized as appropriate for thorough understanding of systems.
 2. All drawings shall be scaled appropriately but no less then 1/8" = 1'
 3. Schematic detailed wiring diagrams showing interconnection of contractor provided components and fabricated products, wiring and cabling diagrams depicting cable types, and devise designators. Each component shall have a unique designator and use same designator throughout the project.
 4. Show location of all equipment in racks, consoles, or on tables, with

complete dimensions, wire routing and cabling within housing.

5. Show all A.C. power outlet locations and terminal strip locations with in each equipment rack.
6. Plans and sections of the building and adjacent grounds showing the location of all installed equipment such as video projectors, racks, consoles, plates/panels and antennas, (etc.).
7. Patch panel layouts and labeling strips, including color schemes as necessary.
8. Full fabrication details of custom enclosures and millwork indicating dimensions, material, finish, and openings for equipment.
9. Provide complete drawings for all fabricated plates and panels. Drawings shall include dimensioned locations of components, component type, engraving information, plate color information, and a complete bill of materials for each plate.
10. Complete labeling schemes for all cabling and equipment components for project. Include font size and styles along with a sample of cable label and equipment label. All labeling shall be consistent with-in the project scope.
11. A complete wire schedule showing source and destination and indicating conduit location and sizing. Provide conduit sizing and layout with at least a 20% oversize for project utilization for future system growth.
12. Provide a complete conduit riser and associated conduit plans for a complete conduit system. Include a Junction Box schedule showing type, size mounting style and location of each box.

C. Submittal Format:

1. Each submittal shall be in three ring binders no larger than 3" spines and sized for 150% of material enclosed. Use multiple volumes if necessary.
2. Arrange product data in alphanumeric order.
3. Separate major groupings with labeled binder tabs.
4. Index product data sheets by manufacture and model or part number.
5. Each submittal shall include a unique number scheme and be numbered in consecutive order.
6. Each submittal shall include a complete table of contents with the following information:
 - a. Project title and number.
 - b. Submittal number.
 - c. Date of submission.
7. Referenced addendum or change order numbers as applicable
8. Referenced specification section, part, article, paragraph and page or drawing reference as applicable.

1.08 PROJECT CONDITIONS

- A. Verify conditions on the job site applicable this work. Notify Owner's Representative in writing of discrepancies, conflicts, or omissions promptly upon discovery.
- B. If conditions exist on the job site which make it impossible to install work as shown on the drawings or detailed in the specifications, recommend solutions and submit drawings to the Owner for approval showing how the work may be installed.

1.09 FINAL INSPECTION AND TESTING

- A. Upon completion of installation and contractor commissioning as outlined in Section 3, the Consultant shall perform inspection and testing.
- B. To assist the Consultant provide a minimum of one person for

inspection and two persons for testing who are familiar with all aspects of the system(s).

C. Process of testing the system(s) may necessitate moving and adjusting certain components.

D. Testing will include operation of each system and any components deemed necessary. Provide required test equipment, tools, and materials required to perform necessary repairs or adjustments.

E. In the event further adjustments or work is required during testing, the Contractor shall continue his work until the system(s) is acceptable at no addition to the contract price. If approval is delayed due to defective equipment or failure of equipment or installation to meet the requirements of this specification, the Contractor shall pay for additional time and expenses of the Owner at the rate as specified by the Owner.

1.10 WARRANTY

A. All equipment provided by the Contractor shall be installed per manufacturer's specifications and warranted by the Contractor for a period of one (1) year from date of written acceptance to meet all performance requirements outlined herein. Warranties may not be pro-rated. For all Owner-provided equipment, include pricing for an initial one-year service contract.

B. During the warranty period, no charges shall be made for any labor, equipment, or transportation to maintain performance and functions.

C. The Contractor shall respond with remedy to a trouble call within twenty-four (24) hours after receipt of such a call, and shall provide a 24-hour service phone number. Uptime for system(s) shall be no more than 24-hour period. All replacement parts/components shall be of equal or higher level for service.

D. Equivalent replacement equipment shall be temporarily provided when immediate on-site repairs cannot be made.

E. At least two routine inspection and adjustment visits will be scheduled for the first year. Submit reports to the Owner.

F. Provide a separate price for an optional yearly service contract for five years, to begin at the end of the initial warranty and service contract. Provide details on coverage and options.

1.11 INSTRUCTION OF OWNER PERSONNEL

A. After final inspection and completion, provide instruction to Owner designated personnel on the operation and maintenance of the System(s).

B. Develop an instructional course based on the use of the system(s) and manufacture's recommendations. Provide a minimum of 8 hours of instruction. Arrange course so that operational and maintenance lasses are separate.

C. Submit an outline of the course with sample instructional aids for approval 30 days prior to scheduled instruction sessions.

D. Video Projection System Contractor shall be present at first system use event.

PART 2 PRODUCTS

2.1 COLOR

Finish colors for required items shall be as specified in the COLOR SCHEDULE.

2.2 MATERIALS

2.2.1 Porcelain Enamel

Marker board writing surface shall be composed of porcelain enamel fused to a nominal 28 gauge (0.0149 inches) thick steel, laminated to a minimum 1/4 inch thick core material with a steel or foil backing sheet. Writing surface shall be capable of supporting paper by means of magnets. Marker board surface for display track system may be a powder paint dry erase surface adhered to a nominal 18 gauge (0.0478 inches) thick steel.

2.2.2 Cork

Cork shall be a continuous resilient sheet made from soft, clean, granulated cork relatively free from hardback and dust and bonded with a binder suitable for the purpose intended. The wearing surface shall be free from streaks, spots, cracks or other imperfections that would impair its usefulness or appearance. The material shall be seasoned, and a clean cut made not less than 1/2 inch from the edge shall show no evidence of soft sticky binder.

2.2.2.1 Colored Cork

Colored cork shall be composed of pure cork and natural color pigments that are combined under heat and pressure with linseed oil. Colored cork shall be colored throughout and shall be washable. The burlap backing shall be deeply imbedded and keyed to the work sheet being partially concealed in it and meeting the requirements of ASTM F 148.

2.2.2.2 Natural Cork

Material shall be a single layer of pure grain natural cork without backing or facing. The color shall be light tan. The cork sheet shall have a tensile strength of not less than 40 psi when tested in accordance with ASTM F 152.

2.2.3 Aluminum

Aluminum frame extrusions shall be alloy 6063-T5 or 6063-T6, conform to ASTM B 221, and be a minimum 0.06 inches thick. Exposed aluminum shall have an anodized, satin finish. Straight, single lengths shall be used wherever possible. Joints shall be kept to a minimum. Corners shall be mitered and shall have a hairline closure.

2.2.4 Hardwood

Exposed hardwood for frames, cabinets, and cases shall be oak, walnut or mahogany. Hardwood shall be provided with a durable factory-applied stain and lacquer finish of a type standard with the manufacturer.

2.2.5 Glass

Glass shall be comprised of tempered glass in accordance with ANSI Z97.1 and shall conform to ASTM C 1048, Kind FT (fully tempered), Condition A (uncoated), Type I, Class I (clear), thickness as specified.

2.3 MARKERBOARD

Markerboard shall have a porcelain enamel writing surface and a chalktray. Markerboard shall be a factory assembled unit complete in one piece, without joints whenever possible. When markerboard dimensions require delivery in separate sections, components shall be prefit at the factory, disassembled for delivery and jointed at the site. Frame shall be oak. Chalktray shall be the same material as the frame and extend the full length of the liquid markerboard. The markerboard shall have a map rail. The map rail with a tackable insert shall extend the full length of the liquid chalkboard, and shall have map hooks with clips for holding sheets of paper. Two map hooks shall be provided for each 4 foot of map rail. Dry erase markings shall be removable with a felt eraser or dry cloth without ghosting. Each unit shall come complete with an eraser and four different color compatible dry erase markers. The size shall be as shown in the drawings.

At Music Room, provide markerboard with engraved lines and a treble clef as shown on the drawings.

2.4 TACKBOARDS

2.4.1 Cork

Tackboard shall consist of a minimum 1/8 inch thick colored cork with burlap backing laminated to a minimum 3/8 inch thick insulation board or fiber board, and shall have an aluminum frame. The size shall be as shown in the drawings.

2.5 PROJECTION SCREEN

Ceiling mounted motorized projection screen shall have 120V motor that is lubricated for life, quick reversal type, has overload protector, integral gears, and preset accessible limit switches. Recessed mount projection screens shall have an operable closure door and access panel. Screen shall be flame retardant, mildew resistant, and white matte with black masking borders. Bottom of screen fabric shall be weighted with metal rod. Roller shall be a rigid metal at least 5 inches in diameter mounted on sound absorbing supports. Motor will be end mounted design. Screen shall have a 3 position control switch to stop or reverse screen at any point. The switch shall be installed in a flush electrical box with cover plate, location(s) as shown on the electrical drawings. All conduit and wiring from the control switch to the projection screen shall be furnished and installed by the Contractor. Screen shall be UL listed.

Material and Viewing Surface of the Manual Projection Screens: Provide screens manufactured from mildew and flame resistant fabric of type indicated for each type of screen specified and complying with the following requirements:

1. Matte white viewing surface with grain characteristics complying with FS GG-S-00172D(1) for Type A screen surface.
2. Material: Vinyl coated glass fiber fabric.

3. Mildew Resistance: Provide mildew resistant screen fabrics as determined by FS 191A/5760.
4. Seams: Where length of screen indicated exceeds maximum length produced without seams in fabric specified, provide screen with horizontal seam placed as follows:
 - a. At top of screen at juncture where maximum length viewing surface is exceeded.
5. Seamless Construction: Provide screens less than 84 inches by 84 inches without seams.
6. Edge Treatment: Black masking borders.

Manually Operated Screens: Provide manufacturer's standard spring roller operated units designed and fabricated for wall installation and consisting of case, screen, mounting accessories, and other components necessary for a complete installation.

1. Screen Case: Fabricated in 1 piece from steel sheet not less than 0.0299 inch, with flat back design and vinyl covering or baked enamel finish. Provide end caps with integral roller brackets and universal mounting brackets, finished to match end caps, for wall mounting.
2. Screen Mounting: Top edge securely anchored to a 3 inch diameter, rigid steel spring roller; bottom edge formed into a pocket holding a tubular metal slat, with ends of slat protected by plastic caps, and saddle and pull attached to slat by screws.

Provide ceiling mounted motorized projection screen at Auditorium and at Media Center. Motorized projection screen shall consist of case, screen, motor, controls, electric brake, limit switches, mounting accessories and other components necessary for complete installation.

Motorized projection screen shall have 110-120V, 60Hz, 3 wire motor that is lubricated for life, quick reversal type, has overload protector, integral gears, electric brake and preset accessible limit switches. Screen shall be flame retardant, mildew resistant, and white matte. Tab tensioned screens shall have a vinyl surface that is stretchable. Bottom of screen fabric shall be weighted with metal rod. Roller shall be a rigid metal at least 5 inches in diameter mounted on sound absorbing supports. Motor will be end mounted or motor-in-roller design. Screen shall have a 3 position control switch to stop or reverse screen at any point. The switch shall be installed in a flush electrical box with cover plate, location(s) as shown on the electrical drawings. All conduit and wiring from the control switch to the projection screen shall be furnished and installed by the Contractor. Ceiling mounted case shall be aluminum. Screen shall be UL listed.

At motorized projection screen provide Single Station Control: 3 position control switch with metal device box and brushed aluminum cover plate for flush wall mounting, accepting 110 V current, ac power supply and operating by sustained contact.

- a. Provide key operated switch.
 - 1) Furnish switch to Electrical Contractor for installation.
 2. Motor: Provide either motor in roller or end mounted motor.
 3. Motor in Roller: Instant reversing motor of size and capacity recommended by screen manufacturer with permanently lubricated ball bearings, automatic thermal overload protection, preset limit switches to automatically stop screen in up and down positions, and positive stop action to prevent coasting. Mount motor inside roller with vibration isolators to reduce noise transmission.
 4. End Mounted Motor: Instant reversing, gear drive motor of size and capacity recommended by screen manufacturer with permanently lubricated

ball bearings, automatic thermal overload protection, preset limit switches to automatically stop screen in up and down positions, and positive stop action to prevent coasting. Locate motor in its own compartment.

5. Screen Mounting: Top edge securely anchored as rigid metal roller and bottom edge formed into a pocket holding a 3/8 inch diameter, metal rod with ends of rod protected by plastic caps.

5. Video interface control: Interface to allow motorized screen to be controlled by video projector/video projector control system through 12V switched outlet. Equip interface with override switch permitting independent operation of screen.

Motorized projection screen case: Fabricate from 3/4 inch warp resistant composition wood with hinged panel for metal lined motor compartment. Bottom of case fully enclosed except for slot allowing viewing surface passage. Case finished with paint primer. 1/4" minimum steel mounting brackets wrap under bottom edge of case.

Motorized projection screen roller: 5 inch diameter steel tube mounted on zinc plated brackets with double row radial ball bearings. The viewing surface shall be securely attached to roller at top and at bottom. Mount outside screen roller on rubber vibration inulators.

Motorized projection screen viewing surface: 12 feet high by 16 feet wide matt white vinyl surface laminated on woven fiberglass base. Surface shall be washable. Viewing surface shall contain no horizontal seams. Surface shall have 2 inch wide black masking borders. Extra drop shall be 4 feet, black.

2.6 STAGE CURTAINS

2.6.1 Curtains

A. Fabrics:

1. Velour shall be 100% Polyester, 22 ounce 64" wide fabric meeting "Class A" flame resistance requirements and shall be Inherently Flame Resistant material. Submit "Class A" test data and 12" X 12" square samples for approval. Submit certificates showing dye lot and flame test. Color per Color Schedule.

2. Icon, 54" wide, 100% polyester fabric meeting "Class A" flame resistance requirements and shall be Inherently Flame Resistant material. Submit "Class A" test data and 12" X 12" square samples for approval. Color per Color Schedule.

3. Cycloramas to be constructed of material meeting "Class A" flame resistance requirements and shall be Inherently Flame Resistant material. Submit "Class A" test data and 12" X 12" square samples to the Contracting Officer for approval. Color per Color Schedule.

B. Fabrication:

1. All pile fabrics shall be constructed with pile running down.

2. All seams shall be vertical with each width running the full height

- no horizontal splices.

3. Thread colors shall match face of fabric.
4. A label shall be attached 6 feet from the bottom of every curtain showing height, width, and date of flameproofing.
5. Sizes and quantities per drawings and schedules.
6. Draw Curtains: Top hem shall be turned and reinforced with continuous 3 ½" heavy jute webbing. 50% fullness shall be sewn in with box pleats approximately 12" on center. A #3 brass black anodized grommet shall be inserted on every pleat and at ends and bit snaps shall be provided in each grommet for attachment to carriers. Provide 36 inch long cotton tie lines in each grommet. Bottom hem shall be 5" and contain a continuous No. 8 jack chain held in a muslin pocket. No. 8 jack chain encased in a separate canvas pocket in the hem and fastened at vertical seam points to prevent bunching with chain weight. Jack chain shall be secured to pocket every 36". Side hems shall be a minimum of 8" on the leading edge and 4" on the offstage edge.
7. Border Curtains: Top hem shall be turned and reinforced with continuous 3 ½" heavy jute webbing. 50% fullness shall be sewn in with box pleats approximately 12" on center. A #3 brass black anodized grommet shall be inserted on every pleat and at ends and contain a 30" heavy grade ¾" twill tape for tying curtain to pipe. Provide 36 inch long cotton tie lines in each grommet. Bottom hem shall be 5". Side hems shall be a minimum of 4". Color per Color Schedule.
8. Leg Curtains: Top hem shall be turned and reinforced with continuous 3 ½" heavy jute webbing. 50% fullness shall be sewn in with box pleats approximately 12" on center. For Track installation bit snaps shall be provided for attachment to carriers at each pleat and ends of curtain. For Pipe installation a #3 brass black anodized grommet shall be inserted on every pleat and at ends and contain a 30" heavy grade ¾" twill tape for tying curtain to pipe. Provide 36 inch long cotton tie lines in each grommet. Bottom hem shall be 5" and contain a continuous No. 8 jack chain held in a muslin pocket. Jack chain shall be secured to pocket every 36". Side hems shall be a minimum of 4". Color per Color Schedule.
9. Cycloramas: Top hem shall be turned and sewn flat with continuous 3 ½" heavy jute webbing reinforcement. For Track installation bit snaps shall be provided for attachment to carriers every 12" and at ends of curtain. For Pipe installation a #3 brass black anodized grommet shall be inserted every 12" and at ends and contain a 30" heavy grade ¾" twill tape for tying curtain to pipe. Provide 36 inch long cotton tie lines in each grommet. Track mounted cycloramas shall have a 5" bottom hem and contain a continuous No. 8 jack chain held in a muslin pocket. Jack chain shall be secured to pocket every 36". No. 8 jack chain encased in a separate canvas pocket in the hem and fastened at vertical seam points to prevent bunching with chain weight. Pipe mounted cycloramas shall contain a 5" pipe pocket reinforced with muslin. Color per Color Schedule.
10. Front curtain shall have a 12 inch faceback on vertical edges and a dust ruffle of same fabric sewn on back of bottom hem and protrude approximately 1-1/2 inches below bottom hem.
11. Sky drop shall be sewn flat. Tops to be reinforced with 3-1/2 inch jute webbing. Grommets and "S" hooks shall be installed into the webbing

on 12 inch centers. Side hems to be 4 inches. Bottom hem shall be equipped with No. 8 single jack chain in separate pocket within the hem.

C. Fabricate and install as directed.

2.6.2 Curtain Track and Hardware

A. Draw Curtains

1. Tracks shall be of 14 guage galvanized steel construction; entirely enclosed except for slot in bottom; each half to be in one continuous piece except where splicing clamps are required.

2. Each curtain carrier shall be spaced on 12 inch centers and shall be of nylon construction supported from a ball-bearing by 2 polyethylene wheels held to ball-bearing by rustproof nickel plated rivet, such wheels rolling on 2 separate parallel treads.

3. Each curtain carrier shall consist of a free-moving plated swivel and sufficient trim chain to accommodate curtain snap hook.

4. End pulley blocks shall be adjustable and shall be equipped with sleeve-bearing wheels adequately guarded.

5. A rubber bumper shall be attached to each curtain carrier to function as noise reducer.

6. The manufacturer shall furnish 2 end stops for placement at each track end and a tension floor pulley for increasing or decreasing cord tension.

7. Stretch-resistant operating cord shall have fiberglass center and shall be of 3/8 inch diameter, extra quality yarn.

B. Hardware:

1. All pipes and track shall be suspended with 2/0 twin loop chain and closed with 3/16" shackles.

2. Appropriate clamping devices or eyebolts shall be used to make connection to support steel or ceiling. Chain is not to be wrapped around support members.

3. 3/4" I.D. Schedule 40 black iron pipe shall be used for dead hung borders and legs.

4. Hanging dead hung equipment shall be supported by vertical hangers of 3/16 inch proof coil chain or 1/4 inch steel cable together with connecting accessories, including 6 inch turnbuckles at each support for adjustment. Auxiliary steel members for equipment support shall be adequate to span roof joist spacing of 6 feet with deflection under load. No jack chain or solid wire shall be used for hanging, and bridling will not be permitted.

5. Secure chains to beams with clamps. Double wrap is acceptable on smaller beams.

6. Secure chains to batten with double wrap approximately 1 foot of excess chain for future adjustment, a 1/4 inch "S" hook closed into the end of the chain, and shall hook into the standing chain.

7. Dead hung battens supporting a curtain track shall have a 12 inch turnbuckle included with the hanging chain to provide adjustment for change in the vertical height of the curtain. In addition, there shall be at least 4 diagonal chains to prevent side sway of the track.

8. Attachments of ropes shall be with a clove hitch and a half-hitch with the free end whipped and separately stopped to the standing part with firmly adhering tape.

9. All fasteners shall be vandal resistant.

2.7 A/V CONDUIT SYSTEM

2.7.1 Materialse

Conduit and Outlet Box System:

1. Empty conduit and outlet box system complying with electrical specifications.
2. Not less than 3/4 inch conduit size and larger conduit sizes as indicated.

Outlet Boxes:

1. 2 Gang Box - 2-1/8 inches deep by 4-11/16 inches square with 2-gang ring.
2. 1 Gang Box - 2-1/8 inches deep by 2-1/8 inches high with 1 gang ring.

Cover Plates:

1. Comply with electrical specifications.
2. Provide blank plates for all outlet boxes that are not utilized.

2.8 VIDEO PROJECTION SYSTEM

PART 2 - VIDEO PROJECTION SYSTEM PRODUCTS

2.01 MANUFACTURERS

A. Electronic component models shall be commercially available for at least one (1) year prior to bid, or be approved by The Owner.

B. All equipment and material shall be new.

C. All equipment must be UL listed or built to UL standards, where required.

2.02 GENERAL

A. All equipment shall be professional grade and rated for continuous duty. Basic guidelines have been prepared with manufacturer names, makes, and model numbers included as minimum performance requirements. These must be satisfied, unless a variance (separate document) is submitted and

approved by the Owner.

B. System shall be installed and configured for simplicity of operation, with user-friendly controls.

C. Product quantity is as required for a complete and operable system. If any quantities are given, Video Projection System Contractor shall provide at least the given amount. Some of the product listed under this section may not be required to fulfill the work as outlined.

D. Regardless of the length or completeness of the descriptive paragraphs listed herein, each device shall meet published manufacture's specifications.

E. Remove all manufacture's nameplates or logos from product within the public site lines or spaces.

F. Paint all wall and ceiling mounted speaker grilles and enclosures as directed by the Architect.

G. System shall be installed and configured for simplicity of operation, with user-friendly controls.

2.03 INPUT SOURCES

A. Editing VCR (VCR 1):

1. Editing controllable VCR
2. S-Video and Composite Outputs
3. S-Video and composite inputs
4. RS-232 controllable
5. Shuttle control wheel for alignment
6. Deck shall be rack mounted
7. Deck shall be professional quality

B. DVD Player (DVD):

1. DVD player and CD player.
2. S-Video and Composite Outputs
3. Wireless Remote shall be included
4. Deck shall be rack mounted
5. Deck shall be professional quality

C. Computer Interface (COMPUTER INT): Computer Female 15Pin Input

1. HD Input, VGA Compatible
2. Audio Female 3.5 mm Mini Input
3. Output: Computer Video 10 Pin terminal block
4. Output: 5 Pin Terminal Block
5. Compatible with VGA thru UXGA
6. Sized to fit in single Gang Box or Floor Plate
7. Provide with appropriate accessories

2.04 SYSTEM SWITCHERS/CONTROLLERS/PROCESSORS

A. System Switcher/Controller (SWITCHER):

1. Twelve Input/eight outputs
2. Independently Scaled Video Outputs.
3. Two built in scalars
4. S-Video and Stereo Audio Matrix Switcher
5. Rack mounted

6. Computer RS-232 Controlled
7. Supply with Manufactures control software
8. Install software on editing computer and interface for complete switcher control

- B. Video Processor (VSP):
1. Scalar, Scan Converter,
 2. 5 Inputs and 6 outputs
 3. S-Video input and output
 4. Rack mounted
 5. Computer RS-232 Controlled

- C. Video Production Switcher (PRODUCTION SWITCHER):
1. 4-Input synchronized video switcher
 2. Full Frame time based correction (TBC)
 3. On-board video effects
 4. On-board color generators
 5. Color correction
 6. Built-in audio mixer
 7. Video preview and main outputs

2.05 PROJECTORS/MONITORS

- A. Video Projector (PROJECTOR):
1. 5200 ANSI Lumens
 2. True XGA (1024x768) Resolution
 3. Compressed UXGA
 4. Two Lamp System
 5. Detachable Interface Panel System with DVI
 6. Digital Keystone Correction of = or - 40degs.
 7. RGB, Component, S-Video, inputs
 8. Serial in/out, USB, RCA and Stereo Inputs
 9. Provide with two spare lamps

- B. Video Monitors (PREVIEW MONITOR):
1. 9" CRT Type Monitor
 2. 9" Viewable Area
 3. Input: Composite BNC
 4. H/V Separated Sync BNC
 5. Horz. 280 Lines Resolution
 6. Rack Mountable Provide Proper Rack Mounting

- C. Video Monitors (PROGRAM MONITOR):
1. 14" CRT Type Monitor
 2. 13" Viewable Area
 3. Input: Composite BNC, Y/C, S-Video
 4. Bi and Tri Separated Sync BNC
 5. Horz. 800 Lines Resolution
 6. Rack Mountable Provide Proper Rack Mounting

2.06 CAMERA & PAN/TILT SYSTEMS

- A. VIDEO CAMERA (CAMERA)
1. 1/3" 3-CCD Convertible Camera
 2. Pixels 410,000
 3. Minimum Sensitivity: 1.5 lux @ f/4

4. Horizontal Resolution: 750 Lines
5. Standard Sensitivity: 2000lux @f/8
6. Video Output: Composite, Y/C

B. VIDEO CAMERA CONTROLLER (CAMERA CONTROLLER)

1. Camera and P/T Compatible
2. 10 Memory recall locations
3. Surface mounted unit
4. S-Video monitor output
5. Gen-Lock Pass capable

C. PAN/TILT SYSTEM (PAN/TILT)

1. Designed to work with camera and lens system
2. 50 Pre-set memory locations
3. 95 deg. Tilt angle
4. 300deg panning range
5. 25deg per second

2.07 CAMERA & PAN/TILT SYSTEMS

A. COMPUTER EDITING SYSTEM (EDITOR)

1. Computer based editing system
2. Inputs: Composite, S-Video, IEEE 1394 Audio and Video
3. Supplied w/ Adobe Premiere 6.0, Hollywood FX Tech, Pinnacle DVD SE, TitleDecko RT, DV Tools, Real Time Scene Cutter
4. Direct to/from hard disc in full CD/DAT stereo audio quality
5. Video Overlay capable
6. Computer: Dell Precision Workstation with min - Pentium IV 1GHZ or faster, 1x32 bit PCI 2.1 Slot, 256 MB Ram, 4GB Hard Drive, 18GB video hard disk, 24 bit direct draw driver, CD writer or DVD writer, Windows 2000, XP

2.08 MISCELLANOUS EQUIPMENT

A. Equipment Racks:

1. Frame and side panels with locking rear door
2. 31.5" overall depth
3. Locate racks as shown on drawings
4. Racks shall be 70" or as shown on drawings
5. Provide with appropriate side panels as required
6. Provide with top vent panels as required or fan panels as required when utilized for amplifier housing
7. Provide with vented locking front door
8. Provide with Cable Chase for multi rack ganging one between each ganged rack
9. Provide quantity as required as per section 3.5.
10. Supply black in color

B. Equipment Rack Power:

1. Specifically designed integrated rack power system
2. Module for system installation flexibility
3. Provides for Remote sequenced on/off
4. Sized to fit within Equipment Racks
5. All outlets shall allow local switch and monitoring of status
6. 20amp Outlets shall allow Isolated Ground Outlets

7. Provide for Complete integration and proper operation
8. Provide with wall mounted USC-KL Key switch Plate located in Booth for controlled power up/down.
9. Integrate with Audio Powering System for Seamless On/Off
10. Acceptable Product:

C. Projector Support Stand:

1. Designed to hold video projector at proper height and angle
2. Provide separate leveling feet on each corner
3. Stain to match interior color (color selection by Architect/Owner)
4. Stand shall be of ¾" plywood with trim molding
5. Supply Submittal Drawings for approval
6. Projector shall be attached to stand for security
7. Acceptable Product:
Custom by Contractor

2.09 CONNECTION CABLES

A. Computer Cables:

1. Computer connectivity cables for interface units

2.10 PLATES AND PANELS:

- A. Provide plates and panels as described in the drawings and as required for a fully operation system.
- B. Custom plates shall be 1/8" thick aluminum, standard EIA sizes, brushed black anodized finished unless otherwise noted
- C. Plastic plates are not allowed
- D. Lettering shall be in all caps and numbers engraved with a color contrasting to the base material with a minimum size of 0.25".

2.11 CABLES AND WIRING:

- A. All audio cable shall be stranded cooper.
- B. Shielded cables located in raceways shall have aluminum foil shield with drain wire.
- C. Where speaker cables are run exposed in return plenum space provide plenum rated cable.
- D. Where cables are routed through cable tray provide tray rated cable of equal gauge
- E. Provide the following as required for a fully operable system:
 1. Microphone level cables: No. 22 shielded jacketed - West Penn 452 with gray jacket
 2. Line level cables: No 22 shielded jacketed - West Penn 452 with gray jacket
 3. Constant voltage speakers: amplifier to zone: Min No. 14 gauge jacketed - West Penn 226
 4. Constant voltage speakers: plenum rated amplifier to zone: No. 14 gauge jacketed - West Penn 25226.
 5. Constant voltage speakers: within zone No. 16 gauge jacketed - West Penn 225
 6. Constant voltage speakers: within zone plenum No. 16 gauge jacketed -

West Penn 252225

7. Communication Outlet Cables: No. 20 shielded - West Penn 293
8. Control cables: No. 20 shielded - West Penn 293
9. Loudspeaker Cable: No. 10 THHN provide different colors for each pass band type, supply plenum as required.
10. Antenna Cable: RG-59 minimum refer to manufactures specifications and recommendations as required.
11. RGB Video Cable: Belden 1406B, 1407B, 1417B as required
12. RGB Riser: Belden 7710A, 7711A, 7712A, 7713A as required
13. RGB Plenum Rated: Belden 1824A, 1825A, 1826A as required
14. SVHS Cables: Belden 1808A as required
15. Precision Video Cable: Belden 8281 as required

2.15 PROPOSED SUBSTITUTIONS

A. Where specific equipment is described, it is not the intention to discriminate against the products of other manufacturers, but rather to establish a standard of quality. All proposed substitutions should be submitted as alternates with complete data.

B. The Owner requires manufacturer's original specification tests. The Owner will evaluate and approve all substitutions.

C. Items designated "no substitution" will be specified item only. Submission of items other than specified will not be considered.

PART 3 EXECUTION

3.1 PLACEMENT SCHEDULE

Location and mounting height of visual display boards shall be as shown on the drawings.

Mounting height is defined as distance from finished floor to top of the display board frame.

3.2 INSTALLATION

Installation and assembly shall be in accordance with manufacturer's printed instructions. Concealed fasteners shall be used. Visual display boards shall be attached to the walls with suitable devices to anchor each unit. The Contractor shall furnish and install trim items, accessories and miscellaneous items in total, including but not limited to hardware, grounds, clips, backing materials, adhesives, brackets, and anchorages incidental to or necessary for a sound, secure, complete and finished installation. Installation shall not be initiated until completion of room painting and finishing operations. Visual display boards shall be installed in locations and at mounting heights indicated. Visual display boards shall be installed level and plumb, and if applicable doors shall be aligned and hardware shall be adjusted. Damaged units shall be repaired or replaced by the Contractor as directed by the Contracting Officer.

3.2.1 Motorized Projection Screen

3.2.1.1 Preparation

Coordinate layout and installation of projection screens with ceiling construction and related components penetrating or above ceilings such as lighting fixtures, mechanical equipment, ductwork, and fire-suppression system.

Coordinate requirements for blocking, structural supports, and bracing to ensure adequate means for installation of screens.

Coordinate requirements for power supply conduit, and wiring required for projection screen motors and controls.

Coordinate interface and installation of screen and masking controls with provision of video projector/projector control system.

Prior to installation, verify type and location of power supply.

3.2.1.2 Installation

Install projection screens and controls at locations and heights indicated on drawings.

Comply with screen manufacturer's written instructions and shop drawings.

Install screens securely to supporting substrate so that screens are level and back of case is plumb.

Provide required brackets, hanger rods, and fasteners.

3.2.1.3 Testing and Demonstration

Test motorized projection screens to verify that screen, controls, limit switches, closure, and other operating components are functional. Ensure that motorized and manual screens are level and viewing surface plumb when extended. Correct deficiencies.

Demonstrate operation of screen to Owner's designated representative.

3.2.1.4 Protection

Protect projection screens after installation from damage from construction operations. If damage occurs, remove and replace damaged components or entire unit as required to provide units in their original, undamaged condition.

3.3 STAGE CURTAINS

1. All equipment shall be installed under the direct supervision of an experienced representative of the rigging contractor.

2. All work shall be performed in strict accordance with approved shop and installation drawings.

3. Contractor shall coordinate installation of curtain systems with the theatrical rigging contractor for utilization of the Tri-Batten system and Line Shaft Hoist system as specified. Contractor shall be responsible for supplying all components for a completely operational curtain system and coordination with the theatrical rigging contractor for this system.

4. Provide curtains, track, hardware and installation of all items.

5.
Schedule of Curtains

No.	Qty.	Name	Fabric	Color	Fullness	Hght	Width	Track
1	1	Traveler	Velour	TBD	50%	23'	35'	As req'd
2	1	Tormenter	Velour	TBD	50%	4'	35'	
3	2	Leg 1	Velour	TBD	50%	23'	4'	
4	2	Leg 2	Velour	TBD	50%	23'	4'	
5	2	Leg 3	Velour	TBD	50%	23'	4'	
6	1	Border 1	Velour	TBD	50%	3'	35'	
7	1	Border 2	Velour	TBD	50%	3'	35'	
8	1	Border 3	Velour	TBD	50%	3'	35'	
9		Cyc	Muslin	TBD	Flat	26'	40'	Curved

3.4 A/V CONDUIT SYSTEM

Install raceway and outlet box system continuous from outlet to junction box and to equipment location with no more than four quarter bends (360 degrees total). Bush and ream conduit ends and terminate with insulated bushings.

Install raceway from outlet boxes to cable ladder in corridor as indicated. Bush and ream conduit ends and terminate with insulated busings. Clamp conduit to ladder as required for proper support, provide fittings.

Install raceway from outlet boxes to accessible ceiling spaces. Bush and ream conduit ends and terminate with insulated bushings.

Where cable tray/ladder is not utilized make continuous runs from box to box with isolation from building systems as required.

3.5 CLEANING

All surfaces shall be cleaned in accordance with manufacturer's instructions.

3.6 VIDEO PROJECTION SYSTEM

PART 3 - VIDEO PROJECTION SYSTEM EXECUTION

3.01 INSTALLATION

- A. Electronic equipment shall be permanently mounted in equipment racks.
- B. Follow ASDI standards as a minimum,
- C. Provide shaft locks or security covers on no user operated equipment having front panel access.
- D. Mount all equipment, plates and panels plumb and level.
- E. Permanently install all equipment to be firmly mounted and held in place. Provide necessary equipment supports to hold and support loads with at least a 5:1 safety factor.

3.02 EQUIPMENT HOUSING

- A. Install amplifiers in equipment racks according to manufactures recommendations.
- B. Provide adequate ventilation fans to maintain a rack temperature of less then 92 degrees Fahrenheit.
- C. Provide rear support for housing mounted equipment greater then 15" deep.
- D. Allow a minimum of 20% open rack space.
- E. Fill all empty spaces with blank panels, sizing as required painted to match housing.
- F. Locate operator usable equipment and patch panels at an appropriate operating height.
- G. Key all door locks for each housing type (front, rear) alike.
- H. Looking at the equipment racks from the rear of the racks, install all AC power and ground cabling on the left and audio and video cabling on the right.
- I. Provide lights mounted in the top of each rack to illuminate the interior for service or maintenance. Lights to be individually switch able and placed so as to provide maximum illumination throughout the rack.
- J. Provide rear-mounting rails as required for proper mounting.

3.03 PATCH PANELS

- A. Patch panel shall be located in designated racks as shown on drawings
- B. All patch panels shall be in consecutive rack spaces located at approximately 46" above floor.
- C. Locate inputs from microphone input plates and floor plates near the top of the patch bay layout.
- D. Locate sends and tielines near the bottom of the patch bay.
- E. Patch bays shall be normalled as directed by the Owner.

F. Provide 24"x32" reference diagram of the patch bay system. The layout shall be easily understood, mount diagram behind plexiglass and mount in the control room close to the patch bay rack.

G. Diagram shall show all input locations, patch normals, and any console connections, and interconnection of control room equipment.

3.04 LABELING

A. Provide, for each piece of rack-mounted equipment, an engraved lamicoid label and attach to the front of the equipment. Install in a plumb, level, and permanent manner. Provide rear mounted labeling for all rack mounted equipment.

B. Provide engraved label over each user-operated control that describes the function or purpose of the control. Adjust size of label to appropriate size for location.

C. Provide each terminal strip with a unique descriptor and a numerical designator for each strip. Show strip information on the drawings.

D. Provide logical and legible cable and wiring labels permanently attached for easy identification to each cable, both ends.

E. Label on cables shall be adhesive style striping covered with clear heat shrink tubing sized appropriately for the cable.

F. Wiring designator shall be alphanumeric code unique for each cable.

G. Each cable type shall be labeled starting with different designations (i.e. mic series "Mxxx", speaker series "Sxxx", etc.)

H. Locate the cable designator at the origination and the destination of each circuit. Locate cable designator within 2" of connection point.

3.05 CONTRACTOR COMMISSIONING

A. Prior to energizing or testing the system, ensure the following:

1. All products are installed in a proper and safe manner per the manufacture's instructions.
2. Insulation and shrink tubing are present where required.
3. Dust, debris, solder, splatter, etc. is removed.
4. Cable is dressed, routed, and labels, and all connections are all consistent with regard to polarity.
5. All labeling has been provided and installed.
6. All products are neat, clean and unmarred and securely fastened.
7. All debris has been cleaned and removed from the site.
8. All electronic devices are properly grounded.

B. Perform the following test, Record all results in the final project manual

1. Test each AC power outlet for proper connections for hot, neutral and ground
2. Measure the and record the DC resistance for the technical ground in the equipment racks and console. Resistance should be 0.15 ohms or less.
3. Measure the impedance of each speaker line from the amplifier rack.

C. System Adjustment:

1. Adjust all video components utilizing proper test equipment for a

clean, non-ghosting signal for maximum signal strength.

2. Perform Color Bar tests for proper alignment of each video component including Video Projector.

3. Eliminate any signal imperfections to provide a clean precise video signal at each component and video screen.

D. Input Verification Test:

1. Verify video signal presence at each component input with test equipment and verify the proper signal and uniform strength.

2. Perform compete system operation to verify proper system operation

3. In a similar manner check any other inputs or tielines as appropriate.

E. Notification:

1. Once all of the above the system is ready for inspection. Formally notify the Owner at least seven days prior to desired inspection date.

2. Final adjustments will be conducted at the time of inspection.

3.07 APPLICABLE FEDERAL SPECIFICATIONS (The list below forms only a part of this specification.)

J-C--30A & AM-1 Cable and Wire, Electrical (Power, fixed Installations)

W-C-3735B Circuit Breakers, Molded Case, Branch Circuit, and Service

W-C-586C Conduit outlet boxes, bodies and entrance caps, electrical: cast metal

W-C-596E/Gen Connector, Electrical, Power, General Specifications

W-F-406B Fittings for Cable, Power, Electrical and Conduit, Metal, Flexible

W-F-408C Fittings for Conduit, Metal, Rigid, (Thick wall and EMT)

W-J-800D Junction Box: Extension, Junction Box; Cover, Junction Box (Steel, Cadmium, or Zinc Coated)

HH-I-553C Insulation Tape, Electrical (Rubber, Natural, or Synthetic)

HH-I-595C Insulation Tape, Electrical, Pressure Sensitive Adhesive, Plastic

WW-C-00540C Conduit, Metal, Rigid: and Coupling, Elbow, and Nipple, Electrical Conduit: Aluminum

WW-C-566C Conduit, Metal, Flexible

WW-C-581E Conduit, Metal, Rigid, and Intermediate: and Coupling, Elbow and Nipple, Electrical Conduit: Steel Zinc Coated

C2-1990 National Electrical Safety Code

C97.1-1972 Low Voltage Cartridge Fuses 600V or Less

Institute of Electrical and Electronic Engineers (IEEE)

142-1982 Recommended Practice for Grounding of Industrial and Commercial Power Systems

-- End of Section --

SECTION 10110

AUDIO/VISUAL SYSTEMS

07/02 (REVISED 10/03/03)

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

ANSI Z97.1 (1984; R 1994) Safety Performance Specifications and Methods of Testing for Safety Glazing Materials Used In Buildings

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM B 221 (2000) Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes

ASTM B 221M (2000) Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes (Metric)

ASTM C 1048 (1997b) Heat-Treated Flat Glass - Kind HS, Kind FT Coated and Uncoated Glass

ASTM E 84 (2001) Surface Burning Characteristics of Building Materials

ASTM F 148 (1995) Binder Durability of Cork Composition Gasket Materials

ASTM F 152 (1995; R 2002) Tension Testing of Nonmetallic Gasket Materials

ASTM F 793 (1993; R 1998) Wallcovering by Durability Characteristics

1.2 GENERAL REQUIREMENTS

1.3 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-03 Product Data

Theatre Rigging; G A/E

Theatre Lighting System; G A/E

Sound System; G A/E

Manufacturer's descriptive data and catalog cuts.
Manufacturer's installation instructions, and cleaning and
maintenance instructions.

07 Certificates

Theatre Rigging

Theatre Lighting System; G A/E

Sound System; G A/E

Certificate of compliance signed by Contractor attesting that
Theatre Rigging conform to the requirements specified.

1.3.1 Theater Rigging

A. Provide the following for approval sixty days after Notice to Proceed
and prior to commencement of Work:

- a. A complete list of all products to be incorporated within the work
with all quantities listed. Each product shall be listed with
specification section references in Excel format.
- b. Complete functional diagrams of each system required for a complete
and operational system with descriptive narratives of any deviations from
the specified system design.
- c. All shop drawings as defined in this section.

B. Shop Drawings:

1. Shall not be smaller than 24"x36" and shall be sized as appropriate
for thorough understanding of systems.
2. All drawings shall be scaled appropriately but no less than 1/8" = 1'
3. Schematic detailed wiring diagrams showing interconnection of
contractor provided components and fabricated products, wiring and cabling
diagrams depicting cable types, and devise designators. Each component
shall have a unique designator and use same designator throughout the
project.
4. Show location of all equipment in racks, consoles, or on tables, with
complete dimensions, wire routing and cabling within housing.
5. Show all A.C. power outlet locations and terminal strip locations with
in each equipment rack.
6. Plans and sections of the building and adjacent grounds showing the
location of all installed equipment such as loudspeakers, racks, consoles,
plates/panels and antennas, (etc.).
7. Full fabrication details of custom enclosures and millwork indicating
dimensions, material, finish, and openings for equipment.
8. Provide complete drawings for all fabricated plates and panels.
Drawings shall include dimensioned locations of components, component type,

engraving information, plate color information, and a complete bill of materials for each plate.

9. Provide a complete conduit riser and associated conduit plans for a complete conduit system. Include a Junction Box schedule showing type, size mounting style and location of each box.

C. Submittal Format:

1. Each submittal shall be in three ring binders no larger than 3" spines and sized for 150% of material enclosed. Use multiple volumes if necessary.
2. Arrange product data in alphanumeric order.
3. Separate major groupings with labeled binder tabs.
4. Index product data sheets by manufacture and model or part number.
5. Each submittal shall include a unique number scheme and be numbered in consecutive order.
6. Each submittal shall include a complete table of contents with the following information:
 - a. Project title and number.
 - b. Submittal number.
 - c. Date of submission.
7. Referenced addendum or change order numbers as applicable
8. Referenced specification section, part, article, paragraph and page or drawing reference as applicable.

1.4 DELIVERY, STORAGE AND HANDLING

Materials shall be delivered to the building site in the manufacturer's original unopened containers and shall be stored in a clean dry area with temperature maintained above 50 degrees F. Materials shall be stacked according to manufacturer's recommendations. Visual display boards shall be allowed to acclimate to the building temperature for 24 hours prior to installation.

1.5 WARRANTY

Manufacturer's standard performance guarantees or warranties that extend beyond a one year period shall be provided.

1.5.1 Theater Rigging

A. All equipment provided by the Contractor shall be installed per manufacturer's specifications and warranted by the Contractor for a period of one (1) year from date of written acceptance to meet all performance requirements outlined herein. Warranties may not be pro-rated. For all Owner-provided equipment, include pricing for an initial one-year service contract

B. During the warranty period, no charges shall be made for any labor, equipment, or transportation to maintain performance and functions.

C. The Contractor shall respond with remedy to a trouble call within twenty-four (24) hours after receipt of such a call, and shall provide a 24-hour service phone number. Uptime for system(s) shall be no more than 24-hour period. All replacement parts/components shall be of equal or higher level for service.

D. Equivalent replacement equipment shall be temporarily provided when immediate on-site repairs cannot be made.

E. At least two routine inspection and adjustment visits will be scheduled for the first year. Submit reports to the Owner.

F. Provide a separate price for an optional yearly service contract for five years, to begin at the end of the initial warranty and service contract. Provide details on coverage and options.

1.6 THEATER RIGGING

Provide all wiring, plates, connections, and miscellaneous equipment for a complete and operational system whether specified in this or other related documents or not.

1.6.1 Scope of Work

A. The Contractor shall provide theater riggings compatible with the building structure and theater performance space.

B. The Contractor shall provide equipment that, where required, shall conform to the applicable requirements of the Underwriter's Laboratories, Inc., local codes, the National Electrical Code and any other governing codes. Such items shall bear a label or mark indicating their conformance to the above requirements.

C. The Contractor shall provide a complete and operational system configured and installed for user-friendly operation and low maintenance. On-site factory technical support shall be provided if necessary to assure performance.

D. The Contractor shall restore finish hardware to original condition, including painting, ceiling modifications and attachments.

E. Work shall be in compliance with all applicable standards listed above and all governing codes and regulations of the authorities having jurisdiction and the Contract Documents.

F. Coordinate exact location and installation of the equipment, power, conduit, and raceway systems with the Contracting Officer.

G. Provide all necessary labor, materials, equipment accessories, transportation and services required for the installation of a totally integrated self-contained line shaft hoist system consisting of rigging as specified herein.

H. All items of work included in this section shall be furnished and installed under a single contract.

I. In order to maintain a level of proficiency, bidder shall be an experienced theatre contractor. Bids from jobbers, dealers, manufacturers' representatives and the like will not be considered.

J. The rigging system shall consist of (3) three line shaft hoist systems as part of the Base Building system. Bidders shall provide a Base Building Theatrical Rigging Price.

K. The three (3) Base Building Line Shaft sets shall be supplied with Tri-Batten assemblies each.

L. Supply and interface a complete and operational Rigging Control Panel and mounted in the location shown on the drawings.

1.6.2 Related Work

A. Conduits: Review all conduit runs, junction boxes, and electrical outlets provided and installed by the electrical contractor, and provide fit-up drawings based on these. Verify and inspect rough in of all necessary conduits and outlets. Provide a written acceptance of all field conditions, or a list of any discrepancies, within ten (10) working days from Notice To Proceed.

B. Structure: Review all structure that will support the rigging system(s) provided and installed by others and provide coordinated drawings to reflect field conditions. Verify that field conditions will allow for the proper installation and operation of the rigging system.

1.6.3 Bid/Technical Proposals

A. The Theatrical Rigging System Contractor shall be experienced in the provisions of systems similar in complexity to those required for this project and at least meet the following criteria

1. The primary business of the contractor/installer shall be the installation of rigging systems.
2. At least five years experience with the specified equipment and systems.
3. Experience with at least one project of similar size and complexity as outlined in these specifications
4. If installer does not have said experience then it shall be the installer's responsibility to hire a subcontractor that does meet this criterion without additional cost to the Owner.
5. Be a franchised dealer and service facility for the products furnished.
6. Maintain a fully staffed installation crew and service crew for maintenance and installation of the specified systems.
7. At the request of the Owner, Contractor shall demonstrate that he has:
 - a. Adequate facilities and equipment for this work.
 - b. Adequate staff with the appropriate technical expertise and experience for this project.

B. Provide a list of five (5) references with locations, names of contacts, and contact phone information with brief system descriptions and dollar amounts for each reference. References shall be no more than three (3) years old.

C. A detailed list in Microsoft Excel format (both hard copy and disk) showing Item Number, Item Description, Manufacturer, Part Number, Quantity, and Price. Include manufacturer's specification sheets for each piece submitted. This shall be generated from this document and related drawings.

1.7 PROJECT CONDITIONS

1.7.1 Theater Rigging

- A. Verify conditions on the job site applicable this work. Notify Contracting Officer in writing of discrepancies, conflicts, or omissions promptly upon discovery.
- B. If conditions exist on the job site which make it impossible to install work as shown on the drawings or detailed in the specifications, recommend solutions and submit drawings to the Owner for approval showing how the work may be installed.

1.8 FINAL INSPECTION AND TESTING

1.8.1 Theater Rigging

- A. Upon completion of installation and contractor commissioning, the Consultant shall perform inspection and testing.
- B. To assist the Consultant provide a minimum of one person for inspection and two persons for testing who are familiar with all aspects of the system(s).
- C. Process of testing the system(s) may necessitate moving and adjusting certain components.
- D. Testing will include operation of each system and any components deemed necessary. Provide required test equipment, tools, and materials required to perform necessary repairs or adjustments.
- E. In the event further adjustments or work is required during testing, the Contractor shall continue his work until the system(s) is acceptable at no addition to the contract price. If approval is delayed due to defective equipment or failure of equipment or installation to meet the requirements of this specification, the Contractor shall pay for additional time and expenses of the Owner at the rate as specified by the Owner.

1.9 INSTRUCTION OF OWNER PERSONNEL

1.9.1 Theater Rigging

- A. After final inspection and completion, provide instruction to Owner designated personnel on the operation and maintenance of the System(s).
- B. Develop an instructional course based on the use of the system(s) and manufacture's recommendations. Provide a minimum of 5 hours of instruction. Arrange course so that operational and maintenance lasses are separate.
- C. Submit an outline of the course with sample instructional aids for approval 30 days prior to scheduled instruction sessions.

1.10 EXCLUDED WORK

- A. All conduit pull boxes and High Voltage field wiring for rigging.
- B. Structural steel support not specifically called out as part of this section.

1.11 OPERATION AND MAINTENANCE DATA

- A. Submit operation and maintenance data.
- B. Information to specifically include the following:
 - 1. Operating instructions for all systems.
 - 2. User maintenance instructions.
 - 3. Reduced 11" x 17" drawings of all systems.

1.12 THEATRICAL LIGHTING SYSTEM

PART 1 - THEATRICAL LIGHTING SYSTEM GENERAL

1.01 SECTION INCLUDES

- A. General: Comply with all Contract Documents, including Divisions 1 through 16 of the general contract specifications.
- B. Statement of Work: The work of this section includes, but is not necessarily limited to, the following:
 - 1. Provide, and install complete and operational Theatrical Lighting System as outlined in these specifications and related drawings and documentation requirements as set forth in this documentation.
 - 2. It is the responsibility of the Contractor to provide all wiring, plates, connections, and miscellaneous equipment for a complete and operational system weather specified in this or other related documents or not.
- C. Coordination, provision, installation, inspection, testing, instruction, and warranties of the Theatrical Lighting System.
- D. All facilities, materials, equipment, transportation, and necessary labor for a complete and operational Theatrical Lighting System.
- E. Additional Section information:
 - 1. Required licenses and permits including any required bonding or insurance requirements that comply with General Conditions of specifications and contract documentations.
 - 2. Verification of dimensions and conditions at the job site.
 - 3. Installation in accordance with the contract documentation, applicable installation procedures or codes as set forth by the state or county of the project or manufactures recommendations.
 - 4. Submittal information and provisions.
 - 5. Instruction of operating personnel.

6. Manuals and provisions thereof.
7. Maintenance and warranties.

F. Definitions:

1. "Contractor" - Installer who has been awarded the contract to perform the work.
2. The term "shall" is mandatory, the term "will" is informative, and the term "should" is advisory.
3. "Provide and install" - To supply, install, and connect up complete and ready for safe and regular operation.
4. "Indicated", "shown", or "noted" - As indicated, shown or noted on drawings or specifications.
5. "Equivalent", "similar", or "equal" - Of base bid manufacturer, equal in materials, size, color, design, and efficiency of specified product, conforming to base bid manufacturers.
6. "Reviewed", "satisfactory", "accepted", "approved", "directed" - As reviewed, satisfactory, accepted, approved, or directed by the Owner.
7. "Professional grade" - Equipment that is intended for commercial, not residential, use and is rated for continuous duty.
8. "User-friendly controls" - Controls that are designed and laid out for ease of use, in a logical, easily recognizable format that utilizes industry standard symbols wherever applicable.
9. "Labels" - All labels on audio-visual equipment and racks shall be self-adhering black laminate with white engraved letters as specified in sections 3.3 and 3.4.

G. Below is a listing of specification standards, tests or recommended installation methods or procedures or applicable installation or safety codes:

1. National Electric Code (NEC)
2. National Electrical Manufacture's Association (NEMA)
3. Underwriters Laboratories (UL)
4. Electronics Industries Association (E.I.A.)
5. American National Safety Institute (ANSI)

1.02 SCOPE OF WORK

A. The Contractor shall provide Theatrical Lighting compatible with the Owner's communications systems and operations.

B. The Contractor shall provide equipment that, where required, shall conform to the applicable requirements of the Underwriter's Laboratories, Inc., local codes, the National Electrical Code and any other governing codes. Such items shall bear a label or mark indicating their conformance to the above requirements.

C. The Contractor shall provide a complete and operational system configured and installed for user-friendly operation and low maintenance. Assist the Owner in a first session fixture focusing training session. On-site factory technical support shall be provided if necessary to assure performance.

D. The Contractor shall restore finish hardware to original condition, including painting, ceiling modifications and attachments.

E. Work shall be in compliance with all applicable standards listed above and all governing codes and regulations of the authorities having

jurisdiction and the Contract Documents.

F. Coordinate exact location and installation of the equipment, power, conduit, and raceway systems with the Architect.

1.03 SYSTEM DESCRIPTION AND REQUIREMENTS

A. The following is for a basic system description and is not intended to be exhaustive in nature and is not complete for proper installation or operation of system.

B. Provide a Theatrical Lighting System for the Gym/Auditorium. System shall contain one 24 bay dual dimmer rack with a total of 48 total dimmable circuits. Dimming system shall be capable of Dimming Double for and additional 48 dimmable circuits if required (not provided for in this specification) Dimmer rack shall supply circuits to four floor box locations, two on-stage power locations integrated with the rigging system and two valance locations located in front of the proscenium area.

C. A 24/48-control console shall be supplied with the system for complete control and presets of the lighting systems. Console shall allow for easy, "on-the-fly" adjustments of more elaborate show type controls.

D. An assortment of fixtures shall be supplied with the system. Fixtures shall be supplied with lamps, safety cables and "C" clamps

1.04 RELATED WORK

A. Conduits: Review all conduit runs, junction boxes, and electrical outlets provided and installed by the electrical contractor, and provide fit-up drawings based on these. Verify and inspect rough in of all necessary conduits and outlets. Provide a written acceptance of all field conditions, or a list of any discrepancies, within ten (10) working days from Notice To Proceed.

1.05 DELIVERY, STORAGE, AND HANDLING

A. The Contractor shall carefully control handling and installation of all items, which are not immediately replaceable, so that completion of the work will not be delayed by hardware or equipment losses before, during, and after installation. The Contractor is responsible for all items until final acceptance.

B. Prior to installation, protect exposed surfaces with material, which is easily removed without marring finishes.

C. Without cost to the Owner replace product damaged during storage or handling.

1.06 SCHEDULING

A. The Contractor shall submit a schedule to the Owner for approval. Show sequence of work, etc. from time of notice to proceed to final sign off of project. This schedule shall be submitted on Microsoft Project both paper and electronic form with submittals.

B. It shall be the responsibility of the Contractor to coordinate the installation of the system to be compatible with the work of other trades. The Contractor shall attend weekly progress meetings and provide continuous on-site project management.

C. It shall be the responsibility of the Contractor to arrange with The Owner a mutually acceptable time for Acceptance Testing, based upon the dates provided in the Solicitation.

D. The Contractor shall provide operating personnel with extensive training for each system type and room type as outlined in section 1.03.

1.07 BID/TECHNICAL PROPOSALS

A. A mandatory pre-bid site visit will be utilized to allow the contractor to see the current jobsite conditions. This meeting will be scheduled in advance with the owner.

B. The Theatrical Lighting System Contractor shall be experienced in the provisions of systems similar in complexity to those required for this project and at least meet the following criteria

1. The primary business of the contractor/installer shall be the installation of theater lighting systems.
2. At least five years experience with the specified equipment and systems.
3. Experience with at least one project of similar size and complexity as outlined in these specifications
4. Be a franchised dealer and service facility for the products furnished.
5. Maintain a fully staffed installation crew and service crew for maintenance and installation of the specified systems.
6. Lead installed shall have factory trained DSP and digital format classes for equipment specified in this specification.
7. Theatrical Lighting System shall be approved by the Owner, Architect and Consultant.
8. At the request of the Owner, Contractor shall demonstrate that he has:
 - a. Adequate facilities and equipment for this work.
 - b. Adequate staff with the appropriate technical expertise and experience for this project.

C. Provide a list of five (5) references with locations, names of contacts, and contact phone information with brief system descriptions and dollar amounts for each reference. References shall be no more than three (3) years old.

D. A detailed list in Microsoft Excel format (both hard copy and disk) showing Item Number, Item Description, Manufacturer, Part Number, Quantity, and Price. Include manufacturer's specification sheets for each piece submitted. This shall be generated from this document and related drawings.

1.08 SUBMITTALS

A. Provide the following for approval sixty days after Notice to Proceed and prior to commencement of Work:

1. A complete list of all products to be incorporated within the work with all quantities listed. Each product shall be listed with specification section references in Excel format.
2. Complete functional diagrams of each system required for a complete and operational system with descriptive narratives of any deviations from the specified system design.
3. All shop drawings as defined in this section.

B. Shop Drawings:

1. Shall not be smaller than 24"x36" and shall be sized as appropriate for thorough understanding of systems.
2. All drawings shall be scaled appropriately but no less than 1/8" = 1'
3. Schematic detailed wiring diagrams showing interconnection of contractor provided components and fabricated products, wiring and cabling diagrams depicting cable types, and device designators. Each component shall have a unique designator and use same designator throughout the project.
4. Show location of all equipment in racks, consoles, or on tables, with complete dimensions, wire routing and cabling within housing.
5. Show all A.C. power outlet locations and terminal strip locations with in each equipment rack.
6. Plans and sections of the building and adjacent grounds showing the location of all installed equipment such as dimmers, connector strips, floor boxes (etc.).
7. Full fabrication details of custom enclosures and millwork indicating dimensions, material, finish, and openings for equipment.
8. Provide complete drawings for all fabricated plates and panels. Drawings shall include dimensioned locations of components, component type, engraving information, plate color information, and a complete bill of materials for each plate.
9. Complete labeling schemes for all cabling and equipment components for project. Include font size and styles along with a sample of cable label and equipment label. All labeling shall be consistent with-in the project scope.
10. A complete wire schedule showing source and destination and indicating conduit location and sizing. Provide conduit sizing and layout with at least a 20% oversize for project utilization for future system growth.
11. Provide a complete conduit riser and associated conduit plans for a complete conduit system. Include a Junction Box schedule showing type, size mounting style and location of each box.

C. Submittal Format:

1. Each submittal shall be in three ring binders no larger than 3" spines and sized for 150% of material enclosed. Use multiple volumes if necessary.
2. Arrange product data in alphanumeric order.
3. Separate major groupings with labeled binder tabs.
4. Index product data sheets by manufacture and model or part number.
5. Each submittal shall include a unique number scheme and be numbered in consecutive order.
6. Each submittal shall include a complete table of contents with the following information:
 - a. Project title and number.
 - b. Submittal number.
 - c. Date of submission.
 - d. Referenced addendum or change order numbers as applicable
 - e. Referenced specification section, part, article, paragraph and page or drawing reference as applicable.

1.09 PROJECT CONDITIONS

- A. Verify conditions on the job site applicable this work. Notify Owner's Representative in writing of discrepancies, conflicts, or omissions promptly upon discovery.
- B. If conditions exist on the job site which make it impossible to install work as shown on the drawings or detailed in the specifications,

recommend solutions and submit drawings to the Owner for approval showing how the work may be installed.

1.10 FINAL INSPECTION AND TESTING

- A. Upon completion of installation and contractor commissioning as outlined in Section 3, the Consultant shall perform inspection and testing.
- B. To assist the Consultant provide a minimum of one person for inspection and two persons for testing who are familiar with all aspects of the system(s).
- C. Process of testing the system(s) may necessitate moving and adjusting certain components.
- D. Testing will include operation of each system and any components deemed necessary. Provide required test equipment, tools, and materials required to perform necessary repairs or adjustments.
- E. In the event further adjustments or work is required during testing, the Contractor shall continue his work until the system(s) is acceptable at no addition to the contract price. If approval is delayed due to defective equipment or failure of equipment or installation to meet the requirements of this specification, the Contractor shall pay for additional time and expenses of the Owner at the rate as specified by the Owner.

1.11 WARRANTY

- A. All equipment provided by the Contractor shall be installed per manufacturer's specifications and warranted by the Contractor for a period of one (1) year from date of written acceptance to meet all performance requirements outlined herein. Warranties may not be pro-rated. For all Owner-provided equipment, include pricing for an initial one-year service contract.
- B. During the warranty period, no charges shall be made for any labor, equipment, or transportation to maintain performance and functions.
- C. The Contractor shall respond with remedy to a trouble call within twenty-four (24) hours after receipt of such a call, and shall provide a 24-hour service phone number. Uptime for system(s) shall be no more than 24-hour period. All replacement parts/components shall be of equal or higher level for service.
- D. Equivalent replacement equipment shall be temporarily provided when immediate on-site repairs cannot be made.
- E. At least two routine inspection and adjustment visits will be scheduled for the first year. Submit reports to the Owner.
- F. Provide a separate price for an optional yearly service contract for five years, to begin at the end of the initial warranty and service contract. Provide details on coverage and options.

1.12 INSTRUCTION OF OWNER PERSONNEL

- A. After final inspection and completion, provide instruction to Owner designated personnel on the operation and maintenance of the System(s).
- B. Develop an instructional course based on the use of the system(s) and manufacture's recommendations. Provide a minimum of 12 hours of instruction. Arrange course so that operational and maintenance classes are

separate.

C. Submit an outline of the course with sample instructional aids for approval 30 days prior to scheduled instruction sessions.

D. Theatrical Lighting System Contractor shall be present at first system use event.

1.13 SOUND SYSTEM

PART 1 - SOUND SYSTEM GENERAL

1.01 SECTION INCLUDES

A. General: Comply with all Contract Documents, including Divisions 1 through 16 of the general contract specifications.

B. Statement of Work: The work of this section includes, but is not necessarily limited to, the following:

1. Provide, and install complete and operational Sound System (s) as outlined in these specifications and related drawings and documentation requirements as set forth in this documentation.

2. It is the responsibility of the Contractor to provide all wiring, plates, connections, and miscellaneous equipment for a complete and operational system weather specified in this or other related documents or not.

C. Coordination, provision, installation, inspection, testing, instruction, and warranties of the Sound System.

D. All facilities, materials, equipment, transportation, and necessary labor for a complete and operational Sound System.

E. Additional Section information:

1. Required licenses and permits including any required bonding or insurance requirements that comply with General Conditions of specifications and contract documentations.

2. Verification of dimensions and conditions at the job site.

3. Installation in accordance with the contract documentation, applicable installation procedures or codes as set forth by the state or county of the project or manufactures recommendations.

4. Submittal information and provisions.

5. Documented sound system testing procedures.

6. Instruction of operating personnel.

7. Manuals and provisions thereof.

8. Maintenance and warranties.

F. Definitions:

1. "Contractor" - Installer who has been awarded the contract to perform the work.

2. The term "shall" is mandatory, the term "will" is informative, and the term "should" is advisory.

3. "Provide and install" - To supply, install, and connect up complete and ready for safe and regular operation.

4. "Indicated", "shown", or "noted" - As indicated, shown or noted on

drawings or specifications.

5. "Equivalent", "similar", or "equal" - Of base bid manufacturer, equal in materials, size, color, design, and efficiency of specified product, conforming to base bid manufacturers.

6. "Reviewed", "satisfactory", "accepted", "approved", "directed" - As reviewed, satisfactory, accepted, approved, or directed by the Owner.

7. "Professional grade" - Equipment that is intended for commercial, not residential, use and is rated for continuous duty.

8. "User-friendly controls" - Controls that are designed and laid out for ease of use, in a logical, easily recognizable format that utilizes industry standard symbols wherever applicable.

9. "Labels" - All labels on audio-visual equipment and racks shall be self-adhering black laminate with white engraved letters as specified in sections 3.3 and 3.4.

G. Below is a listing of specification standards, tests or recommended installation methods or procedures or applicable installation or safety codes:

1. National Electric Code (NEC)
2. National Electrical Manufacture's Association (NEMA)
3. Underwriters Laboratories (UL)
4. Electronics Industries Association (E.I.A.)
5. American National Safety Institute (ANSI)
6. Sound System Engineering, by Davis and Davis Second Addition published by SAMS
7. Audio System - Design and Installation, by Giddings published by SAMS

1.02 SCOPE OF WORK

A. The Contractor shall provide audio-visual systems compatible with the Owner's communications systems (i.e. telephone, video, and computer systems) and operations.

B. The Contractor shall provide equipment that, where required, shall conform to the applicable requirements of the Underwriter's Laboratories, Inc., local codes, the National Electrical Code and any other governing codes. Such items shall bear a label or mark indicating their conformance to the above requirements.

C. The Contractor shall provide a complete and operational system configured and installed for user-friendly operation and low maintenance. Provide for two reprogrammings of the remote control software, as directed by the Owner, before Final Acceptance. Provide for two level adjustments of the audio systems, as directed by the Owner, before Final Acceptance. On-site factory technical support shall be provided if necessary to assure performance.

D. The Contractor shall restore finish hardware to original condition, including painting, ceiling modifications and attachments.

E. Work shall be in compliance with all applicable standards listed above and all governing codes and regulations of the authorities having jurisdiction and the Contract Documents.

F. Coordinate exact location and installation of the equipment, power, conduit, and raceway systems with the Architect.

1.03 SYSTEM DESCRIPTION AND REQUIREMENTS

A. The following is for a basic system description and is not intended to be exhaustive in nature and is not complete for proper installation or operation of system.

B. The Sound System shall be comprised of the Gym sound system capable of supplying clean crisp high quality audio reinforcement for music, vocal, and live performances throughout the seating area. The volume coverage supplied by the speaker system shall obtain within 3dB coverage from and seating area in the Gym area at 2,000Hz. The main speaker system shall consist of a Left and Right full range speaker mounted in cavities with grille cloth covering the front on either side of the proscenium. A single mono delay speaker mounted on the rear side of the moveable partition shall supply coverage to the rear seating area. The system shall multiple source input decks and wireless microphones. A 24 channel mixing console shall be located in the booth for control of any of the source inputs.

C. A monitor system shall allow playback of audio to the stage area, either stage-flown speakers or floor monitors.

D. A Back Ground System shall be supplied for the Gym Foyer area and the two restrooms located just off of the Gym Foyer. A volume control panel, located in the booth equipment rack will allow independent adjustment of each of the three zones.

E. A small two-channel production intercom system shall allow for intercommunications from the booth to the stage area at five belt pack locations

1.04 RELATED WORK

A. Conduits: Review all conduit runs, junction boxes, and electrical outlets provided and installed by the electrical contractor, and provide fit-up drawings based on these. Verify and inspect rough in of all necessary conduits and outlets. Provide a written acceptance of all field conditions, or a list of any discrepancies, within ten (10) working days from Notice To Proceed.

1.05 DELIVERY, STORAGE, AND HANDLING

A. The Contractor shall carefully control handling and installation of all items, which are not immediately replaceable, so that completion of the work will not be delayed by hardware or equipment losses before, during, and after installation. The Contractor is responsible for all items until final acceptance.

B. Prior to installation, protect exposed surfaces with material, which is easily removed without marring finishes.

C. Without cost to the Owner replace product damaged during storage or handling.

1.06 SCHEDULING

A. The Contractor shall submit a schedule to the Owner for approval.

Show sequence of work, etc. from time of notice to proceed to final sign off of project. This schedule shall be submitted on Microsoft Project both paper and electronic form with submittals.

B. It shall be the responsibility of the Contractor to coordinate the installation of the system to be compatible with the work of other trades. The Contractor shall attend weekly progress meetings and provide continuous on-site project management.

C. It shall be the responsibility of the Contractor to arrange with The Owner a mutually acceptable time for Acceptance Testing, based upon the dates provided in the Solicitation.

D. The Contractor shall provide operating personnel with extensive training for each system type and room type as outlined in section 1.10.

1.07 BID/TECHNICAL PROPOSALS

A. A mandatory pre-bid site visit will be utilized to allow the contractor to see the current jobsite conditions. This meeting will be scheduled in advance with the owner.

B. The Sound System installer shall be experienced in the provisions of systems similar in complexity to those required for this project and at least meet the following criteria

1. The primary business of the contractor/installer shall be the installation of audio or video systems.
2. At least five years experience with the specified equipment and systems.
3. Experience with at least one project of similar size and complexity as outlined in these specifications
4. Experience with rigging and tuning large scale fixed loudspeaker clusters similar to that specified with installation of similar cluster within the last two years. If installer does not have said experience then it shall be the installer's responsibility to hire a subcontractor that does meet this criterion without additional cost to the Owner.
5. Be a franchised dealer and service facility for the products furnished.
6. Maintain a fully staffed installation crew and service crew for maintainance and installation of the specified systems.
7. Lead installed shall have factory trained DSP and digital format classes for equipment specified in this specification.
8. Sound System shall be approved by the Owner, Architect and Consultant.
9. At the request of the Owner, Contractor shall demonstrate that he has:
 - a. Adequate facilities and equipment for this work.
 - b. Adequate staff with the appropriate technical expertise and experience for this project.

C. Provide a list of five (5) references with locations, names of contacts, and contact phone information with brief system descriptions and dollar amounts for each reference. References shall be no more than three (3) years old.

D. A detailed list in Microsoft Excel format (both hard copy and disk) showing Item Number, Item Description, Manufacturer, Part Number, Quantity, Heat in Watts, Weight, and Price. Include manufacturer's specification sheets for each piece submitted. This shall be generated from this document and related drawings.

1.08 SUBMITTALS

A. Provide the following for approval sixty days after Notice to Proceed and prior to commencement of Work:

1. A complete list of all products to be incorporated within the work with all quantities listed. Each product shall be listed with specification section references in Excel format.
2. Complete functional diagrams of each system required for a complete and operational system with descriptive narratives of any deviations from the specified system design.
3. All shop drawings as defined in this section.
4. Suspended loudspeakers rigging design with a Professional Engineer's certification. Loudspeaker clusters shall not be installed before Engineer's certification has been submitted. Stamped approval of all rigging shall be made from this same Engineer within the State of the project.

B. Shop Drawings:

1. Shall not be smaller than 24"x36" and shall be sized as appropriate for thorough understanding of systems.
2. All drawings shall be scaled appropriately but no less than 1/8" = 1'
3. Schematic detailed wiring diagrams showing interconnection of contractor provided components and fabricated products, wiring and cabling diagrams depicting cable types, and devise designators. Each component shall have a unique designator and use same designator throughout the project.
4. Show location of all equipment in racks, consoles, or on tables, with complete dimensions, wire routing and cabling within housing.
5. Show all A.C. power outlet locations and terminal strip locations with in each equipment rack.
6. Plans and sections of the building and adjacent grounds showing the location of all installed equipment such as loudspeakers, racks, consoles, plates/panels and antennas, (etc.).
7. Patch panel layouts and labeling strips, including color schemes as necessary.
8. Full fabrication details of custom enclosures and millwork indicating dimensions, material, finish, and openings for equipment.
9. All speaker mounting details including hardware types and load capacity. Structural information with design calculations and a copy of the PE's certifications for each item/drawing.
10. Provide complete drawings for all fabricated plates and panels. Drawings shall include dimensioned locations of components, component type, engraving information, plate color information, and a complete bill of materials for each plate.
11. Complete labeling schemes for all cabling and equipment components for project. Include font size and styles along with a sample of cable label and equipment label. All labeling shall be consistent with-in the project scope.
12. A complete wire schedule showing source and destination and indicating conduit location and sizing. Provide conduit sizing and layout with at least a 20% oversize for project utilization for future system growth.
13. Provide a complete conduit riser and associated conduit plans for a complete conduit system. Include a Junction Box schedule showing type, size mounting style and location of each box.

C. Submittal Format:

1. Each submittal shall be in three ring binders no larger than 3" spines and sized for 150% of material enclosed. Use multiple volumes if necessary.
2. Arrange product data in alphanumeric order.
3. Separate major groupings with labeled binder tabs.
4. Index product data sheets by manufacture and model or part number.
5. Each submittal shall include a unique number scheme and be numbered in consecutive order.
6. Each submittal shall include a complete table of contents with the following information:
 - a. Project title and number.
 - b. Submittal number.
 - c. Date of submission.
7. Referenced addendum or change order numbers as applicable
8. Referenced specification section, part, article, paragraph and page or drawing reference as applicable.

1.08 PROJECT CONDITIONS

- A. Verify conditions on the job site applicable this work. Notify Owner's Representative in writing of discrepancies, conflicts, or omissions promptly upon discovery.
- B. If conditions exist on the job site which make it impossible to install work as shown on the drawings or detailed in the specifications, recommend solutions and submit drawings to the Owner for approval showing how the work may be installed.

1.09 FINAL INSPECTION AND TESTING

- A. Upon completion of installation and contractor commissioning as outlined in Section 3, the Consultant shall perform inspection and testing.
- B. To assist the Consultant provide a minimum of one person for inspection and two persons for testing who are familiar with all aspects of the system(s).
- C. Process of testing the system(s) may necessitate moving and adjusting certain components such as speaker aiming and transformer tap values.
- D. Testing will include operation of each system and any components deemed necessary. Provide required test equipment, tools, and materials required to perform necessary repairs or adjustments.
- E. In the event further adjustments or work is required during testing, the Contractor shall continue his work until the system(s) is acceptable at no addition to the contract price. If approval is delayed due to defective equipment or failure of equipment or installation to meet the requirements of this specification, the Contractor shall pay for additional time and expenses of the Owner at the rate as specified by the Owner.

1.10 WARRANTY

- A. All equipment provided by the Contractor shall be installed per manufacturer's specifications and warranted by the Contractor for a period of one (1) year from date of written acceptance to meet all performance requirements outlined herein. Warranties may not be pro-rated. For all Owner-provided equipment, include pricing for an initial one-year service contract.
- B. During the warranty period, no charges shall be made for any labor, equipment, or transportation to maintain performance and functions.
- C. The Contractor shall respond with remedy to a trouble call within

twenty-four (24) hours after receipt of such a call, and shall provide a 24-hour service phone number. Uptime for system(s) shall be no more than 24-hour period. All replacement parts/components shall be of equal or higher level for service.

D. Equivalent replacement equipment shall be temporarily provided when immediate on-site repairs cannot be made.

E. At least two routine inspection and adjustment visits will be scheduled for the first year. Submit reports to the Owner.

F. Provide a separate price for an optional yearly service contract for five years, to begin at the end of the initial warranty and service contract. Provide details on coverage and options.

1.11 INSTRUCTION OF OWNER PERSONNEL

A. After final inspection and completion, provide instruction to Owner designated personnel on the operation and maintenance of the System(s).

B. Develop an instructional course based on the use of the system(s) and manufacture's recommendations. Provide a minimum of 32 hours of instruction. Arrange course so that operational and maintenance classes are separate.

C. Submit an outline of the course with sample instructional aids for approval 30 days prior to scheduled instruction sessions.

D. Sound system Contractor shall be present at first three system use events and three additional events as requested by the Owner.

PART 2 PRODUCTS

2.1 THEATER RIGGING

A. System to consist of 3(three) total self-contained line shaft hoists. Each line shaft hoist price shall be a complete and operational system with all necessary components to have a working system. Each batten to be equipment with drums, for 40 ft. of travel. Each hoist to consist of a mounting steel frame (complete with necessary mounting hardware), an electric motor with a fail safe brake, a gear box with a secondary braking system, tandemly connected helically grooved cable drums, a reversing starter, fused disconnect and a 4-element limit switch. Contractor shall provide three 35' Tri-Batten assemblies.

B. Control of the electric motors to be by a key-operated motor control panel mounted on the stage wall.

C. Materials

1. Line Shaft Hoist

a. Live load capacity to be 2,000 pounds, speed 23 FPM, travel distance 40 feet.

b. Motor power to be 208-230/460 VAC, 3 Phase, 60 Hertz. Each brake motor to be equipped with integral 220/440 Volt, Single Phase, spring

loaded, electrically released disc brakes capable of stopping the rated load at full speed within a maximum distance of 6". Horsepower to be as required. Minimum service factor to be 1.15.

c. Speed reducers to be self-locking, single or double worm gear unit, direct shaft connected to both the motor/brake and the drums. Open gears, chains or V-belt drives will not be allowed. Minimum service factor to be 1.0.

d. Winch cable drums to have a minimum diameter of 7.5" with helical grooves machined into the drum surface for
Required cable size and 40 ft of travel. Maximum allowable distance between the lines is 12 feet.

e. Wire rope shall be 7 x 19 galvanized aircraft cable, sized for minimum factor of safety of 8. Maximum load to be determined based on continuous beam theory.

f. Equip each winch with adjustable four-element rotary limit switch to stop winch at top and bottom extremes of travel, as well as upper and lower trim heights. Second set of limit switches is to serve as back up to normal operating limit switches.

2. Pipe Battens/Tri-Battens

a. Battens: Spliced piece of 1-1/2" Schedule 40 black steel pipe. Weld splices with 12" solid steel sleeves with welded/bolted connections.

b. Tri-Battens: Provide Tri-Batten systems for connection to the Line Shaft System(s) as noted on drawings and stated in related specifications. Tri-Battens shall be provided with all necessary mounting accessories and curtain accessories to provide a complete operational system.

3. Steel Mounting Frame (Self-Contained)

a. Supply a 1.25 foot wide tubular steel frame to support the entire assembly, including winch, drums and shaft, plus pre-wired motor control panels. Length to be as required.

4. Control Panel

a. Provide a wall-mountable control panel, to allow operation of all hoists. PAC Model 626W series. The panel to be a NEMA 12 enclosure, equipped with the following:

- An On/Off key switch.
- A power "On" indicator light.
- Mushroom head, illuminated, maintained Emergency Stop button.
- An Up/Off/Down, spring return to center, rocker switch, one for each hoist.

b. Panel to be located as shown on the drawings

2.2 THEATRICAL LIGHTING SYSTEM

PART 2 - THEATRICAL LIGHTING PRODUCTS

2.01 MANUFACTURERS

- A. Electronic component models shall be commercially available for at least one (1) year prior to bid, or be approved by The Owner.
- B. All equipment and material shall be new.
- C. All equipment must be UL listed or built to UL standards, where required.

2.02 GENERAL

- A. All equipment shall be professional grade and rated for continuous duty. Basic guidelines have been prepared with manufacturer names, makes, and model numbers included as minimum performance requirements. These must be satisfied, unless a variance (separate document) is submitted and approved by the Owner.
- B. System shall be installed and configured for simplicity of operation, with user-friendly controls.
- C. Product quantity is as required for a complete and operable system. If any quantities are given, Theatrical Lighting System Contractor shall provide at least the given amount. Some of the product listed under this section may not be required to fulfill the work as outlined.
- D. Regardless of the length or completeness of the descriptive paragraphs listed herein, each device shall meet published manufacture's specifications.
- E. Remove all manufacture's nameplates or logos from product within the public site lines or spaces.
- F. Paint all wall and ceiling mounted speaker grilles and enclosures as directed by the Architect.
- G. System shall be installed and configured for simplicity of operation, with user-friendly controls.

2.03 DIMMING RACKS/POWER DISTRIBUTION

- A. Dimmer Rack (SENSOR SR24):
 - 1. 24 Dual 20Amp Slots
 - 2. Dimming Double Capable
 - 3. Up To 32 Backup looks in Memory
 - 4. DMX 512Controlable, ETC Link
 - 5. Equipped w/ Sound Suppression Hood System
 - 6. Single or Three Phase Power
 - 7. 100k AIC Rack Rating
- B. Connector Strips (CONNECTOR STRIP):
 - 1. 18 gauge steel
 - 2. Connectors Available: U-Ground, Stage Pin, Twist lock, DMX
 - 3. Various Lengths and Connector Spacing Capable
 - 4. Surface Connectors or pigtails
 - 5. DMX outlet capable
 - 6. Supplied with hangers
- C. Theater Lighting Junction Boxes (JB "X"):

1. 18/14 gauge steel
 2. Barrier strips/connectors for quick installation
 3. DMX outlet box available
 4. Compatible with lighting control system
- D. Theater Lighting Floor Boxes (FB2):
1. 16 gauge steel housing
 1. 3/8" grade cast iron hinged cover
 2. Insert plate with power connectors
 3. Supplied with wood screws
 4. Color: Black

2.04 THEATERICAL LIGHTING CONSOLE

- A. Light Control Console (CONSOLE):
1. 48 channels
 2. 1024 DMX outputs
 3. 600 cues, 500 groups, 2000 macros
 4. 2 scene presets, preset focus points
 5. MIDI Show control
 6. On-Board diskette drive
 7. Single VGA output
 8. Print port

2.05 FIXTURES

- A. Lighting Fixtures:
1. Die cast Aluminum
 2. 25deg rotate able shutter
 3. 20 gauge stainless steel shutters
 4. Two accessories slots and top mounted gel frame
 5. Lamp: 750W max
 6. Supplied with Steel C-Clamp
 7. Available in 5, 10, 19, 26, 36, 50deg versions
 8. Plastic fresnel lens
 9. Acceptable product:
- Source Four - Supply the following:

- 10 - 450A
- 5 - 436A
- 10 - 426A
- 10 - PAR-EA-A
- 35 - 400SC
- 40 - HPL575/115

2.06 PLATES AND PANELS:

- A. Provide plates and panels as described in the drawings and as required for a fully operation system.
- B. Custom plates shall be 1/8" thick aluminum, standard EIA sizes, brushed black anodized finished unless otherwise noted
- C. Plastic plates are not allowed
- D. Lettering shall be in all caps and numbers engraved with a color contrasting to the base material with a minimum size of 0.25".

2.07 CABLES AND WIRING:

- A. All audio cable shall be stranded cooper.
- B. Shielded cables located in raceways shall have aluminum foil shield with drain wire.
- C. Where speaker cables are run exposed in return plenum space provide plenum rated cable.
- D. Where cables are routed through cable tray provide tray rated cable of equal gauge
- E. Provide the following as required for a fully operable system:
 - 1. Microphone level cables: No. 22 shielded jacketed - West Penn 452 with gray jacket
 - 2. Line level cables: No 22 shielded jacketed - West Penn 452 with gray jacket
 - 3. Constant voltage speakers: amplifier to zone: Min No. 14 gauge jacketed - West Penn 226
 - 4. Constant voltage speakers: plenum rated amplifier to zone: No. 14 gauge jacketed - West Penn 25226.
 - 5. Constant voltage speakers: within zone No. 16 gauge jacketed - West Penn 225
 - 6. Constant voltage speakers: within zone plenum No. 16 gauge jacketed - West Penn 252225
 - 7. Communication Outlet Cables: No. 20 shielded - West Penn 293
 - 8. Control cables: No. 20 shielded - West Penn 293
 - i. Loudspeaker Cable: No. 10 THHN provide different colors for each pass band type, supply plenum as required.
 - j. Antenna Cable: RG-59 minimum refer to manufactures specifications and recommendations as required.
 - k. RGB Video Cable: Belden 1406B, 1407B, 1417B as required
 - l. RGB Riser: Belden 7710A, 7711A, 7712A, 7713A as required
 - m. RGB Plenum Rated: Belden 1824A, 1825A, 1826A as required
 - n. SVHS Cables: Belden 1808A as required
 - o. Precision Video Cable: Belden 8281 as required

2.08 PROPOSED SUBSTITUTIONS

- A. Where specific equipment is described, it is not the intention to discriminate against the products of other manufacturers, but rather to establish a standard of quality. All proposed substitutions should be submitted as alternates with complete data.
- B. The Owner requires manufacturer's original specification tests. The Owner will evaluate and approve all substitutions.
- C. Items designated "no substitution" will be specified item only. Submission of items other than specified will not be considered.

2.3 SOUND SYSTEM

PART 2 - SOUND SYTEM PRODUCTS

2.01 MANUFACTURERS

A. Electronic component models shall be commercially available for at least one (1) year prior to bid, or be approved by The Owner.

B. All equipment and material shall be new.

C. All equipment must be UL listed or built to UL standards, where required.

2.02 GENERAL

A. All equipment shall be professional grade and rated for continuous duty. Basic guidelines have been prepared with manufacturer names, makes, and model numbers included as minimum performance requirements. These must be satisfied, unless a variance (separate document) is submitted and approved by the Owner.

B. System shall be installed and configured for simplicity of operation, with user-friendly controls.

C. Product quantity is as required for a complete and operable system. If any quantities are given, Sound System Contractor shall provide at least the given amount. Some of the product listed under this section may not be required to fulfill the work as outlined.

D. Regardless of the length or completeness of the descriptive paragraphs listed herein, each device shall meet published manufacture's specifications.

E. Remove all manufacture's nameplates or logos from product, such as found on speaker(s) within the public site lines or spaces.

F. Paint all wall and ceiling mounted speaker grilles and enclosures as directed by the Architect.

G. System shall be installed and configured for simplicity of operation, with user-friendly controls.

2.03 INPUT SOURCES

- A. Combo Cassette/CD Player (COMBO):
1. Independent Cassette and CD Player
 2. Cassette Recording and playback capable
 3. CD to Cassette recording capable
 4. Dolby B & C noise reduction
 5. Pitch Control
 6. Wired Remote shall be included
 7. Deck shall be rack mounted

2.04 SIGNAL PROCESSING

- A. Digital Signal Processors (DSP):
1. All system parameters shall be software controllable via serial port
 2. Software shall be supplied with DSP
 3. System signal processing shall include crossover functions, parametric and graphic equalization, delay, compression, limiting, and feedback suppression
 4. Software shall allow for easy and flexible configuration of the DSP

5. DSP shall have at least 4 inputs with at least 8 outputs configurable in any configuration.
 6. DSP shall include user definable preset configurations
 7. All input and outputs shall be electronically balanced
 8. Provide appropriate serial cables as required for computer interface
 9. Contractor shall utilize software configuration as supplied by Consultant and shall submit finals for approval
 10. Provide the latest release version of software
 11. Processor shall be rack mounted
- B. 1/3oct. Graphic Equalizer (EQ)
1. Graphic Equalizer with Limiter and Type III Noise Reduction
 2. Shall be single channel or dual channel as required
 3. Shall have XLR, 1.4" and Barrier strip inputs and outputs
 4. LED ladders for metering
 5. Processor shall be rack mounted
- C. Effect Processor (EFFECT)
1. Professional multi-effect processor
 2. True stereo 2 input 2 output
 3. Sampling frequency of 44.1khz
 4. Preset memory up to 99
 5. User memory card capable
 6. Midi controllable
 7. Processor shall be rack mounted

2.05 CONSOLES AND MIXERS

- A. FOH Reinforcement Console (CONSOLE):
1. 22 mono channels with 2 stereo channels
 2. 2 stereo channels located to the right of the center master section
 3. 4 groups
 4. 6 aux sends
 5. FOH or monitor console configurable
 6. Inserts on all channels and groups
 7. 2 stereo returns
 8. Provide console lights as required to populate console light connectors

2.06 AMPLIFIERS

- A. Power Amplifiers
1. Amplifiers shall be of same amplifier family and manufacture whenever possible
 2. Input connectors shall be Phoenix style
 3. Level control shall be a detented position control per channel located on the back of the amplifier
 4. Single mode switch shall allow amplifier adjustment to different operation modes
 5. Fan cooled variable speed
 6. Damping of greater then 500 for dual channel and greater then 180 for multichannel
 7. Total harmonic distortion of <0.05%
 8. Amplifiers shall allow the use of DSP or amp control modules
 9. Products:
 - Type 1 300watts per channel at 8ohms or 70v
 - Type 2 600watts per channel at 8 ohms or 70v
 - Type 3 1000watts per channel at 8ohms or 70v
 - Type 4 60 watts single channel at 8ohms or 70v

2.07 AMPLIFIER CONTROL

- A. Not used

2.08 CONTROL SYSTEMS:

- A. Not used

2.09 SPEAKERS

A. Reinforcement Speaker (LEFT/ RIGHT MAIN SPEAKERS):

1. Nominal coverage 90x90
2. Full Range Speaker
3. Passive
4. Long term 124dB

B. Reinforcement Speaker (DELAY SPEAKER):

1. Nominal Coverage 120x60
2. Full range speaker
3. Long term 119dB

C. Stage Monitors (STAGE 1):

1. Compact multiangle speaker cabinet
2. Low profile
3. 85x85 coverage
4. Full range two way speaker

D. Full Range Reinforcement Speakers (FR-1):

1. Compact multiangle speaker cabinet
2. Low profile
3. 85x85 coverage
4. Full range two way speaker
5. Supply w/ integral mounting bracket

E. Ceiling Speaker (Type 1)

1. 4" Ceiling type with self contained enclosure
2. Speaker shall have 4" woofer and tweeter
3. Formed steel back can
4. Wattage taps - 3.7, 7.5, 15, 30

F. Ceiling Speaker (Type 2)

1. 6" Ceiling type with self contained enclosure
2. Speaker shall have 6" woofer and tweeter
3. Formed steel back can
4. Wattage taps - 7.5, 15, 30, 60

G. Stage Monitor Speaker Cable:

1. Provide (4) 25' speaker cables
2. Provide (4) 10' speaker cables
3. Wire gauge shall be #12 rubber jacketed
4. All cables shall be NL4 type and mate with connector plates and speakers
5. Provide (2) barrel adapters to allow for connection of two cables together

- H. Cue/Booth Monitors (CUE)
 - 1. Self Powered self contained speaker
 - 2. Full range
 - 3. Shall have a 5.25" woofer and tweeter
 - 4. Capable of 100w LF and 50w HF
 - 5. Provide with wall mounts such as those by Omni Mount sized for the speaker

- I. System Headphones:
 - 1. Professional Headphones
 - 2. Cushioned and high quality

2.10 PRODUCTION INTERCOM SYSTEM:

- A. Master Station (MS):
 - 1. Two channel capable
 - 2. Headphone connection for two channels
 - 3. Supply with microphone appropriate for application at least 8"
 - 4. Illuminated Channel call lights and talk buttons
 - 5. Supply with rack ears

- B. Station Call Light (CL):
 - 1. Yellow or Orange type call light small dome type
 - 2. Interface to main station or biscuit as required
 - 3. Mount in appropriate location for operator convenience and site lines

Wall Plates (WP-2):

- 4. Single gang wall plate
 - 5. Two channel capable
 - 6. Selector switch for channel selection
 - 7. Single 3 pin XLR connector for belt pack connection
- C. Belt Pack:
 - 1. Two channel capable
 - 2. Selector switch for channel selection
 - 3. Party line capable
 - 4. Headset volume control
 - 5. Compatible with main station and power supply system
 - 6. Supply with appropriate connecting capable
 - 7. Supply with appropriate headsets

2.11 HEARING ASSISTANCE SYSTEM:

- A. FM Hearing Assist System:
 - 1. Field Strength Maximum 8000 micro volts
 - 2. Transmitter input balanced bridging with level of .03 to 1 volt
 - 3. Antenna type 75ohm
 - 4. Receiver to be battery powered and have approximately a 15 hour life when used with alkaline batteries

2.12 MISCELLANEOUS EQUIPMENT

- A. Equipment Racks:
 - 1. Frame and side panels with locking rear door
 - 2. 31.5" overall depth
 - 3. Locate racks as shown on drawings
 - 4. Racks shall be 70" or as shown on drawings
 - 5. Provide with appropriate side panels as required

6. Provide with top vent panels as required or fan panels as required when utilized for amplifier housing
 7. Provide with vented locking front door
 8. Provide with Cable Chase for multi rack ganging one between each ganged rack
 9. Provide quantity as required as per section 3.5.
 10. Provide with one D-3 Rack Drawer
 11. Supply black in color
- B. Equipment Rack Power:
1. Specifically designed integrated rack power system
 2. Module for system installation flexibility
 3. Provides for Remote sequenced on/off
 4. Sized to fit within Equipment Racks
 5. All outlets shall allow local switch and monitoring of status
 6. 20amp Outlets shall allow Isolated Ground Outlets
 7. Provide for Complete integration and proper operation
 8. Provide with wall mounted USC-KL Key switch Plate located in Booth for controlled power up/down.
- C. Desktop Turret:
1. 16 gauge frame
 2. Ten rack spaces
 3. Provide with PDS-615R sequenced from USC-6R

2.13 MICROPHONES AND ACCESSORIES

- A. Handheld Microphones:
1. Vocal microphone for performances and announcements
- B. Hanging Microphones:
1. Hanging/suspended type for general use
 2. Supply with 30' factory installed cable
- C. General purpose Microphones:
1. Instrument Microphones (quantity 4)
 2. Condenser Style Microphones (quantity 2)
- D. Wireless Microphone (RF):
1. UHF w/ 99 channel selectable
 2. Dual diversity
 3. Provide with rack mount
 4. Provide with antenna and cabling as shown on drawings
 5. Product:
 - (quantity 2)
 - (quantity:2)
- E. Stands and Mounting Hardware:
1. Vocalist Stand w/ one touch control (quantity 4)
 2. Instrument Stand (quantity 4)
 3. Tripod Stand (quantity 4)
 4. Boom Arm (quantity 4)
 5. Large stand w/ wheels (quantity 2)
 6. Desk type stand (quantity 4)
 7. Microphone foam lined portable case sized for quantity (quantity: 2)
- F. Microphone Cables:
1. 10' Microphone cable -blue (quantity: 10)

2. 20' Microphone cable -blue (quantity: 10)
3. 50' Microphone cable -blue (quantity: 2)

2.14 PLATES, PANELS AND FLOOR BOXES:

- A. Provide plates, panels and floor boxes as described in the drawings and as required for a fully operation system.
- B. Custom plates shall be 1/8" thick aluminum, standard EIA sizes, brushed black anodized finished unless otherwise noted
- C. Plastic plates are not allowed
- D. Lettering shall be in all caps and numbers engraved with a color contrasting to the base material with a minimum size of 0.25".
- E. Floor boxes shall be designed for mounting in the stage area or flooring as required
- F. Floor boxes shall have compartmentalized stage areas for separate disciplines
- G. Supply floor boxes with appropriate covers and insert plates
- H. Coordinate final color of plates, panels and floor box covers with Owner
- I. Acceptable Manufactures of Custom Plates and Panels

2.15 CABLES AND WIRING:

- A. All audio cable shall be stranded cooper.
- B. Shielded cables located in raceways shall have aluminum foil shield with drain wire.
- C. Where speaker cables are run exposed in return plenum space provide plenum rated cable.
- D. Where cables are routed through cable tray provide tray rated cable of equal gauge
- E. Provide the following as required for a fully operable system:
 1. Microphone level cables: No. 22 shielded jacketed - West Penn 452 with gray jacket
 2. Line level cables: No 22 shielded jacketed - West Penn 452 with gray jacket
 3. Constant voltage speakers: amplifier to zone: Min No. 14 gauge jacketed - West Penn 226
 4. Constant voltage speakers: plenum rated amplifier to zone: No. 14 gauge jacketed - West Penn 25226.
 5. Constant voltage speakers: within zone No. 16 gauge jacketed - West Penn 225
 6. Constant voltage speakers: within zone plenum No. 16 gauge jacketed - West Penn 252225
 7. Communication Outlet Cables: No. 20 shielded - West Penn 293
 8. Control cables: No. 20 shielded - West Penn 293
 9. Loudspeaker Cable: No. 10 THHN provide different colors for each pass band type, supply plenum as required.
 10. Antenna Cable: RG-59 minimum refer to manufactures specifications and recommendations as required.

2.16 LOUDSPEAKER CLUSTER RIGGING

- A. Provide rigging, hardware, suspension cables, and all appropriate

hardware for the clusters as required for a fully operable system. A structural engineer licensed by the state of the installation must approve the rigging system with stamped drawings.

B. Acceptable Manufacturers for all mounting bars and trusses: Allen Products ZB-880 w/ support cabling.

2.15 PROPOSED SUBSTITUTIONS

A. Where specific equipment is described, it is not the intention to discriminate against the products of other manufacturers, but rather to establish a standard of quality. All proposed substitutions should be submitted as alternates with complete data.

B. The Owner requires manufacturer's original specification tests. The Owner will evaluate and approve all substitutions.

C. Items designated "no substitution" will be specified item only. Submission of items other than specified will not be considered.

PART 3 EXECUTION

3.1 Theater Rigging

3.1.1 Field Quality Control

A. All equipment shall be installed under the direct supervision of an experienced representative of the system manufacturer.

B. All work shall be performed in strict accordance with approved shop and installation drawings.

3.1.2 Noise and Vibration

Unless otherwise specified, all noise and vibration producing equipment shall not exceed NC30 in the first row of the audience, measured at 4 feet above the floor level.

3.1.3 Inspection

Prior to fabrication and installation, the Contractor shall verify field dimensions and structural capabilities.

3.1.4 Installation

A. Rigging

1. Hardware (bolts, nuts, washers, etc.) shall be SAE Grade 5, cadmium or similarly plated.

2. Forged cable clips to be tightened before loading and then torqued to manufacturer's specifications when cable is under load.

3. Compressible copper swage fittings shall be crimped exactly according

to manufacturer's recommendations as to quantity and spacing of crimps. Swage tools must be calibrated prior to beginning work. Trim dead end of cable to within 3/8" of swage. The entire swage shall be taped, including the short dead end of the cable.

4. Only copper sleeves shall be used. Aluminum is not acceptable.
5. Turnbuckles shall have jam nuts. In addition, a hole shall be drilled in the threaded shank of each jaw or eye two threads from the end and have cotter pin installed after final trim position is determined.
6. Wire ropes shall be taped with good quality friction tape prior to cutting.
7. Dead ends of all wire ropes shall be taped snug against the live end wherever cable clips are used.
8. All field wiring shall be done in accordance with system manufacturer's riser as indicated on approved shop drawings and as shown on the plans. For estimating purposes figure 208V, 3 Phase, 4 wires to each motor for power and six #14 control wires from the motor to the control box. Also required is a 120 VAC, 1 Phase, 60 Hertz, 15A supply at the control station.

3.1.5 Adjusting

After the rigging installation is completed and all loads are applied, a representative of the manufacturer will set all of the limit switches and verify the operation of all over travel and safety devices.

3.1.6 Tests and Inspections

- A. The complete job shall be subject to reasonable tests and inspections during construction and at final acceptance.
- B. Upon notice, the contractor shall furnish not to exceed two men (one to be the installation supervisor), and tools as required to conduct tests and inspections for the architect or local authorities.
- C. At the time of final inspection, owner may randomly require a full load test of any hoisting equipment.
- D. All design and performance testing shall be verified by a registered Professional Engineer employed by the stage equipment contractor.

3.1.7 System Demonstration

After the installation is complete and all adjustments have been made, a representative of the contractor shall demonstrate the systems and instruct the owner's personnel, using the written instruction books and maintenance manuals as a guide.

3.2 CLEANING

All surfaces shall be cleaned in accordance with manufacturer's instructions.

3.3 THEATRICAL LIGHTING

PART 3 - THEATRICAL LIGHTING EXECUTION

3.01 INSTALLATION

- A. Electronic equipment shall be permanently mounted in equipment racks.
- B. Follow ASDI standards as a minimum,
- C. Provide shaft locks or security covers on no user operated equipment having front panel access.
- D. Mount all equipment, plates and panels plumb and level.

3.02 EQUIPMENT HOUSING

- A. Install amplifiers in equipment racks according to manufactures recommendations.
- B. Provide adequate ventilation fans to maintain a rack temperature of less then 92 degrees Fahrenheit.
- C. Fill all empty spaces with blank panels, sizing as required painted to match housing.
- D. Locate operator usable equipment and patch panels at an appropriate operating height.
- E. Key all door locks for each housing type (front, rear) alike.
- F. Looking at the equipment racks from the rear of the racks, install all AC power and ground cabling on the left and audio and video cabling on the right.
- G. Provide lights mounted in the top of each rack to illuminate the interior for service or maintenance. Lights to be individually switch able and placed so as to provide maximum illumination throughout the rack.

3.03 LABELING

- A. Provide, for each piece of rack-mounted equipment, an engraved lamicoïd label and attach to the front of the equipment. Install in a plumb, level, and permanent manner. Provide rear mounted labeling for all rack mounted equipment.
- B. Provide engraved label over each user-operated control that describes the function or purpose of the control. Adjust size of label to appropriate size for location.
- C. Provide each terminal strip with a unique descriptor and a numerical designator for each strip. Show strip information on the drawings.
- D. Provide logical and legible cable and wiring labels permanently

attached for easy identification to each cable, both ends.

E. Label on cables shall be adhesive style striping covered with clear heat shrink tubing sized appropriately for the cable.

F. Wiring designator shall be alphanumeric code unique for each cable.

G. Locate the cable designator at the origination and the destination of each circuit. Locate cable designator within 2" of connection point.

3.04 CONTRACTOR COMMISSIONING

A. Prior to energizing or testing the system, ensure the following:

1. All products are installed in a proper and safe manner per the manufacture's instructions.
2. Insulation and shrink tubing are present where required.
3. Dust, debris, solder, splatter, etc. is removed.
4. Cable is dressed, routed, and labels, and all connections are all consistent with regard to polarity.
5. All labeling has been provided and installed.
6. All products are neat, clean and unmarred and securely fastened.
7. All debris has been cleaned and removed from the site.
8. All electronic devices are properly grounded.

B. Perform the following test, Record all results in the final project manual

1. Test each AC power outlet for proper connections for hot, neutral and ground
2. Measure the and record the DC resistance for the technical ground in the equipment racks and console. Resistance should be 0.15 ohms or less.
3. Test each circuit and power distribution outlet for proper operation.

4. Notification:

5. Once all of the above the system is ready for inspection. Formally notify the Owner at least seven days prior to desired inspection date.
6. Final adjustments will be conducted at the time of inspection.

3.05 APPLICABLE FEDERAL SPECIFICATIONS (The list below forms only a part of this specification.)

J-C--30A & AM-1 Cable and Wire, Electrical (Power, fixed Installations)

W-C-3735B Circuit Breakers, Molded Case, Branch Circuit, and Service

W-C-586C Conduit outlet boxes, bodies and entrance caps, electrical: cast metal

W-C-596E/Gen Connector, Electrical, Power, General Specifications

W-F-406B Fittings for Cable, Power, Electrical and Conduit, Metal, Flexible

W-F-408C Fittings for Conduit, Metal, Rigid, (Thick wall and EMT)

W-J-800D Junction Box: Extension, Junction Box; Cover, Junction Box (Steel, Cadmium, or Zinc Coated)

HH-I-553C Insulation Tape, Electrical (Rubber, Natural, or Synthetic)

HH-I-595C Insulation Tape, Electrical, Pressure Sensitive Adhesive, Plastic

WW-C-00540C Conduit, Metal, Rigid: and Coupling, Elbow, and Nipple, Electrical Conduit: Aluminum

WW-C-566C Conduit, Metal, Flexible

WW-C-581E Conduit, Metal, Rigid, and Intermediate: and Coupling, Elbow and Nipple, Electrical Conduit: Steel Zinc Coated

C2-1990 National Electrical Safety Code

C97.1-1972 Low Voltage Cartridge Fuses 600V or Less

Institute of Electrical and Electronic Engineers (IEEE)
142-1982 Recommended Practice for Grounding of Industrial and Commercial
Power Systems

3.4 SOUND SYSTEM

PART 3 - SOUND SYSTEM EXECUTION

3.01 INSTALLATION

- A. Electronic equipment shall be permanently mounted in equipment racks.
- B. Follow ASDI standards as a minimum,
- C. Provide shaft locks or security covers on no user operated equipment having front panel access.
- D. Install XLR type connectors wired Pin 2 High, Pin 3 Low, and Pin 1 Shield.
- E. Mount all equipment, speakers, plates and panels plumb and level.
- F. Permanently install all equipment to be firmly mounted and held in place. Provide necessary equipment supports to hold and support loads with at least a 5:1 safety factor.

3.02 EQUIPMENT HOUSING

- A. Install amplifiers in equipment racks according to manufactures recommendations.
- B. Provide adequate ventilation fans to maintain a rack temperature of less then 92 degrees Fahrenheit.
- C. Provide rear support for housing mounted equipment greater then 15" deep.
- D. Allow a minimum of 20% open rack space.
- E. Fill all empty spaces with blank panels, sizing as required painted to match housing.
- F. Locate operator usable equipment and patch panels at an appropriate operating height.
- G. Key all door locks for each housing type (front, rear) alike.
- H. Looking at the equipment racks from the rear of the racks, install all AC power and ground cabling on the left and audio and video cabling on the right.
- I. Provide lights mounted in the top of each rack to illuminate the interior for service or maintenance. Lights to be individually switch able and placed so as to provide maximum illumination throughout the rack.
- J. Provide rear-mounting rails as required for proper mounting.

3.03 PATCH PANELS

- A. Patch panel shall be located in designated racks as shown on drawings
- B. All patch panels shall be in consecutive rack spaces located at approximately 46" above floor.
- C. Locate inputs from microphone input plates and floor plates near the top of the patch bay layout.
- D. Locate sends and tielines near the bottom of the patch bay.
- E. Patch bays shall be normalled as directed by the Owner.
- F. Provide 24"x32" reference diagram of the patch bay system. The layout shall be easily understood, mount diagram behind plexiglass and mount in the control room close to the patch bay rack.
- G. Diagram shall show all input locations, patch normals, and any console connections, and interconnection of control room equipment.

3.04 LABELING

- A. Provide, for each piece of rack-mounted equipment, an engraved lamincoid label and attach to the front of the equipment. Install in a plumb, level, and permanent manner. Provide rear mounted labeling for all rack mounted equipment.
- B. Provide engraved label over each user-operated control that describes the function or purpose of the control. Adjust size of label to appropriate size for location.
- C. Provide each terminal strip with a unique descriptor and a numerical designator for each strip. Show strip information on the drawings.
- D. Provide logical and legible cable and wiring labels permanently attached for easy identification to each cable, both ends.
- E. Label on cables shall be adhesive style striping covered with clear heat shrink tubing sized appropriately for the cable.
- F. Wiring designator shall be alphanumeric code unique for each cable.
- G. Each cable type shall be labeled starting with different designations (i.e. mic series "Mxxx", speaker series "Sxxx", etc.)
- H. Locate the cable designator at the origination and the destination of each circuit. Locate cable designator within 2" of connection point.

3.05 LOUDSPEAKER SUSPENSION

- A. All loudspeakers shall be suspended or mounted at the appropriate operating position in a safe, secure and permanent manner.
- B. The aiming direction of all loudspeakers and speaker clusters shall be adjustable in plus or minus 5-degree increments.
- C. All loudspeakers enclosures being flown or suspended shall have internally integrated mounting brackets to distribute the load to the

rigging points on each speaker cabinet. Contractor shall provide internal bracing as required if not incorporated into the speaker cabinet by the manufacture.

D. At all times speakers to be mounted or flown shall be intentional designed for the purpose of suspension with integrated rigging points designed into the speaker cabinet by the manufacture.

E. All loudspeakers shall have permanently attached grilles with all manufacture logos removed.

F. All loudspeaker cables/wiring shall disconnect from a junction box located in the same speaker cavity as the speakers or clusters. Provide a single loudspeaker cable assembly that connects from the junction box the speaker cluster and allows cable length for testing and powering the cluster while assembled on the floor.

G. Structural support members shall be designed by a licensed structural engineer and stamped by same with in the state of the project

H. All mounting hardware and wire rope shall be stamped and designed by a licensed structural engineer and submitted for approval.

I. All fasteners, bridles, carabineers, quick links, shackles, etc. shall be of forged material whenever possible and shall be manufactured for rigging.

J. All rigging, mounting and support systems for the loudspeaker clusters or suspended speakers shall be reviewed and certified by a registered Structural Engineer licensed in the state of the project. Once the systems are installed, the engineer shall physically inspect the methods and means used for the installation and verify that the installation complies both with the certified documents and code practices. A document from the Structural Engineer stating this compliance shall be supplied to the owner before any final payments will be authorized.

K. All speakers, speaker clusters and rigging equipment shall be painted the same color, if exposed to the public areas.

3.06 OUTDOOR EQUIPMENT MOUNTING

A. All outdoor mounting hardware shall be non-corrosive

B. Any exposed structural supports for speakers or other outdoor components shall be non-corrosive or covered with an inhibiting layer.

C. Any components mounted outside shall be secured in such a way as to prevent movement caused by wind or storms.

D. All speaker, microphone, line, communications enclosures to include grill components capable of protecting the devices and keep the water and elements out of the components.

E. Seal all connections on each speaker with a waterproof silicone sealant.

F. Provide screened covering over all openings in horn type enclosures to keep out birds, insects or small animals.

3.07 CONTRACTOR COMMISSIONING

- A. Prior to energizing or testing the system, ensure the following:
1. All products are installed in a proper and safe manner per the manufacture's instructions.
 2. Insulation and shrink tubing are present where required.
 3. Dust, debris, solder, splatter, etc. is removed.
 4. Cable is dressed, routed, and labels, and all connections are all consistent with regard to polarity.
 5. All labeling has been provided and installed.
 6. All products are neat, clean and unmarred and securely fastened.
 7. All debris has been cleaned and removed from the site.
 8. All electronic devices are properly grounded.
- B. Perform the following test, Record all results in the final project manual
1. Test each AC power outlet for proper connections for hot, neutral and ground
 2. Measure the and record the DC resistance for the technical ground in the equipment racks and console. Resistance should be 0.15 ohms or less.
 3. Measure the impedance of each speaker line from the amplifier rack.
- D. Speaker Verification Test:
1. Provide a low level distinctive tone to each amplifier input.
 2. Systematically turn on each amplifier one by one and verify that the correct speaker is being driven. Correct wiring as required for proper operation.
- E. Constant Voltage Speaker Test:
1. Provide a low level distinctive tone to each amplifier input.
 2. Systematically turn on each amplifier one by one and verify that the correct speaker is being driven. Correct wiring as required for proper operation.
 3. Walk the areas covered by the speakers and check for even level volume coverage. Adjust any speakers that are not correct by changing tap values as required for even volume level.
- F. Speaker Polarity:
1. Use an electronic polarity checker to test each reinforcement speaker. All speakers should have the same relative polarity.
- G. System Gain Adjustment:
1. Adjust each active device to have unity gain from the console output to the input of the amplifiers.
 2. With all amplifiers turned off, connect a sine wave or pink noise to an input of the console. Using a RMS voltmeter adjust the scale to an output between -10 and 0 dBu. Once level has been established, it should remain unchanged throughout testing.
 3. From the console proceed to each electronic device in the signal path and adjust to be uniform based on the input and outputs of the console.
- H. Signal Delay Adjustment:
1. Adjust the delay speakers to ensure proper synchronization between the main speakers and delayed speakers
 2. Using TEF20 or SMARRT Live measure and adjust the arrival times of each speaker to be fully sync'd.
- I. Amplifier Level Adjustment:
1. Adjust the gain of each amplifier to provide consistent and

appropriate levels throughout the seating areas/facility.

2. With the console and other electronic devices feeding the amplifiers adjusted as described above adjust the output of the console to be -10dB on the output VU meter.
3. Adjust the appropriate amplifiers to achieve 85dBA in the area covered by one of speakers. Use a calibrated sound level meter to make the adjustments.
4. If the speaker is utilizing an active crossover mute the individual bandpass sections to adjust each section independently.
5. Start with the speaker closed to the stage area or the booth location as appropriate. Once that speaker has been adjust to the above criteria repeat this procedure for each speaker cabinet.
6. Amplifiers should be set to provide an average of 85dBA plus or minus 1.5dB throughout each seating section.

J. Amplifier Level Adjustment 70 volt system:

1. Adjust the level of the 70-volt systems to achieve a volume level appropriate for their location and intended use.
2. After initial amplifier adjustment as performed in 3.07.I, walk all areas utilizing the 70 volt systems and check for volume uniformity. If any changes of 3dB or more occur adjust that specific area or speaker as required for even coverage.

K. Input Verification Test:

1. Using a microphone or portable signal generator or CD player send signal from every microphone input to the console, check every connection location in the faculty.
2. Verify that the receptacle under test appears at the correct position on the patch bay and is operating properly.
3. In a similar manner check any other inputs or tielines as appropriate.

L. Notification:

1. Once all of the above the system is ready for inspection. Formally notify the Owner at least seven days prior to desired inspection date.
2. Final adjustments and equalization will be conducted at the time of inspection.

3.07 APPLICABLE FEDERAL SPECIFICATIONS (The list below forms only a part of this specification.)

J-C--30A & AM-1 Cable and Wire, Electrical (Power, fixed Installations)
W-C-3735B Circuit Breakers, Molded Case, Branch Circuit, and Service
W-C-586C Conduit outlet boxes, bodies and entrance caps, electrical: cast metal
W-C-596E/Gen Connector, Electrical, Power, General Specifications
W-F-406B Fittings for Cable, Power, Electrical and Conduit, Metal, Flexible
W-F-408C Fittings for Conduit, Metal, Rigid, (Thick wall and EMT)
W-J-800D Junction Box: Extension, Junction Box; Cover, Junction Box (Steel, Cadmium, or Zinc Coated)
HH-I-553C Insulation Tape, Electrical (Rubber, Natural, or Synthetic)
HH-I-595C Insulation Tape, Electrical, Pressure Sensitive Adhesive, Plastic
WW-C-00540C Conduit, Metal, Rigid: and Coupling, Elbow, and Nipple, Electrical Conduit: Aluminum
WW-C-566C Conduit, Metal, Flexible
WW-C-581E Conduit, Metal, Rigid, and Intermediate: and Coupling, Elbow and Nipple, Electrical Conduit: Steel Zinc Coated
C2-1990 National Electrical Safety Code
C97.1-1972 Low Voltage Cartridge Fuses 600V or Less
Institute of Electrical and Electronic Engineers (IEEE)

142-1982 Recommended Practice for Grounding of Industrial and Commercial
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-- End of Section --

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CONTRACT NO.

TITLE AND LOCATION						CONTRACTOR											
Wheatley Elementary School Modernization and Addition																	
ACTIVITY NO	TRANSMITTAL NO	SPEC SECT	DESCRIPTION ITEM SUBMITTED	PARAGRAPH	GOVT CLASSIFICATION	CONTRACTOR: SCHEDULE DATES			CONTRACTOR ACTION		APPROVING AUTHORITY				MAILED TO CONTR/	REMARKS	
						SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	CODE	DATE OF ACTION	DATE FWD TO APPR AUTH/	DATE RCD FROM CONTR	DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER			CODE
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)	(q)	(r)
		01000	SD-01 Preconstruction Submittals														
			Hazmat Materials	1.15	G AR												
			SD-03 Product Data														
			Cost or Pricing Data	1.8	G AR												
			Equipment Data	1.9	G AR												
			SD-10 Operation and Maintenance Data														
			O and M Data	1.10	G AR												
			Commissioning Activity for HVAC	1.4.5	G AR												
		01050	SD-07 Certificates														
			Operations Statement	1.11.2	G AR												
		01060	SD-01 Preconstruction Submittals														
			Safety Supervisor	1.4	G AR												
			Activity Phase Hazard Analysis Plan	1.4	G AR												
			Site Safety and Health Plan		G AR												
			Qualifications		G AR												
			SD-02 Shop Drawings														
			Work Layout Drawings		G AR												
			SD-07 Certificates														
			Language Certification	1.4	FIO												
			SD-09 Manufacturer's Field Reports														
			Activity Hazard Analyses in accordance with EM 385-1-1, paragraph 01.A.09		G AR												

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(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)	(q)	(r)
		01060	Outline Report		FIO												
			OSHA Log		FIO												
			Slte Control Log		G AR												
		01110	SD-01 Preconstruction Submittals														
			Connection Requests		FIO												
			Borrow Permits	1.7.1	FIO												
			Excavation Permits	1.7.1	FIO												
			Welding Permits	1.7.1	FIO												
		01200	SD-04 Samples														
			Sample Tags	1.7.2.2	FIO												
		01315	SD-01 Preconstruction Submittals														
			Project Submittal Schedule	1.5	FIO												
			Monthly Progress Report	1.5	FIO												
		01320	SD-01 Preconstruction Submittals														
			Initial Project Schedule		G AR												
			Preliminary Project Schedule		G AR												
			Periodic Schedule Updates		G AR												
			Qualifications	1.3	G AR												
			Narrative Report	3.5.2	G AR												
			Schedule Reports	3.5.4	G AR												
		01356	SD-07 Certificates														
			Mill Certificate or Affidavit	2.1.3	FIO												
		01460	SD-01 Preconstruction Submittals														
			Site Security Plan	1.5	G AR												
		01510	SD-02 Shop Drawings														
			Temporary Electrical Work		G AR												

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		01520	SD-01 Preconstruction Submittals														
			Prints with Original Negatives		FIO												
			Electronic Format	1.5	G AR												
			Videotape Recordings	1.6	FIO												
		01561	SD-05 Design Data														
			Facility Plan	1.9.4	G AR												
			Temporary Plan	1.9.5	G AR												
		01720	SD-01 Preconstruction Submittals														
			Progress Prints		G AR												
			Final Requirements	1.6	G AR												
			CADD Files		FIO												
		02220	SD-03 Product Data														
			Work Plan		G A/E												
			SD-07 Certificates														
			Demolition plan	1.9	G A/E												
			Notifications	1.4.1	G A/E												
			Notification of Demolition and Renovation forms	1.4.1	G A/E												
			SD-11 Closeout Submittals														
			Receipts	1.4.2	G A/E												
		02231	SD-04 Samples														
			Tree wound paint	2.1	G A/E												
			Herbicide	2.2	G A/E												
		02300a	SD-03 Product Data														
			Earthwork		G A/E												
			SD-06 Test Reports														

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		02300a	Testing	3.12	G A/E												
			SD-07 Certificates														
			Testing	3.12	FIO												
		02316a	SD-06 Test Reports														
			Field Density Tests	3.4.3	G A/E												
			Testing of Backfill Materials	3.4.2	G A/E												
		02370a	SD-03 Product Data														
			Geosynthetic Binders		G A/E												
			Hydraulic Mulch	2.2.4	G A/E												
			Geotextile Fabrics	2.3	G A/E												
		02510a	SD-03 Product Data														
			Installation	3.1	G A/E												
			Waste Water Disposal Method		G A/E												
			Satisfactory Installation		G A/E												
			SD-06 Test Reports														
			Bacteriological Disinfection		G A/E												
			SD-07 Certificates														
			Manufacturer's Representative		FIO												
			Installation	3.1	FIO												
			Meters	2.8.5	FIO												
		02531	SD-02 Shop Drawings														
			Precast concrete manhole		G A/E												
			Metal items	2.3.3	G A/E												
			Frames, covers, and gratings	2.3.3.1	G A/E												
			SD-03 Product Data														
			Pipeline materials	2.1	G A/E												

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		02630a	SD-03 Product Data														
			Placing Pipe	3.3	G A/E												
			SD-07 Certificates														
			Resin Certification		FIO												
			Pipeline Testing	3.8	FIO												
			Hydrostatic Test on Watertight Joints	2.6	FIO												
			Determination of Density	3.7.5	FIO												
			Frame and Cover for Gratings	2.2.5	FIO												
		02741N	SD-06 Test Reports														
			Trial batch	1.3.4	G A/E												
			Mix design	1.3.5	G A/E												
			Asphalt concrete	2.1	G A/E												
			Density	3.3.2.2	G A/E												
			Density	3.3.2.3	G A/E												
			Thickness	3.3.2.2	G A/E												
			Thickness	3.3.2.3	G A/E												
			Straightedge test	3.3.2.2	G A/E												
			SD-07 Certificates														
			mix delivery record	1.3.3	FIO												
			Asphalt concrete and material sources		FIO												
			Asphalt concrete	2.1	FIO												
			Traffic signs	2.7	FIO												
		02770a	SD-03 Product Data														
			Concrete	2.1	G A/E												

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		02770a	SD-06 Test Reports														
			Field Quality Control	3.8	G A/E												
		02791	SD-02 Shop Drawings														
			Shop Drawings	3.1.2.2	G A/E												
			SD-03 Product Data														
			Synthetic Surfacing	2.2	G A/E												
			Geotextile Fabric	2.4	G A/E												
			Manufacturer's Qualification	1.7	G A/E												
			Wood	2.6.1	G A/E												
			Wood Treatment	2.6.1.2	G A/E												
			Adhesive	2.2.8	G A/E												
			Color	2.2.4	G A/E												
			SD-04 Samples														
			Synthetic Surfacing	2.2	G A/E												
			SD-06 Test Reports														
			Percolation Test	3.1.4	G A/E												
			Recycled Plastic	2.5	G A/E												
			Synthetic Surfacing	2.2	G A/E												
			SD-07 Certificates														
			Materials	2.1	G A/E												
			Manufacturer's Qualification	1.7	G A/E												
			Manufacturer's Representative	1.11	G A/E												
			Installer's Qualification	1.8	G A/E												
			Substitution	3.1.5	G A/E												
			Child Safety and Accessibility Evaluation	3.4.1	G A/E												

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		02791	SD-10 Operation and Maintenance Data														
			Maintenance Instruction	3.4.3	G A/E												
		02870a	SD-02 Shop Drawings														
			Site Furnishing Standards	2.5	FIO												
			SD-03 Product Data														
			Site Furnishings	1.4	FIO												
			Installation	3.1	FIO												
			Materials	2.1	FIO												
			SD-04 Samples														
			Finish	2.4	FIO												
			SD-06 Test Reports														
			Recycled Material	2.1.2	FIO												
			Testing	3.1.5	FIO												
		02882	SD-02 Shop Drawings														
			Configuration	2.3.1	FIO												
			Shop Drawings	3.1.2.2	FIO												
			Fall Height	3.2.7	FIO												
			Finished Grade and Underground Utilities		FIO												
			SD-03 Product Data														
			Equipment	2.3	FIO												
			Equipment Identification	1.6	FIO												
			Delivery, Storage and Handling	1.5	FIO												
			Manufacturer Qualification	1.10	FIO												
			Spare Parts	3.4.2	FIO												

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		02882	Materials	2.2	FIO												
			SD-04 Samples														
			Color	2.2.6	FIO												
			SD-06 Test Reports														
			Recycled Plastic	2.2.3	FIO												
			SD-07 Certificates														
			Materials	2.2	FIO												
			Manufacturer Qualification	1.10	FIO												
			Installer Qualification	1.11	FIO												
			Manufacturer's Representative	1.14	FIO												
			Substitution	2.3.2	FIO												
			Play Event Modification	3.2.1	FIO												
			Child Safety and Accessibility	3.4.1	FIO												
			Evaluation														
			SD-10 Operation and Maintenance														
			Data														
			Maintenance Instruction	3.4.3	FIO												
		02921a	SD-03 Product Data														
			Equipment		G A/E												
			Surface Erosion Control Material	2.8	G A/E												
			Delivery	1.4.1	G A/E												
			Topsoil	2.2	G A/E												
			Seed Establishment Period	3.9	G A/E												
			Maintenance Record	3.9.3.5	G A/E												
			Application of Pesticide	3.6	G A/E												
			SD-06 Test Reports														

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		02921a	Soil Test	3.1.4	FIO												
			SD-07 Certificates														
			Seed	2.1	FIO												
			Topsoil	2.2	FIO												
			pH Adjuster	2.3.1	FIO												
			Fertilizer	2.3.2	FIO												
			Organic Material	2.3.3	FIO												
			Soil Conditioner	2.3.4	FIO												
			Mulch	2.4	FIO												
			Asphalt Adhesive	2.5	FIO												
			Pesticide	2.7	FIO												
		02922a	SD-03 Product Data														
			Delivery	1.4.1	FIO												
			Finished Grade and Topsoil	3.2.1	FIO												
			Topsoil	2.2	FIO												
			Sod Establishment Period	3.9	FIO												
			Maintenance Record	3.9.3.5	FIO												
			Application of Pesticide	3.6	FIO												
			SD-06 Test Reports														
			Soil Test	3.1.4	FIO												
			SD-07 Certificates														
			Sod	2.1	FIO												
			Topsoil	2.2	FIO												
			pH Adjuster	2.3.1	FIO												
			Fertilizer	2.3.2	FIO												
			Organic Material	2.3.4	FIO												

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		02922a	Soil Conditioner	2.3.5	FIO												
			Pesticide	2.5	G A/E												
		02930a	SD-03 Product Data														
			Delivery	1.4.1	FIO												
			Plant Establishment Period	3.9	FIO												
			Maintenance Record	3.9.2.6	FIO												
			Application of Pesticide	3.7	FIO												
			SD-04 Samples														
			Delivered Topsoil	1.4.1.3	FIO												
			SD-06 Test Reports														
			Soil Test	3.1.4.2	FIO												
			Percolation Test	3.1.4.1	FIO												
			SD-07 Certificates														
			Plant Material	2.1	FIO												
			Topsoil	2.2	FIO												
			pH Adjuster	2.3.1	FIO												
			Fertilizer	2.3.2	FIO												
			Organic Material	2.3.3	FIO												
			Soil Conditioner	2.3.4	FIO												
			Organic Mulch		FIO												
			Mycorrhizal Fungi Inoculum	2.12	FIO												
			Pesticide	2.14	FIO												
			SD-10 Operation and Maintenance Data														
			Maintenance Instructions	3.9.5	FIO												
		03100a	SD-02 Shop Drawings														

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		03100a	Formwork	3.1.1	G A/E												
			SD-03 Product Data														
			Design	1.3	FIO												
			Form Materials	2.1	FIO												
			Form Releasing Agents	2.1.7	FIO												
			SD-04 Samples														
			Fiber Voids	2.1.8	FIO												
			SD-07 Certificates														
			Fiber Voids	2.1.8	FIO												
		03131	SD-02 Shop Drawings														
			Fabrication Drawings	1.7	G A/E												
			Installation Drawings	1.7	G A/E												
			SD-03 Product Data														
			Steel Sheets	2.1	FIO												
			Steel Sheets	2.1	FIO												
			Steel Sheets	2.2	FIO												
			Welding Electrodes	2.3	FIO												
			Galvanizing Repair Coating	2.4	FIO												
			Flexible Closure Strips	2.5	FIO												
			Flexible Closure Strips	2.5	FIO												
			Flexible Closure Strips	3.8	FIO												
			Metal Form Units	1.5	FIO												
			Metal Form Units	1.7	FIO												
			Metal Form Units	2.6.1	FIO												
			Metal Form Units	3.1	FIO												
			Metal Form Units	3.3	FIO												

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		03131	Metal Form Units	3.4	FIO												
			Metal Form Units	3.5	FIO												
			Metal Form Units	3.6	FIO												
			Metal Closure Strips	2.6.2	FIO												
			SD-04 Samples														
			Flexible Closure Strips	2.5	FIO												
			Flexible Closure Strips	2.5	FIO												
			Flexible Closure Strips	3.8	FIO												
			SD-08 Manufacturer's Instructions														
			Metal Form Units	1.5	FIO												
			Metal Form Units	1.7	FIO												
			Metal Form Units	2.6.1	FIO												
			Metal Form Units	3.1	FIO												
			Metal Form Units	3.3	FIO												
			Metal Form Units	3.4	FIO												
			Metal Form Units	3.5	FIO												
			Metal Form Units	3.6	FIO												
			Accessories	3.1	FIO												
			SD-07 Certificates														
			Welding Procedures	3.2	FIO												
			Welder Qualifications		FIO												
			Galvanizing Repair Coating	2.4	FIO												
			Flexible Closure Strips	2.5	FIO												
			Flexible Closure Strips	2.5	FIO												
			Flexible Closure Strips	3.8	FIO												
			Steel Sheets	2.1	FIO												

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		03131	Steel Sheets	2.1	FIO												
			Steel Sheets	2.2	FIO												
			Welding Electrodes	2.3	FIO												
		03300	SD-03 Product Data														
			Mixture Proportions	1.7	FIO												
			Dry Shake Finish		FIO												
			SD-06 Test Reports														
			Testing and Inspection for Contractor Quality Control	3.14	FIO												
			SD-07 Certificates														
			Qualifications	1.4	FIO												
		03413A	SD-02 Shop Drawings														
			Architectural Concrete System		G A/E												
			SD-03 Product Data														
			Calculations	1.4.5	G A/E												
			Mix Design		G A/E												
			Manufacturer's Qualifications		G A/E												
			SD-04 Samples														
			Precast Concrete Units	2.2	G A/E												
			SD-06 Test Reports														
			Materials	2.1	FIO												
		03900	SD-01 Preconstruction Submittals														
			Existing Conditions	1.4	FIO												
			SD-03 Product Data														
			Restoration and Cleaning	2.1	G A/E												
			Materials														

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		03900	SD-07 Certificates														
			A List of Product Installations	1.5	FIO												
			Restoration and Cleaning	2.1	FIO												
			Materials														
			SD-08 Manufacturer's Instructions														
			Surface Preparation	3.1	FIO												
			Patching	3.2	G A/E												
		04200	SD-02 Shop Drawings														
			Masonry Work		G A/E												
			SD-03 Product Data														
			Clay or Shale Brick	2.2	FIO												
			Concrete Brick	2.3	FIO												
			Insulation	2.14	FIO												
			Flashing	2.16	FIO												
			Water-Repellant Admixture	2.8	FIO												
			Cold Weather Installation	3.1.2	FIO												
			SD-04 Samples														
			Concrete Masonry Units (CMU)	2.4	G A/E												
			Concrete Brick	2.3	G A/E												
			Stone Items		G A/E												
			Clay or Shale Brick	2.2	G A/E												
			Anchors, Ties, and Bar Positioners	2.10	G A/E												
			Expansion-Joint Materials	2.15	G A/E												
			Joint Reinforcement	2.11	G A/E												
			Insulation	2.14	G A/E												

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		04200	Portable Panel	1.3	G A/E												
			SD-05 Design Data														
			Pre-mixed Mortar	2.7.5	G A/E												
			Unit Strength Method	1.5.2	G A/E												
			SD-06 Test Reports														
			Efflorescence Test	3.23.3	FIO												
			Field Testing of Mortar	3.23.1	FIO												
			Field Testing of Grout	3.23.2	FIO												
			Prism tests	3.23.4	FIO												
			Masonry Cement	2.7.4	FIO												
			Fire-rated CMU	2.4.3	FIO												
			Special Inspection	1.5.1	FIO												
			SD-07 Certificates														
			Clay or Shale Brick	2.2	FIO												
			Concrete Brick	2.3	FIO												
			Concrete Masonry Units (CMU)	2.4	FIO												
			Control Joint Keys	2.13	FIO												
			Anchors, Ties, and Bar Positioners	2.10	FIO												
			Expansion-Joint Materials	2.15	FIO												
			Joint Reinforcement	2.11	FIO												
			Reinforcing Steel Bars and Rods	2.12	FIO												
			Masonry Cement	2.7.4	FIO												
			Mortar Coloring	2.7.2	FIO												
			Insulation	2.14	FIO												
			Insulation	2.14	FIO												

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		04200	Precast Concrete Items	2.5	FIO												
			Admixtures for Masonry Mortar	2.7.1	FIO												
			Admixtures for Grout	2.9.1	FIO												
			SD-08 Manufacturer's Instructions														
			Masonry Cement	2.7.4	FIO												
		05120	SD-02 Shop Drawings														
			Erection drawings		G A/E												
			Fabrication drawings	1.6.1	G A/E												
			SD-03 Product Data														
			Shop primer	2.4	FIO												
			Load indicator washers		FIO												
			SD-06 Test Reports														
			Class B coating	2.4	FIO												
			Bolts, nuts, and washers	2.2	FIO												
			SD-07 Certificates														
			Steel	2.1	FIO												
			Bolts, nuts, and washers	2.2	FIO												
			Shop primer	2.4	FIO												
			Welding electrodes and rods	2.3.1	FIO												
			Nonshrink grout	2.3.2	FIO												
			Galvanizing	2.5	FIO												
			AISC Quality Certification	1.5	FIO												
			Overhead, top running crane rail beam	1.6.2.1	FIO												
			Welding procedures and qualifications	1.6.2.3	FIO												

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		05210a	SD-02 Shop Drawings														
			Steel Joists	1.3	G A/E												
			SD-07 Certificates														
			Steel Joists	1.3	FIO												
		05300a	SD-02 Shop Drawings														
			Deck Units	2.1	G A/E												
			Accessories	2.5	G A/E												
			Attachments	3.2	G A/E												
			Holes and Openings	3.3	G A/E												
			SD-03 Product Data														
			Deck Units	2.1	FIO												
			Attachments	3.2	FIO												
			SD-07 Certificates														
			Deck Units	2.1	FIO												
			Attachments	3.2	FIO												
		05500A	SD-02 Shop Drawings														
			Miscellaneous Metal Items	1.6	G A/E												
			SD-04 Samples														
			Miscellaneous Metal Items	1.6	G A/E												
		05510	SD-02 Shop Drawings														
			Iron and Steel Hardware	2.1	FIO												
			Steel Shapes, Plates, Bars and Strips	2.1	FIO												
			Metal Stairs	2.13	G A/E												
			Metal Stairs	2.15.1	G A/E												
			SD-03 Product Data														

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		05510	Structural Steel Plates, Shapes, and Bars	2.2	FIO												
			Structural Steel Tubing	2.3	FIO												
			Hot-Rolled Carbon Steel Sheets and Strips	2.6	FIO												
			Cold-Rolled Carbon Steel Sheets	2.7	FIO												
			Galvanized Carbon Steel Sheets	2.8	FIO												
			Cold-Drawn Steel Tubing	2.9	FIO												
			Masonry Anchorage Devices	2.11	FIO												
			Protective Coating	2.14	FIO												
			Steel Pan Stairs	2.15	G A/E												
			SD-07 Certificates														
			Welding Procedures		FIO												
			Welder Qualification		FIO												
			SD-08 Manufacturer's Instructions														
			Structural Steel Plates, Shapes, and Bars	2.2	FIO												
			Structural Steel Tubing	2.3	FIO												
			Hot-Rolled Carbon Steel Sheets and Strips	2.6	FIO												
			Cold Finished Steel Bars		FIO												
			Hot-Rolled Carbon Steel Bars		FIO												
			Cold-Rolled Carbon Steel Sheets	2.7	FIO												
			Galvanized Carbon Steel Sheets	2.8	FIO												
			Cold-Drawn Steel Tubing	2.9	FIO												
			Protective Coating	2.14	FIO												

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		05510	Masonry Anchorage Devices	2.11	FIO												
		05700	SD-01 Preconstruction Submittals														
			Existing Conditions	1.5	FIO												
			SD-02 Shop Drawings														
			Fabrication Drawings		FIO												
			Ornamental Metal Items	2.4	FIO												
			Ornamental Metal Items	2.4	FIO												
			Installation Drawings	2.4	FIO												
			Shop and Field Connections	2.4	FIO												
			Construction Details	2.4	FIO												
			SD-03 Product Data														
			Installation Materials	2.1	FIO												
			Metals for Fabrication	2.2	FIO												
			Ornamental Metal Items	2.4	G A/E												
			SD-04 Samples														
			Manufacturer's Standard Color Charts	2.4	G A/E												
			Shop Paint	2.4	G A/E												
			Finish Paint	2.4	G A/E												
			Aluminum Finishes	2.4.4	G A/E												
			Anchorage Devices and Fasteners	3.3	FIO												
			Architectural Metal Items	1.4	G A/E												
			Architectural Metal Items	2.4.4	G A/E												
			SD-06 Test Reports														
			Welding Tests		FIO												

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		05700	SD-07 Certificates														
			Welding Procedures		FIO												
			Ornamental Metal Items	2.4	FIO												
			Welder Qualifications		FIO												
			SD-08 Manufacturer's Instructions														
			Preventative Maintenance and Inspection	2.4.4	FIO												
			Cleaning Materials	2.4.4	FIO												
			Application Methods	2.4.4	FIO												
		06100a	SD-02 Shop Drawings														
			Structural Wood Members		FIO												
			Installation of Framing	3.1	FIO												
			Nailers and Nailing Strips	3.6.3	FIO												
			SD-03 Product Data														
			Structural Wood Members		FIO												
			Product Installations		FIO												
			SD-07 Certificates														
			Grading and Marking	2.1.1	FIO												
			Insulation		FIO												
		06200a	SD-02 Shop Drawings														
			Finish Carpentry		G A/E												
			SD-04 Samples														
			Moldings	2.1.6	G A/E												
			Fascias and Trim	2.1.5	G A/E												
		06650	SD-02 Shop Drawings														
			Shop Drawings		FIO												

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		06650	Installation	3.2	FIO												
			SD-03 Product Data														
			Solid polymer material	2.1	FIO												
			Qualifications	1.6	FIO												
			Fabrications	2.3	FIO												
			SD-04 Samples														
			Material	2.1	FIO												
			G/AE		FIO												
			Countertops		FIO												
			SD-06 Test Reports														
			Solid polymer material	2.1	FIO												
			SD-07 Certificates														
			Fabrications	2.3	FIO												
			Qualifications	1.6	FIO												
			SD-10 Operation and Maintenance														
			Data														
			Solid polymer material	2.1	FIO												
			Celean-up		FIO												
		07110a	SD-07 Certificates														
			Materials		FIO												
		07131	SD-03 Product Data														
			Elastomeric waterproofing sheet	2.1	FIO												
			material														
			Protection board	2.5	FIO												
			Primers, adhesives, and mastics	2.1	FIO												
			SD-06 Test Reports														

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		07131	Elastomeric waterproofing sheet material	2.1	FIO												
		07210	SD-03 Product Data														
			Glass Fiber Insulation Board		FIO												
			Batts and Rolls	2.1.1.1	FIO												
			Rigid Polystyrene Board	2.1.4	FIO												
			Vapor Barrier	2.1.5	FIO												
			Vapor Barrier Tape	2.1.6	FIO												
			Water-Vapor Barrier Subgrade	2.1.7	FIO												
			Covers														
			Fasteners	2.2.1	FIO												
			Adhesive	2.2.2	FIO												
			Staples	2.2.3	FIO												
			Vapor-Barrier Adhesive	2.2.4	FIO												
			Spray On Acoustical Treatment		FIO												
			Acoustical Ceiling Tiles		FIO												
			Acoustical Wall and Ceiling		FIO												
			Panels														
			SD-04 Samples														
			Glass-Fiber Insulation Board		G A/E												
			Mineral Fiber Batts		G A/E												
			Vapor-Barrier	2.1.5	G A/E												
			Vapor Barrier Tape	2.1.6	FIO												
			Water-Vapor Barrier Subgrade	2.1.7	FIO												
			Covers														
			Rigid Polystyrene Board	2.1.4	FIO												

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		07210	Fasteners	2.2.1	FIO												
			Adhesive	2.2.2	FIO												
			Spray On Acoustical Treatment		FIO												
			Acoustical Ceiling Tiles		FIO												
			Acoustical Wall and Ceiling Panels		FIO												
			SD-06 Test Reports														
			Test Reports	3.8	FIO												
			SD-07 Certificates														
			Glass Fiber Insulation Board		FIO												
			Rigid Polystyrene Board	2.1.4	FIO												
			Vapor Barrier	2.1.5	FIO												
			Vapor Barrier Tape	2.1.6	FIO												
			Water-Vapor Barrier Subgrade	2.1.7	FIO												
			Covers														
			Staples	2.2.3	FIO												
			Spray On Acoustical Treatment		FIO												
			Acoustical Ceiling Tiles		FIO												
			Acoustical Wall and Ceiling Panels		FIO												
			SD-08 Manufacturer's Instructions														
			Fasteners	2.2.1	FIO												
			Vapor-Barrier Adhesive	2.2.4	FIO												
			Exterior Insulation and Finish System		FIO												
			Spray On Acoustical Treatment		FIO												

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		07210	Acoustical Ceiling Tiles		FIO												
			Acoustical Wall and Ceiling Panels		FIO												
		07220	SD-03 Product Data														
			Thermal Insulation Materials	2.1	FIO												
			Vapor Barrier	2.2	FIO												
			Fastening Materials	2.3	FIO												
			Bituminous Plastic Cement		FIO												
			Asphalt-Base Emulsion		FIO												
			SD-04 Samples														
			Fasteners	2.3.2	FIO												
			Adhesives	2.3.1	FIO												
			Vapor Barrier	2.2	FIO												
			Insulation		FIO												
			SD-06 Test Reports														
			Vapor Barrier	2.2	FIO												
			SD-07 Certificates														
			Fiberboard Roof Insulation		FIO												
			Polyisocyanurate Roof Insulation		FIO												
			SD-08 Manufacturer's Instructions														
			Vapor Barrier	2.2	FIO												
			Roof Insulation	3.1	FIO												
		07240	SD-02 Shop Drawings														
			Shop drawings	3.3	G A/E												
			SD-03 Product Data														
			Thermal insulation	2.6	FIO												

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		07240	Accessories	2.12	FIO												
			Base coat	2.7	FIO												
			Portland cement	2.8	FIO												
			Reinforcing fabric	2.9	FIO												
			Finish coat	2.10	FIO												
			Joint Sealant	2.13	FIO												
			Primer	2.11	FIO												
			Bond breaker	2.14	FIO												
			Backer Rod	2.15	FIO												
			Insulation Board	1.4.4	FIO												
			Warranty	1.7	FIO												
			SD-04 Samples														
			Sample Boards	1.2.3.7	G A/E												
			SD-06 Test Reports														
			Abrasion resistance	1.2.3.1	FIO												
			Accelerated weathering	1.2.3.2	FIO												
			Impact resistance	1.2.2.3	FIO												
			Mildew resistance	1.2.3.3	FIO												
			Salt spray resistance	1.2.3.4	FIO												
			Water vapor transmission		FIO												
			Absorption-freeze-thaw	1.2.3.6	FIO												
			Flame spread		FIO												
			Surface Burning Characteristics	1.2.2.1	FIO												
			Radiant heat	1.2.2.2	FIO												
			substrate	3.1	FIO												
			SD-07 Certificates														

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		07240	Qualifications of EIFS Manufacturer	1.4.1	FIO												
			Qualification of EIFS Installer	1.4.2	FIO												
			Qualification of Sealant Applicator	1.4.3	FIO												
			Qualifications of Third Party Inspector		FIO												
			Inspection Check List	3.5.2	FIO												
			SD-08 Manufacturer's Instructions Installation	3.3	FIO												
			SD-10 Operation and Maintenance Data														
			EIFS	1.7	FIO												
		07412A	SD-02 Shop Drawings														
			Metal Roofing	1.7.1	G A/E												
			SD-04 Samples														
			Accessories	2.2	G A/E												
			Roof Panels	2.1	G A/E												
			Fasteners	2.3	G A/E												
			Gaskets and Insulating Compounds	2.9	G A/E												
			Sealant	2.8	G A/E												
			SD-07 Certificates														
			Roof Panels	2.1	FIO												
			Installation	3.1	FIO												
			Accessories	2.2	FIO												
			Insulation	2.6	FIO												

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		07412A	Installer	1.3.3	FIO												
			Warranties	1.7	FIO												
		07413a	SD-02 Shop Drawings														
			Siding	2.1	FIO												
			SD-04 Samples														
			Accessories	2.3	FIO												
			Siding	2.1	FIO												
			Fasteners	2.4	FIO												
			Insulation	2.5	FIO												
			Gaskets and Insulating Compounds	2.8	FIO												
			Sealant	2.7	FIO												
			Wall Liners		FIO												
			SD-07 Certificates														
			Siding	2.1	FIO												
			Installation	3.1	FIO												
			Accessories	2.3	FIO												
			Insulation	2.5	FIO												
		07511	SD-03 Product Data														
			Asphalt Primer	2.2	FIO												
			Base Sheets	2.3	FIO												
			Roofing Felts	2.4	FIO												
			Cap Sheets	2.5	FIO												
			Sheathing Paper	2.6	FIO												
			Bituminous Plastic Cement	2.7	FIO												
			Fasteners		FIO												

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		07511	Aggregate Surfacing	2.9	FIO												
			Roof Walkways	2.10	FIO												
			Adhesive	2.1	FIO												
			Asphalt Base Emulsion	2.11	FIO												
			SD-07 Certificates														
			Adhesive	2.1	FIO												
		07600a	SD-02 Shop Drawings														
			Materials	2.1	FIO												
		07810	SD-03 Product Data														
			Fireproofing Material	3.3	FIO												
			SD-06 Test Reports														
			Fire Resistance Rating	1.7	FIO												
			Field Tests	3.5	FIO												
			SD-07 Certificates														
			Installer Qualifications	1.5	FIO												
			Surface Preparation Report	3.1	FIO												
			Manufacturer's Inspection Report	3.5.4	FIO												
		08110	SD-02 Shop Drawings														
			Doors	2.1	G A/E												
			Frames	2.6	G A/E												
			Accessories	2.4	FIO												
			SD-03 Product Data														
			Doors	2.1	G A/E												
			Frames	2.6	G A/E												
			Accessories	2.4	FIO												
			SD-04 Samples														

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		08110	Factory-applied enamel finish		G A/E												
		08120	SD-02 Shop Drawings														
			Doors and frames	2.1	G A/E												
			SD-08 Manufacturer's Instructions														
			Doors and frames	2.1	FIO												
		08210	SD-02 Shop Drawings														
			Doors	2.1	FIO												
			SD-03 Product Data														
			Doors	2.1	FIO												
			Accessories		FIO												
			Water-resistant sealer	2.3.6	FIO												
			warranty	1.4	FIO												
			Sound transmission class rating	2.1.5	FIO												
			Fire resistance rating	2.1.6	FIO												
			SD-04 Samples														
			Doors	2.1	FIO												
			Door finish colors	2.3.5.4	FIO												
			SD-06 Test Reports														
			Split resistance	2.4	FIO												
			Cycle-slam	2.4	FIO												
			Hinge loading resistance	2.4	FIO												
		08330a	SD-02 Shop Drawings														
			Approved Detail Drawings	3.1	G A/E												
			Installation	3.1	G A/E												
			SD-03 Product Data														
			Overhead Rolling Doors	2.1	G A/E												

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		08330a	SD-06 Test Reports														
			Tests	3.3	FIO												
			SD-04 Samples														
			Overhead Rolling Doors	2.1	G A/E												
			SD-07 Certificates														
			Fire Doors		FIO												
			SD-10 Operation and Maintenance														
			Data														
			Operation and Maintenance	1.6	FIO												
			Manuals														
		08520a	SD-02 Shop Drawings														
			Aluminum Windows		G A/E												
			Insect Screens		G A/E												
			SD-03 Product Data														
			Aluminum Windows		G A/E												
			SD-04 Samples														
			Aluminum Windows		G A/E												
			SD-06 Test Reports														
			Aluminum Windows		FIO												
			SD-07 Certificates														
			Aluminum Windows		FIO												
		08550	SD-02 Shop Drawings														
			Wood windows	2.1	FIO												
			SD-03 Product Data														
			Wood windows	2.1	FIO												
			SD-08 Manufacturer's Instructions														

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ACTIVITY NO	TRANSMITTAL NO	SPEC SECT	DESCRIPTION ITEM SUBMITTED	PARAGRAPH #	GOVT CLASSIFICATION REVIEWER	CONTRACTOR: SCHEDULE DATES			CONTRACTOR ACTION		APPROVING AUTHORITY				MAILED TO CONTR/ DATE RCD FRM APPR AUTH	REMARKS	
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		08550	Wood windows	2.1	FIO												
			SD-10 Operation and Maintenance Data														
			Wood windows	2.1	FIO												
		08600	SD-02 Shop Drawings														
			Shop Drawings	3.2	FIO												
			SD-03 Product Data														
			Skylights		FIO												
			Warranty	1.6	FIO												
			SD-06 Test Reports														
			Test Reports		FIO												
			SD-07 Certificates														
			Skylights		FIO												
			Qualifications	1.4	FIO												
		08710	SD-02 Shop Drawings														
			Hardware schedule	1.3	G A/E												
			Keying system	2.3.7	FIO												
			SD-03 Product Data														
			Hardware items	2.3	G A/E												
			SD-08 Manufacturer's Instructions														
			Installation	3.1	FIO												
			SD-10 Operation and Maintenance Data														
			Hardware Schedule	1.3	G A/E												
			SD-11 Closeout Submittals														
			Key biting	1.4	FIO												

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		08810a	SD-02 Shop Drawings														
			Installation	3.2	G A/E												
			SD-03 Product Data														
			Insulating Glass	2.3	G A/E												
			Glazing Accessories	2.6	FIO												
			A/E		FIO												
			SD-04 Samples														
			Insulating Glass	2.3	G A/E												
			SD-07 Certificates														
			Insulating Glass	2.3	FIO												
		09250	SD-03 Product Data														
			Cementitious backer units	2.1.7	FIO												
			Glass Mat Water-Resistant	2.1.4	FIO												
			Gypsum Tile Backing Board														
			Water-Resistant Gypsum Backing Board	2.1.3	FIO												
			Glass Mat Covered or Reinforced Gypsum Sheathing	2.1.5	FIO												
			Glass Mat Covered or Reinforced Gypsum Sheathing Sealant	2.1.5.1	FIO												
			Impact Resistant Gypsum Board	2.1.6	FIO												
			Accessories	2.1.13	FIO												
			SD-04 Samples														
			Predecorated gypsum board		FIO												
			SD-07 Certificates														
			Asbestos Free Materials	2.1	FIO												

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		09310	SD-03 Product Data														
			Tile	2.1	FIO												
			Setting-Bed	2.2	FIO												
			Mortar, Grout, and Adhesive	2.4	FIO												
			SD-04 Samples														
			Tile	2.1	FIO												
			Accessories	2.1.7	FIO												
			Marble Thresholds	2.5	FIO												
			SD-06 Test Reports														
			Testing	3.7	FIO												
			SD-07 Certificates														
			Tile	2.1	FIO												
			Mortar, Grout, and Adhesive	2.4	FIO												
		09510	SD-02 Shop Drawings														
			Approved Detail Drawings	1.3	FIO												
			SD-03 Product Data														
			Acoustical Ceiling Systems		FIO												
			SD-04 Samples														
			Acoustical Units	2.1	FIO												
			SD-06 Test Reports														
			Fire Resistive Ceilings		FIO												
			Ceiling Attenuation Class and Test		FIO												
			SD-07 Certificates														
			Acoustical Units	2.1	FIO												
		09640A	SD-03 Product Data														

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		09640A	Installation	3.2	FIO												
			SD-04 Samples														
			Strip Flooring	2.1	FIO												
		09650	SD-02 Shop Drawings														
			Sheet Flooring		FIO												
			Tile Flooring	2.2	FIO												
			SD-03 Product Data														
			Tile Flooring	2.2	FIO												
			Sheet Flooring		FIO												
			Accessories for Sheet Vinyl		FIO												
			Integral Coved Base		FIO												
			Adhesive for Sheet Vinyl		FIO												
			Adhesive for Vinyl Composition	2.2.4	FIO												
			Tile														
			Adhesive for Wall Base	2.2.5	FIO												
			SD-04 Samples														
			Tile Flooring	2.2	FIO												
			Sheet Flooring		FIO												
			Seaming Bead		FIO												
			Wall Base	2.4	FIO												
			SD-06 Test Reports														
			Moisture Test	3.3	FIO												
			SD-08 Manufacturer's Instructions														
			Sheet Flooring		FIO												
			Tile Flooring	2.2	FIO												

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		09650	SD-10 Operation and Maintenance Data														
			Data Package 1		FIO												
		09675	SD-02 Shop Drawings														
			Fabrication Drawings	1.4.3	FIO												
			SD-03 Product Data														
			Epoxy-Resin Binder/Matrix	2.1.1	FIO												
			Cured Epoxy Binder	2.1.2	FIO												
			Walnut Shell Aggregate	2.1.3	FIO												
			Surface Sealing Coat	2.1.4	FIO												
			SD-04 Samples														
			Hardboard or Transite Panels	1.4.2	FIO												
			SD-05 Design Data														
			Epoxy-Resin Binder/Matrix	2.1.1	FIO												
			Cured Epoxy Binder	2.1.2	FIO												
			Surface Sealing Coat	2.1.4	FIO												
			SD-06 Test Reports														
			Records of Inspection	1.4	FIO												
			SD-07 Certificates														
			Listing of Product Installations	1.4.1	FIO												
			Epoxy-Resin Binder/Matrix	2.1.1	FIO												
			Cured Epoxy Binder	2.1.2	FIO												
			Walnut Shell Aggregate	2.1.3	FIO												
			Surface Sealing Coat	2.1.4	FIO												
		09680A	SD-02 Shop Drawings														
			Installation	3.4	FIO												

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		09680A	Molding	2.3	FIO												
			SD-03 Product Data														
			Carpet		FIO												
			Surface Preparation	3.1	FIO												
			Installation	3.4	FIO												
			Regulatory Requirements	1.3	FIO												
			SD-04 Samples														
			Carpet		FIO												
			Molding	2.3	FIO												
			SD-06 Test Reports														
			Moisture and Alkalinity Tests	3.2	FIO												
			SD-07 Certificates														
			Carpet		FIO												
			Regulatory Requirements	1.3	FIO												
			SD-10 Operation and Maintenance														
			Data														
			Carpet		FIO												
			Cleaning and Protection	3.5	FIO												
		09900	SD-02 Shop Drawings														
			Piping identification	3.10	FIO												
			stencil	3.10	FIO												
			SD-03 Product Data														
			Coating	2.1	FIO												
			Manufacturer's Technical Data	2.1	FIO												
			Sheets														
			Sealant		FIO												

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		09900	SD-04 Samples														
			Color		FIO												
			SD-07 Certificates														
			Applicator's qualifications	1.3	FIO												
			Qualification Testing	1.4.1.2	FIO												
			SD-08 Manufacturer's Instructions														
			Application instructions		FIO												
			Mixing	3.6.2	FIO												
			Manufacturer's Material Safety	1.7.2	FIO												
			Data Sheets														
			SD-10 Operation and Maintenance														
			Data														
			Coatings:	2.1	FIO												
		10100A	SD-03 Product Data														
			Visual Display Boards		FIO												
			Video Projection System		FIO												
			SD-04 Samples														
			Aluminum	2.2.3	FIO												
			Porcelain Enamel	2.2.1	FIO												
			Materials	2.2	FIO												
			SD-06 Test Reports														
			07 Certificates		FIO												
			Visual Display Boards		FIO												
		10110	SD-03 Product Data														
			Theatre Rigging		G A/E												
			Theatre Lighting System		G G												

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		10110	Sound System		G G												
			07 Certificates		FIO												
		10165	SD-02 Shop Drawings														
			Partitions	3.2	FIO												
			Urinal Screens	3.3.2	FIO												
			Installation Drawings	3.1	FIO												
			SD-03 Product Data														
			Fabric		FIO												
			Core		FIO												
			Adhesive	2.3	FIO												
			Pilasters, Supports, and Hangers	2.4	FIO												
			Anchoring Devices and Fasteners	2.5	FIO												
			Hardware and Fittings	2.6	FIO												
			Brackets	2.7	FIO												
			SD-04 Samples														
			Hardware and Fittings	2.6	FIO												
			Hardware and Fittings	2.6	FIO												
			Anchoring Devices and Fasteners	2.5	FIO												
			Panels	3.1	FIO												
			Fabric		FIO												
			Partitions	3.2	FIO												
			Screens	3.3	FIO												
			SD-07 Certificates														
			Certification	1.5	FIO												
		10430	SD-02 Shop Drawings														
			Approved Detail Drawings	3.1	FIO												

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		10430	SD-03 Product Data														
			Modular Exterior Signage System		FIO												
			Installation	3.1	FIO												
			Exterior Signs		FIO												
			Wind Load Requirements	1.3	FIO												
			SD-04 Samples														
			Exterior Signs		FIO												
			SD-10 Operation and Maintenance														
			Data														
			Protection and Cleaning	3.1.2	FIO												
		10440	SD-02 Shop Drawings														
			Detail Drawings	3.1	FIO												
			SD-03 Product Data														
			Installation	3.1	FIO												
			SD-04 Samples														
			Interior Signage	1.3	FIO												
			SD-10 Operation and Maintenance														
			Data														
			Approved Manufacturer's	3.1	FIO												
			Instructions														
			Protection and Cleaning	3.1.2	FIO												
		10505N	SD-02 Shop Drawings														
			Types	2.1	G A/E												
			Location	2.1	G A/E												
			Installation	3.1	FIO												
			Numbering system	3.2	FIO												

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		10505N	SD-03 Product Data														
			Material	2.2	FIO												
			Finish	2.2.3	FIO												
			components	2.3	FIO												
			Assembly	3.1	FIO												
			SD-04 Samples														
			Color chips	1.5.1	G A/E												
		10523	SD-02 Shop Drawings														
			Fire Extinguishers	2.1	FIO												
			Fire Extinguishers	3.1	FIO												
			Adjuncts	2.4	FIO												
			Cabinets	2.5	FIO												
			Wall Brackets	2.6	FIO												
			SD-03 Product Data														
			Fire Extinguishers	2.1	FIO												
			Fire Extinguishers	3.1	FIO												
			Adjuncts	2.4	FIO												
			Cabinets	2.5	FIO												
			Wall Brackets	2.6	FIO												
			Replacement Parts	3.2.1	FIO												
			SD-04 Samples														
			Fire Extinguishers	2.1	FIO												
			Fire Extinguishers	3.1	FIO												
			Cabinets	2.5	FIO												
			Wall Brackets	2.6	FIO												
			Accessories	2.6	FIO												

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		10523	SD-07 Certificates														
			Fire Extinguishers	2.1	FIO												
			Fire Extinguishers	2.1	FIO												
			Fire Extinguishers	2.1	FIO												
			Fire Extinguishers	3.1	FIO												
			Fire Extinguishers	3.1	FIO												
			Fire Extinguishers	3.1	FIO												
		10650A	SD-02 Shop Drawings														
			Operable Partitions	2.2	FIO												
			SD-03 Product Data														
			Operable Partitions	2.2	FIO												
			SD-04 Samples														
			Operable Partitions	2.2	G A/E												
			SD-07 Certificates														
			Materials	2.1	FIO												
			Operable Partitions	2.2	FIO												
			SD-10 Operation and Maintenance Data														
			Operable Partitions	2.2	FIO												
		10800	SD-03 Product Data														
			Finishes	2.1.2	FIO												
			Accessory Items	2.2	FIO												
			SD-04 Samples														
			Finishes	2.1.2	FIO												
			Accessory Items	2.2	FIO												
			SD-07 Certificates														

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		10800	Accessory Items	2.2	FIO												
		11165	SD-02 Shop Drawings														
			Dock Bumpers	2.1	FIO												
			SD-07 Certificates														
			Fastening Materials	2.2	FIO												
			Rubberized Fabric	2.1	FIO												
			Steel Angles	2.2	FIO												
			Hardware Items	2.3	FIO												
			SD-04 Samples														
			Fastening Materials	2.2	FIO												
			Angles	2.2	FIO												
			Rods	2.2	FIO												
			Nuts	2.2	FIO												
			Loading Dock Bumpers	3.1	FIO												
			Dock Bumpers	2.1	FIO												
			Rubber	2.1	FIO												
		11400A	SD-02 Shop Drawings														
			Food Service Equipment	2.1.6	FIO												
			Installation	3.1	FIO												
			SD-03 Product Data														
			Food Service Equipment	2.1.6	FIO												
			SD-06 Test Reports														
			Testing	3.3	FIO												
			SD-10 Operation and Maintenance														
			Data														
			Laundry Equipment		FIO												

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		11400A	Food Service Equipment	2.1.6	FIO												
		11480	SD-01 Preconstruction Submittals														
			Manufacturer's Equipment		FIO												
			Material, Equipment, and Fixture Lists	1.2	FIO												
			SD-02 Shop Drawings														
			Manufacturer's Equipment		FIO												
			Material, Equipment, and Fixtures		FIO												
		12320A	SD-02 Shop Drawings														
			Installation	3.1	G A/E												
			SD-03 Product Data														
			Cabinets	2.1	G A/E												
			Countertops and Backsplash	2.2	G A/D												
			SD-04 Samples														
			Cabinets	2.1	G A/E												
			Countertops and Backsplash	2.2	G A/E												
			SD-06 Test Reports														
			Cabinets and Countertops		FIO												
		12485	SD-04 Samples														
			Entrance Mats		FIO												
		12495	SD-02 Shop Drawings														
			Venetian Blinds		FIO												
			Window Shades		FIO												
			SD-04 Samples														
			Venetian Blinds		FIO												
			Window Shades		FIO												

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		12495	SD-07 Certificates														
			Venetian Blinds		FIO												
			Window Shades		FIO												
		13100A	SD-02 Shop Drawings														
			Drawings		FIO												
			SD-07 Certificates														
			Materials	2.1	FIO												
		13110A	SD-02 Shop Drawings														
			Drawings	1.3.9	FIO												
			Contractor's Modifications	1.3.2	FIO												
			SD-03 Product Data														
			Equipment		FIO												
			Spare Parts	3.9	FIO												
			SD-06 Test Reports														
			Tests and Measurements	3.5	FIO												
			Contractor's Modifications	1.3.2	FIO												
			SD-07 Certificates														
			Cathodic Protection System		FIO												
			Services of 'Corrosion Expert'	1.3.1	FIO												
			SD-10 Operation and Maintenance														
			Data														
			Cathodic Protection System		FIO												
			Training Course	3.6	FIO												
		13851	SD-02 Shop Drawings														
			Fire Alarm Reporting System	1.4.1	G A/E												
			SD-03 Product Data														

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		13851	Storage Batteries	2.2	FIO												
			Voltage Drop		FIO												
			Special Tools and Spare Parts	2.7.4	FIO												
			Technical Data and Computer Software	1.5	FIO												
			Training	3.6	FIO												
			Testing	3.5	FIO												
			SD-06 Test Reports														
			Testing	3.5	FIO												
			SD-07 Certificates														
			Equipment		FIO												
			Qualifications	1.3.7	FIO												
			SD-10 Operation and Maintenance Data														
			Technical Data and Computer Software	1.5	FIO												
		13930	SD-02 Shop Drawings														
			Sprinkler System Shop Drawings		FIO												
			As-Built Shop Drawings		G A/E												
			SD-03 Product Data														
			Fire Protection Related Submittals	3.1	FIO												
			Load Calculations for Sizing Sway Bracing		FIO												
			Components and Equipment Data		FIO												
			Hydraulic Calculations	1.7	FIO												
			Spare Parts		FIO												

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		13930	Preliminary Tests Procedures		FIO												
			Final Acceptance Test Procedures		G A/E												
			On-site Training Schedule		G A/E												
			Preliminary Tests	3.9	G A/E												
			Final Acceptance Test		G A/E												
			Fire Protection Specialist Qualifications		G A/E												
			Sprinkler System Installer Qualifications	1.9	G A/E												
			SD-06 Test Reports														
			Preliminary Tests Report		FIO												
			Final Acceptance Test Report		FIO												
			SD-07 Certificates														
			Fire Protection Specialist Inspection		FIO												
			SD-10 Operation and Maintenance Data														
			Wet Pipe Sprinkler System		FIO												
		14240	SD-02 Shop Drawings														
			Detail Drawings	1.3	FIO												
			SD-03 Product Data														
			Passenger Elevators	2.1	G A/E												
			Freight Elevators		G A/E												
			Field Quality Control	3.2	G A/E												
			Logic Control	2.4.1	G A/E												
			SD-05 Design Data														

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		14240	Reaction Loads	1.3	G A/E												
			Heat Loads	1.3	G A/E												
			SD-06 Test Reports														
			Field Tests Reports	3.2.2	FIO												
			SD-07 Certificates														
			Qualifications	1.4	FIO												
			SD-10 Operation and Maintenance														
			Data														
			Operation and Maintenance	3.3	G A/E												
			Manuals														
			Maintenance and Diagnostic	1.5.3	G A/E												
			Tools														
			Maintenance and Repair Action	1.6	G A/E												
			Plan														
			Operation and Maintenance	3.3	G A/E												
			Training														
		15080	SD-04 Samples														
			Thermal Insulation Materials		FIO												
		15081	SD-03 Product Data														
			Insulation FIO		FIO												
			Jacket FIO		FIO												
			SD-08 Manufacturer's Instructions														
			field-applied insulation	1.2	FIO												
		15181	SD-02 Shop Drawings														
			Piping System	2.4	FIO												
			SD-03 Product Data														

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		15181	Piping System	2.4	FIO												
			Water Treatment Systems	2.12	FIO												
			Spare Parts		FIO												
			Qualifications	1.3	FIO												
			Field Tests	3.3	FIO												
			Demonstrations	3.4	FIO												
			Verification of Dimensions	1.6.1	FIO												
			SD-06 Test Reports														
			Field Tests	3.3	FIO												
			Condenser Water Quality Tests	3.3.3	FIO												
			One-Year Inspection	3.5	FIO												
			SD-07 Certificates														
			Service Organization	2.1	FIO												
			SD-10 Operation and Maintenance														
			Data														
			Operation Manuals		FIO												
			Maintenance Manuals	3.4	FIO												
			Water Treatment Systems	2.12	FIO												
		15182	SD-02 Shop Drawings														
			Refrigerant Piping System	2.3	G A/E												
			SD-03 Product Data														
			Refrigerant Piping System	2.3	G A/E												
			Spare Parts		FIO												
			Qualifications	1.3	FIO												
			Refrigerant Piping Tests	3.3	FIO												
			Demonstrations	3.4	FIO												

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		15182	Verification of Dimensions	1.6.1	FIO												
			SD-06 Test Reports														
			Refrigerant Piping Tests	3.3	FIO												
			SD-07 Certificates														
			Service Organization	2.1	FIO												
			SD-10 Operation and Maintenance Data														
			Operation Manuals		FIO												
			Maintenance Manuals	3.4	FIO												
		15190	SD-02 Shop Drawings														
			Gas Piping System	3.2	G A/E												
			SD-03 Product Data														
			Qualifications		FIO												
			SD-06 Test Reports														
			Pressure Tests	3.15.1	FIO												
			Test With Gas	3.15.2	FIO												
		15400	SD-02 Shop Drawings														
			Plumbing System	3.8.1	G A/E												
			SD-03 Product Data														
			Plumbing Fixture Schedule	3.9	FIO												
			SD-06 Test Reports														
			Tests, Flushing and Disinfection	3.8	FIO												
			Backflow Preventers		FIO												
			SD-07 Certificates														
			Materials and Fixtures		FIO												
			Bolts	2.1.1	FIO												

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		15400	Welding	1.5.1	FIO												
			SD-10 Operation and Maintenance Data														
			Plumbing System	3.8.1	G A/E												
		15645A	SD-03 Product Data														
			Cooling Tower	2.5	G A/E												
			Spare Parts		FIO												
			Posted Instructions	3.4	FIO												
			Performance Tests	3.3	FIO												
			Demonstrations	3.4	FIO												
			Verification of Dimensions	1.5.1	FIO												
			SD-06 Test Reports														
			Performance Tests	3.3	FIO												
			SD-07 Certificates														
			Service Organization	2.1	FIO												
			SD-10 Operation and Maintenance Data														
			Operation Manuals		FIO												
			Maintenance Manuals	3.4	FIO												
		15700	SD-02 Shop Drawings														
			Drawings		FIO												
			SD-03 Product Data														
			Unitary Equipment	2.4	FIO												
			Spare Parts Data		FIO												
			Posted Instructions	3.5	FIO												
			Verification of Dimensions	1.5.1	FIO												

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		15700	Demonstrations	3.5	FIO												
			SD-06 Test Reports														
			Refrigerant Tests, Charging, and Start-Up	3.3	FIO												
			SD-07 Certificates														
			Unitary Equipment	2.4	FIO												
			Service Organization	2.1	FIO												
			SD-10 Operation and Maintenance Data														
			Operation Manuals		FIO												
			Maintenance Manuals	3.5	FIO												
		15768	SD-02 Shop Drawings														
			Heater installation drawing		FIO												
			SD-03 Product Data														
			Electric unit heaters	2.1	FIO												
			Thermostat	2.1.6	G A/E												
			Unit thermostat		G A/E												
			SD-10 Operation and Maintenance Data														
			Electric unit heaters	2.1	FIO												
		15895	SD-02 Shop Drawings														
			Drawings		FIO												
			Installation	3.1	FIO												
			SD-03 Product Data														
			Components and Equipment	2.1	FIO												
			Test Procedures		FIO												

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		15895	Welding Procedures		FIO												
			System Diagrams		FIO												
			Testing, Adjusting and Balancing	3.2	FIO												
			Field Training	3.4	FIO												
			SD-06 Test Reports														
			Performance Tests	3.3	FIO												
			SD-10 Operation and Maintenance														
			Data														
			Operating and Maintenance	3.4	FIO												
			Instructions														
		15951	SD-02 Shop Drawings														
			HVAC Control System	3.1.1	G A/E												
			SD-03 Product Data														
			Service Organizations		FIO												
			Equipment Compliance Booklet	1.6	FIO												
			Commissioning Procedures	3.4	FIO												
			Performance Verification Test	1.6	FIO												
			Procedures														
			Training	3.6	G A/E												
			SD-06 Test Reports														
			Commissioning Report	3.6.2	FIO												
			Performance Verification Test	3.5.3	FIO												
			SD-10 Operation and Maintenance														
			Data														
			Operation Manual	1.5	FIO												
			Maintenance and Repair Manual	1.6	FIO												

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		15990	SD-02 Shop Drawings														
			TAB Schematic Drawings and Report Forms	3.3	FIO												
			SD-03 Product Data														
			TAB Related HVAC Submittals	3.2	FIO												
			TAB Procedures	3.5.1	FIO												
			Calibration	1.4	FIO												
			Systems Readiness Check	3.5.2	FIO												
			TAB Execution	3.5.1	FIO												
			TAB Verification	3.5.4	FIO												
			SD-06 Test Reports														
			Design Review Report	3.1	FIO												
			Systems Readiness Check	3.5.2	FIO												
			TAB Report	3.5.3	FIO												
			TAB Verification Report	3.5.4	FIO												
			SD-07 Certificates														
			Ductwork Leak Testing	3.4	FIO												
			TAB Firm	1.5.1	FIO												
			TAB Specialist	1.5.2	FIO												
		15995	SD-03 Product Data														
			Commissioning Team	3.1	FIO												
			Test Procedures		FIO												
			Test Schedule		FIO												
			SD-06 Test Reports														
			Test Reports		FIO												
		16264	SD-02 Shop Drawings														

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		16264	Layout		FIO												
			Drawings		FIO												
			Acceptance	3.9	FIO												
			SD-03 Product Data														
			Performance Tests	3.5.5	FIO												
			Sound Limitations		FIO												
			Generator		G A/E												
			Power Factor	3.5.1.2	FIO												
			Heat Rejected to Engine-Generator Space		FIO												
			Time-Delay on Alarms		FIO												
			Cooling System		FIO												
			Manufacturer's Catalog		FIO												
			Vibration Isolation		FIO												
			Instructions	3.8	FIO												
			Experience		FIO												
			Field Engineer		FIO												
			Site Welding		FIO												
			General Installation	3.1	FIO												
			Site Visit		FIO												
			SD-06 Test Reports														
			Onsite Inspection and Tests	3.5	FIO												
			SD-07 Certificates														
			Vibration Isolation		FIO												
			Prototype Tests		FIO												
			Reliability and Durability		FIO												

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		16264	Emissions		FIO												
			Sound limitations		FIO												
			Flywheel Balance		FIO												
			Materials and Equipment		FIO												
			Factory Inspection and Tests		FIO												
			Inspections	3.5.3	FIO												
			Cooling System		FIO												
		16375	SD-02 Shop Drawings														
			Fabrication Drawings	1.4	FIO												
			Conduit and Fittings	1.4	FIO												
			Conduit and Fittings	2.1	FIO												
			Separators	1.4	FIO												
			Separators	2.2	FIO												
			Markers	1.4	FIO												
			Markers	2.3	FIO												
			Grounding Conductor	1.4	FIO												
			Grounding Conductor	2.4	FIO												
			Manholes	1.4	FIO												
			SD-03 Product Data														
			Conduit and Fittings	1.4	FIO												
			Conduit and Fittings	2.1	FIO												
			Separators	1.4	FIO												
			Separators	2.2	FIO												
			Markers	1.4	FIO												
			Markers	2.3	FIO												
			Grounding Conductor	1.4	FIO												

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Wheatley Elementary School Modernization and Addition																	
ACTIVITY NO	TRANSMITTAL NO	SPEC SECT	DESCRIPTION ITEM SUBMITTED	PARAGRAPH #	GOVT CLASSIFICATION REVIEWER	CONTRACTOR: SCHEDULE DATES			CONTRACTOR ACTION		APPROVING AUTHORITY				MAILED TO CONTR/ DATE RCD FRM APPR AUTH	REMARKS	
						SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	ACTION CODE	DATE OF ACTION	DATE FWD TO APPR AUTH/ DATE RCD FROM CONTR	DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACTION CODE			DATE OF ACTION
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)	(q)	(r)
		16375	Grounding Conductor	2.4	FIO												
			Manholes	1.4	FIO												
			Manhole Frames and Covers		FIO												
			Sump Cover		FIO												
			Pulling Irons		FIO												
			Cable Supports		FIO												
			Material, Equipment, and Fixture Lists	1.5	FIO												
			SD-06 Test Reports														
			Test Reports	2.5	FIO												
			SD-08 Manufacturer's Instructions														
			Manufacturer's Instructions	1.5	FIO												
		16415	SD-02 Shop Drawings														
			Interior Electrical Equipment		FIO												
			SD-03 Product Data														
			Fault Current and Protective Device Coordination Study		FIO												
			Manufacturer's Catalog		FIO												
			Material, Equipment, and Fixture Lists		FIO												
			As-Built Drawings	1.2.7	FIO												
			Onsite Tests	3.21.2	FIO												
			SD-06 Test Reports														
			Factory Test Reports		FIO												
			Field Test Plan		FIO												
			Field Test Reports	3.19	FIO												

SUBMITTAL REGISTER

CONTRACT NO.

TITLE AND LOCATION						CONTRACTOR											
Wheatley Elementary School Modernization and Addition																	
ACTIVITY NO	TRANSMITTAL NO	SPEC SECT	DESCRIPTION ITEM SUBMITTED	PARAGRAPH #	GOVT CLASSIFICATION REVIEWER	CONTRACTOR: SCHEDULE DATES			CONTRACTOR ACTION		APPROVING AUTHORITY				MAILED TO CONTR/ DATE RCD FRM APPR AUTH	REMARKS	
						SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	ACTION CODE	DATE OF ACTION	DATE FWD TO APPR AUTH/ DATE RCD FROM CONTR	DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACTION CODE			DATE OF ACTION
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)	(q)	(r)
		16415	SD-07 Certificates Materials and Equipment	1.4	FIO												
		16528	SD-02 Shop Drawings Lighting System Detail Drawings As-Built Drawings	1.3.1 3.7.2	FIO FIO FIO												
			SD-03 Product Data Equipment and Materials Spare Parts		FIO FIO												
			SD-06 Test Reports CCTV Assessment Lighting Operating Test	1.3.2 3.7.1	FIO FIO												
			SD-10 Operation and Maintenance Data Lighting System	1.3.1	FIO												
		16721	SD-02 Shop Drawings Intercommunication System Installation		G A/E FIO												
			SD-03 Product Data Spare Parts		FIO												
			SD-06 Test Reports Acceptance Tests		FIO												
			SD-10 Operation and Maintenance Data Intercommunication System		FIO												

SECTION 10100A

VISUAL COMMUNICATIONS AND THEATRE SPECIALTIES
07/02 (REVISED 10/03/03)

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

ANSI Z97.1 (1984; R 1994) Safety Performance Specifications and Methods of Testing for Safety Glazing Materials Used In Buildings

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM B 221 (2000) Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes

ASTM B 221M (2000) Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes (Metric)

ASTM C 1048 (1997b) Heat-Treated Flat Glass - Kind HS, Kind FT Coated and Uncoated Glass

ASTM D 3691 (1995; Rev. A) Woven, Lace, and Knit Household Curtain and Drapery Fabrics

ASTM E 84 (2001) Surface Burning Characteristics of Building Materials

ASTM F 148 (1995) Binder Durability of Cork Composition Gasket Materials

ASTM F 152 (1995; R 2002) Tension Testing of Nonmetallic Gasket Materials

ASTM F 793 (1993; R 1998) Wallcovering by Durability Characteristics

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 701 (1996) Fire Tests for Flame-Resistant Textiles and Films

UNDERWRITERS LABORATORIES (UL)

UL 214 (1997) Flame-Propagation of Fabrics and Films

1.2 GENERAL REQUIREMENTS

The term visual display board when used herein includes presentation boards, marker boards, tackboards, board cases, display track system and horizontal sliding units. Visual display boards shall be from manufacturer's standard product line.

1.3 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-03 Product Data

Visual Display Boards G A/E

Manufacturer's descriptive data and catalog cuts.
Manufacturer's installation instructions, and cleaning and maintenance instructions.

Video Projection System G A/E

SD-04 Samples

Aluminum

Sections of frame, map rail, and chalktray, and two map hooks.

Porcelain Enamel

Section showing porcelain enamel coating, steel, core material and backing.

Materials

Section of core material showing the lamination of colored cork, natural cork, woven fabric, non-woven fabric, and vinyl wall covering. Sample of hardwood and plastic laminate finish, and glass type. Samples shall be minimum 4 by 4 inches and show range of color.

SD-06 Test Reports

Flame Resistance

07 Certificates

Visual Display Boards

Certificate of compliance signed by Contractor attesting that visual display boards conform to the requirements specified.

SD-08 Manufacturer's Instructions

Drapery hardware

Special fabrication. Before fabrication, submit the manufacturer's instructions for fabrics requiring special fabrication.

SD-10 Operation and Maintenance Data

Drapery system, Data Package 1

Include laundering and dry cleaning instructions for fabrics requiring special care. Furnish separate instruction sheet for each material (one for fiberglass, one for Verel, etc.). For fabrics which are not permanently or inherently flame resistant, furnish instruction to include frequency and process required for retreating the fabric to renew the effectiveness of the flame resistant treatment. Head each sheet with name and number of room or rooms in which each material is hung. In lieu of instruction sheets, provide instructions on small, permanent labels (either iron-on type or sewn-on) affixed to back of the heading of each panel.

Video Projection System

1.4 DELIVERY, STORAGE AND HANDLING

A. Materials shall be delivered to the building site in the manufacturer's original unopened containers and shall be stored in a clean dry area with temperature maintained above 50 degrees F. Materials shall be stacked according to manufacturer's recommendations. Visual display boards shall be allowed to acclimate to the building temperature for 24 hours prior to installation.

B. The Contractor shall carefully control handling and installation of all items, which are not immediately replaceable, so that completion of the work will not be delayed by hardware or equipment losses before, during, and after installation. The Contractor is responsible for all items until final acceptance.

C. Prior to installation, protect exposed surfaces with material, which is easily removed without marring finishes.

D. Without cost to the Owner replace product damaged during storage or handling.

1.5 WARRANTY

Manufacturer's standard performance guarantees or warranties that extend beyond a one year period shall be provided.

1.6 STAGE CURTAINS

1.6.1 Scope of Work

All materials, components and services necessary to provide a complete working system indicated in this section, as specified herein and shown on related drawings including, but not limited to:

1. Dimensional drawings and schedules for specified curtains, track and appropriate hardware.
2. Shipment of equipment and supplies to the job site.
3. Installation in accordance with these specifications, related drawings, the equipment manufactures' recommendations, established trade criteria, and all applicable code requirements.
4. Inspection and demonstration of completed installation with the general contractor's engineering personnel and any necessary adjustments needed to comply with these specifications, related drawings, equipment manufactures' recommendations, established trade criteria, applicable code requirements, or proper operation.

1.6.2 Work Included

A. Base Bid:

1. Theatre Curtains
2. Curtain Track and Hardware
3. Curtain Supports

B. The above list is for reference only and is not intended to define limits of the work for a complete installation. Carefully follow all written specifications and drawings and provide such work for a complete and operable system.

1.6.3 Qualifications

A. All equipment and installation shall be the responsibility of a single contractor, or subcontractor, who shall own and operate his own full time shop for the installation and assembly of stage equipment.

B. Bid submissions must identify any such subcontractors.

C. The contractor or subcontractor shall have at least 10 years experience in the installation of similar stage equipment and systems. If requested, the contractor or subcontractor shall submit a representative list of installations during the above period.

1.6.4 Submittals

A. Samples:

1. Within thirty (30) days of contract award, the contractor shall

submit to the architect for approval, prior to fabrication:

- a) Samples and color lines for all curtain fabrics.
- b) Samples of any equipment component requested by the Contracting Officer.

1.6.5 Standards

All equipment, where applicable standards have been established, shall be built to the standards of Underwriters Laboratories, Inc., the National Electric Code, and the United States Institute for Theatre Technology. Approved equipment shall be so labeled on delivery to the job site.

1.6.6 General Requirements

A. General Conditions of the project contract, work schedules, and site regulations apply to this work.

B. This work shall comply with all applicable local, state, and national codes.

C. All equipment shall be fully insured against loss or damage during shipment, installation and testing. Certification of such coverage shall be furnished to the architect.

D. The contractor shall warrant all equipment provided under this section to be free from defects in materials and workmanship for a period of at least twelve (12) months from the date of final acceptance of all work in this section.

E. All repairs and service during the warranty period shall be at the job site and include all necessary labor, materials and transportation of replacement materials and parts.

F. This warranty shall cover any manufacturer defects of equipment and unusual wear and tear caused by improper installation. Normal wear and tear and abuse of equipment are exempted.

1.7 A/V CONDUIT SYSTEM

System Description: Raceway and outlet box system suitable for installation of Audio and Video based systems equipment and cabling by others.

1.8 VIDEO PROJECTION SYSTEM

PART 1 - VIDEO PROJECTION SYSTEM GENERAL

1.01 SUB-SECTION INCLUDES

A. General: Comply with all Contract Documents, including Divisions 1 through 16 of the general contract specifications.

B. Statement of Work: The work of this section includes, but is not necessarily limited to, the following:

1. Provide, and install complete and operational Video Projection

System(s) as outlined in these specifications and related drawings and documentation requirements as set forth in this documentation.

2. It is the responsibility of the Contractor to provide all wiring, plates, connections, and miscellaneous equipment for a complete and operational system weather specified in this or other related documents or not.

C. Coordination, provision, installation, inspection, testing, instruction, and warranties of the Video Projection System.

D. All facilities, materials, equipment, transportation, and necessary labor for a complete and operational Video Projection System and Video Production System(s).

E. Additional Section information:

1. Required licenses and permits including any required bonding or insurance requirements that comply with General Conditions of specifications and contract documentations.

2. Verification of dimensions and conditions at the job site.

3. Installation in accordance with the contract documentation, applicable installation procedures or codes as set forth by the state or county of the project or manufactures recommendations.

4. Submittal information and provisions.

5. Documented Video Projection System testing procedures.

6. Instruction of operating personnel.

7. Manuals and provisions thereof.

8. Maintenance and warranties.

F. Definitions:

1. "Contractor" - Installer who has been awarded the contract to perform the work.

2. The term "shall" is mandatory, the term "will" is informative, and the term "should" is advisory.

3. "Provide and install" - To supply, install, and connect up complete and ready for safe and regular operation.

4. "Indicated", "shown", or "noted" - As indicated, shown or noted on drawings or specifications.

5. "Equivalent", "similar", or "equal" - Of base bid manufacturer, equal in materials, size, color, design, and efficiency of specified product, conforming to base bid manufacturers.

6. "Reviewed", "satisfactory", "accepted", "approved", "directed" - As reviewed, satisfactory, accepted, approved, or directed by the Owner.

7. "Professional grade" - Equipment that is intended for commercial, not residential, use and is rated for continuous duty.

8. "User-friendly controls" - Controls that are designed and laid out for ease of use, in a logical, easily recognizable format that utilizes industry standard symbols wherever applicable.

9. "Labels" - All labels on audio-visual equipment and racks shall be self-adhering black laminate with white engraved letters as specified in sections 3.3 and 3.4.

G. Below is a listing of specification standards, tests or recommended installation methods or procedures or applicable installation or safety codes:

1. National Electric Code (NEC)

2. National Electrical Manufacture's Association (NEMA)

3. Underwriters Laboratories (UL)
4. Electronics Industries Association (E.I.A.)
5. American National Safety Institute (ANSI)
6. Handbook of Computer-Video Interfacing and Video Distribution, by Extron Electronics

1.02 SCOPE OF WORK

- A. The Contractor shall provide Video Projection System and Video Production System(s) compatible with the Owner's communications systems (i.e. video, and computer systems) and operations.
- B. The Contractor shall provide equipment that, where required, shall conform to the applicable requirements of the Underwriter's Laboratories, Inc., local codes, the National Electrical Code and any other governing codes. Such items shall bear a label or mark indicating their conformance to the above requirements.
- C. The Contractor shall provide a complete and operational system configured and installed for user-friendly operation and low maintenance. Provide for two reprogrammings of the remote control software, as directed by the Owner, before Final Acceptance. Provide for two level adjustments and calibrations of video systems, as directed by the Owner, before Final Acceptance. On-site factory technical support shall be provided if necessary to assure performance.
- D. The Contractor shall restore finish hardware to original condition, including painting, ceiling modifications and attachments.
- E. Work shall be in compliance with all applicable standards listed above and all governing codes and regulations of the authorities having jurisdiction and the Contract Documents.
- F. Coordinate exact location and installation of the equipment, power, conduit, and raceway systems with the Architect.

1.03 SYSTEM DESCRIPTION AND REQUIREMENTS

- A. The following is for a basic system description and is not intended to be exhaustive in nature and is not complete for proper installation or operation of system.
- B. Provide a Video Projection and Video Production System for the Gym/Auditorium. One video projector shall be installed on a custom manufactured video projection stand in the projection booth and aligned and adjusted to provide full projected image to the 12'x16' screen mounted at the stage proscenium area. System controller shall be interfaced with the screen and video projector for remote control capabilities. Video input sources such as a VCR and DVD player and multiple computer interface devices shall be installed and interfaced into the video projection system for a complete and operational system. The video projection system shall be priced complete and operational for the Base Building Add Alternate.
- C. A small camera system shall be installed into the Gym/Auditorium. The camera system shall consist of two pan/tilt cameras that will be remote controlled from the booth location. These cameras shall be located as shown on the drawings and allow good quality video shots of both the stage and audience seating areas. Each camera shall be installed into a custom built, in wall cavity to offer protection. Each camera shall have

zoom-able lens in order to allow close up work of the students and actors on stage.

D. A small computer based video editing system shall be installed for professional grade post production video assembly and graphic over lay for the video projection systems

E. A matrix switcher shall be installer in order to control feeds to both the projection system and the editing system. The switcher shall allow easy source selection for either system.

F. A video production switcher shall be incorporated into the system for professional video source selection for either live events or production editing.

1.04 RELATED WORK

A. Conduits: Review all conduit runs, junction boxes, and electrical outlets provided and installed by the electrical contractor, and provide fit-up drawings based on these. Verify and inspect rough in of all necessary conduits and outlets. Provide a written acceptance of all field conditions, or a list of any discrepancies, within ten (10) working days from Notice To Proceed.

1.05 DELIVERY, STORAGE, AND HANDLING

A. The Contractor shall carefully control handling and installation of all items, which are not immediately replaceable, so that completion of the work will not be delayed by hardware or equipment losses before, during, and after installation. The Contractor is responsible for all items until final acceptance.

B. Prior to installation, protect exposed surfaces with material, which is easily removed without marring finishes.

C. Without cost to the Owner replace product damaged during storage or handling.

1.06 SCHEDULING

A. The Contractor shall submit a schedule to the Owner for approval. Show sequence of work, etc. from time of notice to proceed to final sign off of project. This schedule shall be submitted on Microsoft Project both paper and electronic form with submittals.

B. It shall be the responsibility of the Contractor to coordinate the installation of the system to be compatible with the work of other trades. The Contractor shall attend weekly progress meetings and provide continuous on-site project management.

C. It shall be the responsibility of the Contractor to arrange with The Owner a mutually acceptable time for Acceptance Testing, based upon the dates provided in the Solicitation.

D. The Contractor shall provide operating personnel with extensive training for each system type and room type as outlined in section 1.03.

1.07 BID/TECHNICAL PROPOSALS

- A. A mandatory pre-bid site visit will be utilized to allow the contractor to see the current jobsite conditions. This meeting will be scheduled in advance with the owner.
- B. The Video Projection System and Video Production System Contractor shall be experienced in the provisions of systems similar in complexity to those required for this project and at least meet the following criteria
1. The primary business of the contractor/installer shall be the installation of audio or video systems.
 2. At least five years experience with the specified equipment and systems.
 3. Experience with at least one project of similar size and complexity as outlined in these specifications
 4. Be a franchised dealer and service facility for the products furnished.
 5. Maintain a fully staffed installation crew and service crew for maintainance and installation of the specified systems.
 6. Video Projection System shall be approved by the Owner, Architect and Consultant.
 7. At the request of the Owner, Contractor shall demonstrate that he has:
 - a. Adequate facilities and equipment for this work.
 - b. Adequate staff with the appropriate technical expertise and experience for this project.
- C. Provide a list of five (5) references with locations, names of contacts, and contact phone information with brief system descriptions and dollar amounts for each reference. References shall be no more then three (3) years old.
- D. A detailed list in Microsoft Excel format (both hard copy and disk) showing Item Number, Item Description, Manufacturer, Part Number, Quantity, and Price. Include manufacturer's specification sheets for each piece submitted. This shall be generated from this document and related drawings.

1.08 SUBMITTALS

- A. Provide the following for approval sixty days after Notice to Proceed and prior to commencement of Work:
1. A complete list of all products to be incorporated within the work with all quantities listed. Each product shall be listed with specification section references in Excel format.
 2. Complete functional diagrams of each system required for a complete and operational system with descriptive narratives of any deviations from the specified system design.
 3. All shop drawings as defined in this section.
- B. Shop Drawings:
1. Shall not be smaller then 24"x36" and shall be sized as appropriate for thorough understanding of systems.
 2. All drawings shall be scaled appropriately but no less then 1/8" = 1'
 3. Schematic detailed wiring diagrams showing interconnection of contractor provided components and fabricated products, wiring and cabling diagrams depicting cable types, and devise designators. Each component shall have a unique designator and use same designator throughout the project.
 4. Show location of all equipment in racks, consoles, or on tables, with

complete dimensions, wire routing and cabling within housing.

5. Show all A.C. power outlet locations and terminal strip locations with in each equipment rack.
6. Plans and sections of the building and adjacent grounds showing the location of all installed equipment such as video projectors, racks, consoles, plates/panels and antennas, (etc.).
7. Patch panel layouts and labeling strips, including color schemes as necessary.
8. Full fabrication details of custom enclosures and millwork indicating dimensions, material, finish, and openings for equipment.
9. Provide complete drawings for all fabricated plates and panels. Drawings shall include dimensioned locations of components, component type, engraving information, plate color information, and a complete bill of materials for each plate.
10. Complete labeling schemes for all cabling and equipment components for project. Include font size and styles along with a sample of cable label and equipment label. All labeling shall be consistent with-in the project scope.
11. A complete wire schedule showing source and destination and indicating conduit location and sizing. Provide conduit sizing and layout with at least a 20% oversize for project utilization for future system growth.
12. Provide a complete conduit riser and associated conduit plans for a complete conduit system. Include a Junction Box schedule showing type, size mounting style and location of each box.

C. Submittal Format:

1. Each submittal shall be in three ring binders no larger than 3" spines and sized for 150% of material enclosed. Use multiple volumes if necessary.
2. Arrange product data in alphanumeric order.
3. Separate major groupings with labeled binder tabs.
4. Index product data sheets by manufacture and model or part number.
5. Each submittal shall include a unique number scheme and be numbered in consecutive order.
6. Each submittal shall include a complete table of contents with the following information:
 - a. Project title and number.
 - b. Submittal number.
 - c. Date of submission.
7. Referenced addendum or change order numbers as applicable
8. Referenced specification section, part, article, paragraph and page or drawing reference as applicable.

1.08 PROJECT CONDITIONS

- A. Verify conditions on the job site applicable this work. Notify Owner's Representative in writing of discrepancies, conflicts, or omissions promptly upon discovery.
- B. If conditions exist on the job site which make it impossible to install work as shown on the drawings or detailed in the specifications, recommend solutions and submit drawings to the Owner for approval showing how the work may be installed.

1.09 FINAL INSPECTION AND TESTING

- A. Upon completion of installation and contractor commissioning as outlined in Section 3, the Consultant shall perform inspection and testing.
- B. To assist the Consultant provide a minimum of one person for

inspection and two persons for testing who are familiar with all aspects of the system(s).

C. Process of testing the system(s) may necessitate moving and adjusting certain components.

D. Testing will include operation of each system and any components deemed necessary. Provide required test equipment, tools, and materials required to perform necessary repairs or adjustments.

E. In the event further adjustments or work is required during testing, the Contractor shall continue his work until the system(s) is acceptable at no addition to the contract price. If approval is delayed due to defective equipment or failure of equipment or installation to meet the requirements of this specification, the Contractor shall pay for additional time and expenses of the Owner at the rate as specified by the Owner.

1.10 WARRANTY

A. All equipment provided by the Contractor shall be installed per manufacturer's specifications and warranted by the Contractor for a period of one (1) year from date of written acceptance to meet all performance requirements outlined herein. Warranties may not be pro-rated. For all Owner-provided equipment, include pricing for an initial one-year service contract.

B. During the warranty period, no charges shall be made for any labor, equipment, or transportation to maintain performance and functions.

C. The Contractor shall respond with remedy to a trouble call within twenty-four (24) hours after receipt of such a call, and shall provide a 24-hour service phone number. Uptime for system(s) shall be no more than 24-hour period. All replacement parts/components shall be of equal or higher level for service.

D. Equivalent replacement equipment shall be temporarily provided when immediate on-site repairs cannot be made.

E. At least two routine inspection and adjustment visits will be scheduled for the first year. Submit reports to the Owner.

F. Provide a separate price for an optional yearly service contract for five years, to begin at the end of the initial warranty and service contract. Provide details on coverage and options.

1.11 INSTRUCTION OF OWNER PERSONNEL

A. After final inspection and completion, provide instruction to Owner designated personnel on the operation and maintenance of the System(s).

B. Develop an instructional course based on the use of the system(s) and manufacture's recommendations. Provide a minimum of 8 hours of instruction. Arrange course so that operational and maintenance lasses are separate.

C. Submit an outline of the course with sample instructional aids for approval 30 days prior to scheduled instruction sessions.

D. Video Projection System Contractor shall be present at first system use event.

PART 2 PRODUCTS

2.1 COLOR

Finish colors for required items shall be as specified in the COLOR SCHEDULE.

2.2 MATERIALS

2.2.1 Porcelain Enamel

Marker board writing surface shall be composed of porcelain enamel fused to a nominal 28 gauge (0.0149 inches) thick steel, laminated to a minimum 1/4 inch thick core material with a steel or foil backing sheet. Writing surface shall be capable of supporting paper by means of magnets. Marker board surface for display track system may be a powder paint dry erase surface adhered to a nominal 18 gauge (0.0478 inches) thick steel.

2.2.2 Cork

Cork shall be a continuous resilient sheet made from soft, clean, granulated cork relatively free from hardback and dust and bonded with a binder suitable for the purpose intended. The wearing surface shall be free from streaks, spots, cracks or other imperfections that would impair its usefulness or appearance. The material shall be seasoned, and a clean cut made not less than 1/2 inch from the edge shall show no evidence of soft sticky binder.

2.2.2.1 Colored Cork

Colored cork shall be composed of pure cork and natural color pigments that are combined under heat and pressure with linseed oil. Colored cork shall be colored throughout and shall be washable. The burlap backing shall be deeply imbedded and keyed to the work sheet being partially concealed in it and meeting the requirements of ASTM F 148.

2.2.2.2 Natural Cork

Material shall be a single layer of pure grain natural cork without backing or facing. The color shall be light tan. The cork sheet shall have a tensile strength of not less than 40 psi when tested in accordance with ASTM F 152.

2.2.3 Aluminum

Aluminum frame extrusions shall be alloy 6063-T5 or 6063-T6, conform to ASTM B 221, and be a minimum 0.06 inches thick. Exposed aluminum shall have an anodized, satin finish. Straight, single lengths shall be used wherever possible. Joints shall be kept to a minimum. Corners shall be mitered and shall have a hairline closure.

2.2.4 Hardwood

Exposed hardwood for frames, cabinets, and cases shall be oak, walnut or mahogany. Hardwood shall be provided with a durable factory-applied stain and lacquer finish of a type standard with the manufacturer.

2.2.5 Glass

Glass shall be comprised of tempered glass in accordance with ANSI Z97.1 and shall conform to ASTM C 1048, Kind FT (fully tempered), Condition A (uncoated), Type I, Class I (clear), thickness as specified.

2.3 MARKERBOARD

Markerboard shall have a porcelain enamel writing surface and a chalktray. Markerboard shall be a factory assembled unit complete in one piece, without joints whenever possible. When markerboard dimensions require delivery in separate sections, components shall be prefit at the factory, disassembled for delivery and jointed at the site. Frame shall be oak. Chalktray shall be the same material as the frame and extend the full length of the liquid markerboard. The markerboard shall have a map rail. The map rail with a tackable insert shall extend the full length of the liquid chalkboard, and shall have map hooks with clips for holding sheets of paper. Two map hooks shall be provided for each 4 foot of map rail. Dry erase markings shall be removable with a felt eraser or dry cloth without ghosting. Each unit shall come complete with an eraser and four different color compatible dry erase markers. The size shall be as shown in the drawings.

At Music Room, provide markerboard with engraved lines and a treble clef as shown on the drawings.

2.4 TACKBOARDS

2.4.1 Cork

Tackboard shall consist of a minimum 1/8 inch thick colored cork with burlap backing laminated to a minimum 3/8 inch thick insulation board or fiber board, and shall have an aluminum frame. The size shall be as shown in the drawings.

2.5 PROJECTION SCREEN

Ceiling mounted motorized projection screen shall have 120V motor that is lubricated for life, quick reversal type, has overload protector, integral gears, and preset accessible limit switches. Recessed mount projection screens shall have an operable closure door and access panel. Screen shall be flame retardant, mildew resistant, and white matte with black masking borders. Bottom of screen fabric shall be weighted with metal rod. Roller shall be a rigid metal at least 5 inches in diameter mounted on sound absorbing supports. Motor will be end mounted design. Screen shall have a 3 position control switch to stop or reverse screen at any point. The switch shall be installed in a flush electrical box with cover plate, location(s) as shown on the electrical drawings. All conduit and wiring from the control switch to the projection screen shall be furnished and installed by the Contractor. Screen shall be UL listed.

Material and Viewing Surface of the Manual Projection Screens: Provide screens manufactured from mildew and flame resistant fabric of type indicated for each type of screen specified and complying with the following requirements:

1. Matte white viewing surface with grain characteristics complying with FS GG-S-00172D(1) for Type A screen surface.
2. Material: Vinyl coated glass fiber fabric.

3. Mildew Resistance: Provide mildew resistant screen fabrics as determined by FS 191A/5760.
4. Seams: Where length of screen indicated exceeds maximum length produced without seams in fabric specified, provide screen with horizontal seam placed as follows:
 - a. At top of screen at juncture where maximum length viewing surface is exceeded.
5. Seamless Construction: Provide screens less than 84 inches by 84 inches without seams.
6. Edge Treatment: Black masking borders.

Manually Operated Screens: Provide manufacturer's standard spring roller operated units designed and fabricated for wall installation and consisting of case, screen, mounting accessories, and other components necessary for a complete installation.

1. Screen Case: Fabricated in 1 piece from steel sheet not less than 0.0299 inch, with flat back design and vinyl covering or baked enamel finish. Provide end caps with integral roller brackets and universal mounting brackets, finished to match end caps, for wall mounting.
2. Screen Mounting: Top edge securely anchored to a 3 inch diameter, rigid steel spring roller; bottom edge formed into a pocket holding a tubular metal slat, with ends of slat protected by plastic caps, and saddle and pull attached to slat by screws.

Provide ceiling mounted motorized projection screen at Auditorium and at Media Center. Motorized projection screen shall consist of case, screen, motor, controls, electric brake, limit switches, mounting accessories and other components necessary for complete installation.

Motorized projection screen shall have 110-120V, 60Hz, 3 wire motor that is lubricated for life, quick reversal type, has overload protector, integral gears, electric brake and preset accessible limit switches. Screen shall be flame retardant, mildew resistant, and white matte. Tab tensioned screens shall have a vinyl surface that is stretchable. Bottom of screen fabric shall be weighted with metal rod. Roller shall be a rigid metal at least 5 inches in diameter mounted on sound absorbing supports. Motor will be end mounted or motor-in-roller design. Screen shall have a 3 position control switch to stop or reverse screen at any point. The switch shall be installed in a flush electrical box with cover plate, location(s) as shown on the electrical drawings. All conduit and wiring from the control switch to the projection screen shall be furnished and installed by the Contractor. Ceiling mounted case shall be aluminum. Screen shall be UL listed.

At motorized projection screen provide Single Station Control: 3 position control switch with metal device box and brushed aluminum cover plate for flush wall mounting, accepting 110 V current, ac power supply and operating by sustained contact.

- a. Provide key operated switch.
 - 1) Furnish switch to Electrical Contractor for installation.
 2. Motor: Provide either motor in roller or end mounted motor.
 3. Motor in Roller: Instant reversing motor of size and capacity recommended by screen manufacturer with permanently lubricated ball bearings, automatic thermal overload protection, preset limit switches to automatically stop screen in up and down positions, and positive stop action to prevent coasting. Mount motor inside roller with vibration isolators to reduce noise transmission.
 4. End Mounted Motor: Instant reversing, gear drive motor of size and capacity recommended by screen manufacturer with permanently lubricated

ball bearings, automatic thermal overload protection, preset limit switches to automatically stop screen in up and down positions, and positive stop action to prevent coasting. Locate motor in its own compartment.

5. Screen Mounting: Top edge securely anchored as rigid metal roller and bottom edge formed into a pocket holding a 3/8 inch diameter, metal rod with ends of rod protected by plastic caps.

5. Video interface control: Interface to allow motorized screen to be controlled by video projector/video projector control system through 12V switched outlet. Equip interface with override switch permitting independent operation of screen.

Motorized projection screen case: Fabricate from 3/4 inch warp resistant composition wood with hinged panel for metal lined motor compartment. Bottom of case fully enclosed except for slot allowing viewing surface passage. Case finished with paint primer. 1/4" minimum steel mounting brackets wrap under bottom edge of case.

Motorized projection screen roller: 5 inch diameter steel tube mounted on zinc plated brackets with double row radial ball bearings. The viewing surface shall be securely attached to roller at top and at bottom. Mount outside screen roller on rubber vibration inulators.

Motorized projection screen viewing surface: 12 feet high by 16 feet wide matt white vinyl surface laminated on woven fiberglass base. Surface shall be washable. Viewing surface shall contain no horizontal seams. Surface shall have 2 inch wide black masking borders. Extra drop shall be 4 feet, black.

2.6 STAGE CURTAINS

2.6.1 Curtains

A. Fabrics:

1. Velour shall be 100% Polyester, 22 ounce 64" wide fabric meeting "Class A" flame resistance requirements and shall be Inherently Flame Resistant material. Submit "Class A" test data and 12" X 12" square samples for approval. Submit certificates showing dye lot and flame test. Color per Color Schedule.

2. Icon, 54" wide, 100% polyester fabric meeting "Class A" flame resistance requirements and shall be Inherently Flame Resistant material. Submit "Class A" test data and 12" X 12" square samples for approval. Color per Color Schedule.

3. Cycloramas to be constructed of material meeting "Class A" flame resistance requirements and shall be Inherently Flame Resistant material. Submit "Class A" test data and 12" X 12" square samples to the Contracting Officer for approval. Color per Color Schedule.

B. Fabrication:

1. All pile fabrics shall be constructed with pile running down.

2. All seams shall be vertical with each width running the full height

- no horizontal splices.

3. Thread colors shall match face of fabric.
4. A label shall be attached 6 feet from the bottom of every curtain showing height, width, and date of flameproofing.
5. Sizes and quantities per drawings and schedules.
6. Draw Curtains: Top hem shall be turned and reinforced with continuous 3 ½" heavy jute webbing. 50% fullness shall be sewn in with box pleats approximately 12" on center. A #3 brass black anodized grommet shall be inserted on every pleat and at ends and bit snaps shall be provided in each grommet for attachment to carriers. Provide 36 inch long cotton tie lines in each grommet. Bottom hem shall be 5" and contain a continuous No. 8 jack chain held in a muslin pocket. No. 8 jack chain encased in a separate canvas pocket in the hem and fastened at vertical seam points to prevent bunching with chain weight. Jack chain shall be secured to pocket every 36". Side hems shall be a minimum of 8" on the leading edge and 4" on the offstage edge.
7. Border Curtains: Top hem shall be turned and reinforced with continuous 3 ½" heavy jute webbing. 50% fullness shall be sewn in with box pleats approximately 12" on center. A #3 brass black anodized grommet shall be inserted on every pleat and at ends and contain a 30" heavy grade ¾" twill tape for tying curtain to pipe. Provide 36 inch long cotton tie lines in each grommet. Bottom hem shall be 5". Side hems shall be a minimum of 4". Color per Color Schedule.
8. Leg Curtains: Top hem shall be turned and reinforced with continuous 3 ½" heavy jute webbing. 50% fullness shall be sewn in with box pleats approximately 12" on center. For Track installation bit snaps shall be provided for attachment to carriers at each pleat and ends of curtain. For Pipe installation a #3 brass black anodized grommet shall be inserted on every pleat and at ends and contain a 30" heavy grade ¾" twill tape for tying curtain to pipe. Provide 36 inch long cotton tie lines in each grommet. Bottom hem shall be 5" and contain a continuous No. 8 jack chain held in a muslin pocket. Jack chain shall be secured to pocket every 36". Side hems shall be a minimum of 4". Color per Color Schedule.
9. Cycloramas: Top hem shall be turned and sewn flat with continuous 3 ½" heavy jute webbing reinforcement. For Track installation bit snaps shall be provided for attachment to carriers every 12" and at ends of curtain. For Pipe installation a #3 brass black anodized grommet shall be inserted every 12" and at ends and contain a 30" heavy grade ¾" twill tape for tying curtain to pipe. Provide 36 inch long cotton tie lines in each grommet. Track mounted cycloramas shall have a 5" bottom hem and contain a continuous No. 8 jack chain held in a muslin pocket. Jack chain shall be secured to pocket every 36". No. 8 jack chain encased in a separate canvas pocket in the hem and fastened at vertical seam points to prevent bunching with chain weight. Pipe mounted cycloramas shall contain a 5" pipe pocket reinforced with muslin. Color per Color Schedule.
10. Front curtain shall have a 12 inch faceback on vertical edges and a dust ruffle of same fabric sewn on back of bottom hem and protrude approximately 1-1/2 inches below bottom hem.
11. Sky drop shall be sewn flat. Tops to be reinforced with 3-1/2 inch jute webbing. Grommets and "S" hooks shall be installed into the webbing

on 12 inch centers. Side hems to be 4 inches. Bottom hem shall be equipped with No. 8 single jack chain in separate pocket within the hem.

C. Fabricate and install as directed.

2.6.2 Curtain Track and Hardware

A. Draw Curtains

1. Tracks shall be of 14 guage galvanized steel construction; entirely enclosed except for slot in bottom; each half to be in one continuous piece except where splicing clamps are required.

2. Each curtain carrier shall be spaced on 12 inch centers and shall be of nylon construction supported from a ball-bearing by 2 polyethylene wheels held to ball-bearing by rustproof nickel plated rivet, such wheels rolling on 2 separate parallel treads.

3. Each curtain carrier shall consist of a free-moving plated swivel and sufficient trim chain to accommodate curtain snap hook.

4. End pulley blocks shall be adjustable and shall be equipped with sleeve-bearing wheels adequately guarded.

5. A rubber bumper shall be attached to each curtain carrier to function as noise reducer.

6. The manufacturer shall furnish 2 end stops for placement at each track end and a tension floor pulley for increasing or decreasing cord tension.

7. Stretch-resistant operating cord shall have fiberglass center and shall be of 3/8 inch diameter, extra quality yarn.

B. Hardware:

1. All pipes and track shall be suspended with 2/0 twin loop chain and closed with 3/16" shackles.

2. Appropriate clamping devices or eyebolts shall be used to make connection to support steel or ceiling. Chain is not to be wrapped around support members.

3. 3/4" I.D. Schedule 40 black iron pipe shall be used for dead hung borders and legs.

4. Hanging dead hung equipment shall be supported by vertical hangers of 3/16 inch proof coil chain or 1/4 inch steel cable together with connecting accessories, including 6 inch turnbuckles at each support for adjustment. Auxiliary steel members for equipment support shall be adequate to span roof joist spacing of 6 feet with deflection under load. No jack chain or solid wire shall be used for hanging, and bridling will not be permitted.

5. Secure chains to beams with clamps. Double wrap is acceptable on smaller beams.

6. Secure chains to batten with double wrap approximately 1 foot of excess chain for future adjustment, a 1/4 inch "S" hook closed into the end of the chain, and shall hook into the standing chain.

7. Dead hung battens supporting a curtain track shall have a 12 inch turnbuckle included with the hanging chain to provide adjustment for change in the vertical height of the curtain. In addition, there shall be at least 4 diagonal chains to prevent side sway of the track.

8. Attachments of ropes shall be with a clove hitch and a half-hitch with the free end whipped and separately stopped to the standing part with firmly adhering tape.

9. All fasteners shall be vandal resistant.

2.7 A/V CONDUIT SYSTEM

2.7.1 Materialse

Conduit and Outlet Box System:

1. Empty conduit and outlet box system complying with electrical specifications.
2. Not less than 3/4 inch conduit size and larger conduit sizes as indicated.

Outlet Boxes:

1. 2 Gang Box - 2-1/8 inches deep by 4-11/16 inches square with 2-gang ring.
2. 1 Gang Box - 2-1/8 inches deep by 2-1/8 inches high with 1 gang ring.

Cover Plates:

1. Comply with electrical specifications.
2. Provide blank plates for all outlet boxes that are not utilized.

2.8 VIDEO PROJECTION SYSTEM

PART 2 - VIDEO PROJECTION SYSTEM PRODUCTS

2.01 MANUFACTURERS

A. Electronic component models shall be commercially available for at least one (1) year prior to bid, or be approved by The Owner.

B. All equipment and material shall be new.

C. All equipment must be UL listed or built to UL standards, where required.

2.02 GENERAL

A. All equipment shall be professional grade and rated for continuous duty. Basic guidelines have been prepared with manufacturer names, makes, and model numbers included as minimum performance requirements. These must be satisfied, unless a variance (separate document) is submitted and

approved by the Owner.

B. System shall be installed and configured for simplicity of operation, with user-friendly controls.

C. Product quantity is as required for a complete and operable system. If any quantities are given, Video Projection System Contractor shall provide at least the given amount. Some of the product listed under this section may not be required to fulfill the work as outlined.

D. Regardless of the length or completeness of the descriptive paragraphs listed herein, each device shall meet published manufacture's specifications.

E. Remove all manufacture's nameplates or logos from product within the public site lines or spaces.

F. Paint all wall and ceiling mounted speaker grilles and enclosures as directed by the Architect.

G. System shall be installed and configured for simplicity of operation, with user-friendly controls.

2.03 INPUT SOURCES

A. Editing VCR (VCR 1):

1. Editing controllable VCR
2. S-Video and Composite Outputs
3. S-Video and composite inputs
4. RS-232 controllable
5. Shuttle control wheel for alignment
6. Deck shall be rack mounted
7. Deck shall be professional quality

B. DVD Player (DVD):

1. DVD player and CD player.
2. S-Video and Composite Outputs
3. Wireless Remote shall be included
4. Deck shall be rack mounted
5. Deck shall be professional quality

C. Computer Interface (COMPUTER INT): Computer Female 15Pin Input

1. HD Input, VGA Compatible
2. Audio Female 3.5 mm Mini Input
3. Output: Computer Video 10 Pin terminal block
4. Output: 5 Pin Terminal Block
5. Compatible with VGA thru UXGA
6. Sized to fit in single Gang Box or Floor Plate
7. Provide with appropriate accessories

2.04 SYSTEM SWITCHERS/CONTROLLERS/PROCESSORS

A. System Switcher/Controller (SWITCHER):

1. Twelve Input/eight outputs
2. Independently Scaled Video Outputs.
3. Two built in scalars
4. S-Video and Stereo Audio Matrix Switcher
5. Rack mounted

6. Computer RS-232 Controlled
7. Supply with Manufactures control software
8. Install software on editing computer and interface for complete switcher control

- B. Video Processor (VSP):
1. Scalar, Scan Converter,
 2. 5 Inputs and 6 outputs
 3. S-Video input and output
 4. Rack mounted
 5. Computer RS-232 Controlled

- C. Video Production Switcher (PRODUCTION SWITCHER):
1. 4-Input synchronized video switcher
 2. Full Frame time based correction (TBC)
 3. On-board video effects
 4. On-board color generators
 5. Color correction
 6. Built-in audio mixer
 7. Video preview and main outputs

2.05 PROJECTORS/MONITORS

- A. Video Projector (PROJECTOR):
1. 5200 ANSI Lumens
 2. True XGA (1024x768) Resolution
 3. Compressed UXGA
 4. Two Lamp System
 5. Detachable Interface Panel System with DVI
 6. Digital Keystone Correction of = or - 40degs.
 7. RGB, Component, S-Video, inputs
 8. Serial in/out, USB, RCA and Stereo Inputs
 9. Provide with two spare lamps

- B. Video Monitors (PREVIEW MONITOR):
1. 9" CRT Type Monitor
 2. 9" Viewable Area
 3. Input: Composite BNC
 4. H/V Separated Sync BNC
 5. Horz. 280 Lines Resolution
 6. Rack Mountable Provide Proper Rack Mounting

- C. Video Monitors (PROGRAM MONITOR):
1. 14" CRT Type Monitor
 2. 13" Viewable Area
 3. Input: Composite BNC, Y/C, S-Video
 4. Bi and Tri Separated Sync BNC
 5. Horz. 800 Lines Resolution
 6. Rack Mountable Provide Proper Rack Mounting

2.06 CAMERA & PAN/TILT SYSTEMS

- A. VIDEO CAMERA (CAMERA)
1. 1/3" 3-CCD Convertible Camera
 2. Pixels 410,000
 3. Minimum Sensitivity: 1.5 lux @ f/4

4. Horizontal Resolution: 750 Lines
5. Standard Sensitivity: 2000lux @f/8
6. Video Output: Composite, Y/C

B. VIDEO CAMERA CONTROLLER (CAMERA CONTROLLER)

1. Camera and P/T Compatible
2. 10 Memory recall locations
3. Surface mounted unit
4. S-Video monitor output
5. Gen-Lock Pass capable

C. PAN/TILT SYSTEM (PAN/TILT)

1. Designed to work with camera and lens system
2. 50 Pre-set memory locations
3. 95 deg. Tilt angle
4. 300deg panning range
5. 25deg per second

2.07 CAMERA & PAN/TILT SYSTEMS

A. COMPUTER EDITING SYSTEM (EDITOR)

1. Computer based editing system
2. Inputs: Composite, S-Video, IEEE 1394 Audio and Video
3. Supplied w/ Adobe Premiere 6.0, Hollywood FX Tech, Pinnacle DVD SE, TitleDecko RT, DV Tools, Real Time Scene Cutter
4. Direct to/from hard disc in full CD/DAT stereo audio quality
5. Video Overlay capable
6. Computer: Dell Precision Workstation with min - Pentium IV 1GHZ or faster, 1x32 bit PCI 2.1 Slot, 256 MB Ram, 4GB Hard Drive, 18GB video hard disk, 24 bit direct draw driver, CD writer or DVD writer, Windows 2000, XP

2.08 MISCELLANOUS EQUIPMENT

A. Equipment Racks:

1. Frame and side panels with locking rear door
2. 31.5" overall depth
3. Locate racks as shown on drawings
4. Racks shall be 70" or as shown on drawings
5. Provide with appropriate side panels as required
6. Provide with top vent panels as required or fan panels as required when utilized for amplifier housing
7. Provide with vented locking front door
8. Provide with Cable Chase for multi rack ganging one between each ganged rack
9. Provide quantity as required as per section 3.5.
10. Supply black in color

B. Equipment Rack Power:

1. Specifically designed integrated rack power system
2. Module for system installation flexibility
3. Provides for Remote sequenced on/off
4. Sized to fit within Equipment Racks
5. All outlets shall allow local switch and monitoring of status
6. 20amp Outlets shall allow Isolated Ground Outlets

7. Provide for Complete integration and proper operation
8. Provide with wall mounted USC-KL Key switch Plate located in Booth for controlled power up/down.
9. Integrate with Audio Powering System for Seamless On/Off
10. Acceptable Product:

C. Projector Support Stand:

1. Designed to hold video projector at proper height and angle
2. Provide separate leveling feet on each corner
3. Stain to match interior color (color selection by Architect/Owner)
4. Stand shall be of ¾" plywood with trim molding
5. Supply Submittal Drawings for approval
6. Projector shall be attached to stand for security
7. Acceptable Product:
Custom by Contractor

2.09 CONNECTION CABLES

A. Computer Cables:

1. Computer connectivity cables for interface units

2.10 PLATES AND PANELS:

- A. Provide plates and panels as described in the drawings and as required for a fully operation system.
- B. Custom plates shall be 1/8" thick aluminum, standard EIA sizes, brushed black anodized finished unless otherwise noted
- C. Plastic plates are not allowed
- D. Lettering shall be in all caps and numbers engraved with a color contrasting to the base material with a minimum size of 0.25".

2.11 CABLES AND WIRING:

- A. All audio cable shall be stranded cooper.
- B. Shielded cables located in raceways shall have aluminum foil shield with drain wire.
- C. Where speaker cables are run exposed in return plenum space provide plenum rated cable.
- D. Where cables are routed through cable tray provide tray rated cable of equal gauge
- E. Provide the following as required for a fully operable system:
 1. Microphone level cables: No. 22 shielded jacketed - West Penn 452 with gray jacket
 2. Line level cables: No 22 shielded jacketed - West Penn 452 with gray jacket
 3. Constant voltage speakers: amplifier to zone: Min No. 14 gauge jacketed - West Penn 226
 4. Constant voltage speakers: plenum rated amplifier to zone: No. 14 gauge jacketed - West Penn 25226.
 5. Constant voltage speakers: within zone No. 16 gauge jacketed - West Penn 225
 6. Constant voltage speakers: within zone plenum No. 16 gauge jacketed -

West Penn 252225

7. Communication Outlet Cables: No. 20 shielded - West Penn 293
8. Control cables: No. 20 shielded - West Penn 293
9. Loudspeaker Cable: No. 10 THHN provide different colors for each pass band type, supply plenum as required.
10. Antenna Cable: RG-59 minimum refer to manufactures specifications and recommendations as required.
11. RGB Video Cable: Belden 1406B, 1407B, 1417B as required
12. RGB Riser: Belden 7710A, 7711A, 7712A, 7713A as required
13. RGB Plenum Rated: Belden 1824A, 1825A, 1826A as required
14. SVHS Cables: Belden 1808A as required
15. Precision Video Cable: Belden 8281 as required

2.15 PROPOSED SUBSTITUTIONS

A. Where specific equipment is described, it is not the intention to discriminate against the products of other manufacturers, but rather to establish a standard of quality. All proposed substitutions should be submitted as alternates with complete data.

B. The Owner requires manufacturer's original specification tests. The Owner will evaluate and approve all substitutions.

C. Items designated "no substitution" will be specified item only. Submission of items other than specified will not be considered.

PART 3 EXECUTION

3.1 PLACEMENT SCHEDULE

Location and mounting height of visual display boards shall be as shown on the drawings.

Mounting height is defined as distance from finished floor to top of the display board frame.

3.2 INSTALLATION

Installation and assembly shall be in accordance with manufacturer's printed instructions. Concealed fasteners shall be used. Visual display boards shall be attached to the walls with suitable devices to anchor each unit. The Contractor shall furnish and install trim items, accessories and miscellaneous items in total, including but not limited to hardware, grounds, clips, backing materials, adhesives, brackets, and anchorages incidental to or necessary for a sound, secure, complete and finished installation. Installation shall not be initiated until completion of room painting and finishing operations. Visual display boards shall be installed in locations and at mounting heights indicated. Visual display boards shall be installed level and plumb, and if applicable doors shall be aligned and hardware shall be adjusted. Damaged units shall be repaired or replaced by the Contractor as directed by the Contracting Officer.

3.2.1 Motorized Projection Screen

3.2.1.1 Preparation

Coordinate layout and installation of projection screens with ceiling construction and related components penetrating or above ceilings such as lighting fixtures, mechanical equipment, ductwork, and fire-suppression system.

Coordinate requirements for blocking, structural supports, and bracing to ensure adequate means for installation of screens.

Coordinate requirements for power supply conduit, and wiring required for projection screen motors and controls.

Coordinate interface and installation of screen and masking controls with provision of video projector/projector control system.

Prior to installation, verify type and location of power supply.

3.2.1.2 Installation

Install projection screens and controls at locations and heights indicated on drawings.

Comply with screen manufacturer's written instructions and shop drawings.

Install screens securely to supporting substrate so that screens are level and back of case is plumb.

Provide required brackets, hanger rods, and fasteners.

3.2.1.3 Testing and Demonstration

Test motorized projection screens to verify that screen, controls, limit switches, closure, and other operating components are functional. Ensure that motorized and manual screens are level and viewing surface plumb when extended. Correct deficiencies.

Demonstrate operation of screen to Owner's designated representative.

3.2.1.4 Protection

Protect projection screens after installation from damage from construction operations. If damage occurs, remove and replace damaged components or entire unit as required to provide units in their original, undamaged condition.

3.3 STAGE CURTAINS

1. All equipment shall be installed under the direct supervision of an experienced representative of the rigging contractor.

2. All work shall be performed in strict accordance with approved shop and installation drawings.

3. Contractor shall coordinate installation of curtain systems with the theatrical rigging contractor for utilization of the Tri-Batten system and Line Shaft Hoist system as specified. Contractor shall be responsible for supplying all components for a completely operational curtain system and coordination with the theatrical rigging contractor for this system.

4. Provide curtains, track, hardware and installation of all items.

5.
Schedule of Curtains

No.	Qty.	Name	Fabric	Color	Fullness	Hght	Width	Track
1	1	Traveler	Velour	TBD	50%	23'	35'	As req'd
2	1	Tormenter	Velour	TBD	50%	4'	35'	
3	2	Leg 1	Velour	TBD	50%	23'	4'	
4	2	Leg 2	Velour	TBD	50%	23'	4'	
5	2	Leg 3	Velour	TBD	50%	23'	4'	
6	1	Border 1	Velour	TBD	50%	3'	35'	
7	1	Border 2	Velour	TBD	50%	3'	35'	
8	1	Border 3	Velour	TBD	50%	3'	35'	
9		Cyc	Muslin	TBD	Flat	26'	40'	Curved

3.4 A/V CONDUIT SYSTEM

Install raceway and outlet box system continuous from outlet to junction box and to equipment location with no more than four quarter bends (360 degrees total). Bush and ream conduit ends and terminate with insulated bushings.

Install raceway from outlet boxes to cable ladder in corridor as indicated. Bush and ream conduit ends and terminate with insulated busings. Clamp conduit to ladder as required for proper support, provide fittings.

Install raceway from outlet boxes to accessible ceiling spaces. Bush and ream conduit ends and terminate with insulated bushings.

Where cable tray/ladder is not utilized make continuous runs from box to box with isolation from building systems as required.

3.5 CLEANING

All surfaces shall be cleaned in accordance with manufacturer's instructions.

3.6 VIDEO PROJECTION SYSTEM

PART 3 - VIDEO PROJECTION SYSTEM EXECUTION

3.01 INSTALLATION

- A. Electronic equipment shall be permanently mounted in equipment racks.
- B. Follow ASDI standards as a minimum,
- C. Provide shaft locks or security covers on no user operated equipment having front panel access.
- D. Mount all equipment, plates and panels plumb and level.
- E. Permanently install all equipment to be firmly mounted and held in place. Provide necessary equipment supports to hold and support loads with at least a 5:1 safety factor.

3.02 EQUIPMENT HOUSING

- A. Install amplifiers in equipment racks according to manufactures recommendations.
- B. Provide adequate ventilation fans to maintain a rack temperature of less then 92 degrees Fahrenheit.
- C. Provide rear support for housing mounted equipment greater then 15" deep.
- D. Allow a minimum of 20% open rack space.
- E. Fill all empty spaces with blank panels, sizing as required painted to match housing.
- F. Locate operator usable equipment and patch panels at an appropriate operating height.
- G. Key all door locks for each housing type (front, rear) alike.
- H. Looking at the equipment racks from the rear of the racks, install all AC power and ground cabling on the left and audio and video cabling on the right.
- I. Provide lights mounted in the top of each rack to illuminate the interior for service or maintenance. Lights to be individually switch able and placed so as to provide maximum illumination throughout the rack.
- J. Provide rear-mounting rails as required for proper mounting.

3.03 PATCH PANELS

- A. Patch panel shall be located in designated racks as shown on drawings
- B. All patch panels shall be in consecutive rack spaces located at approximately 46" above floor.
- C. Locate inputs from microphone input plates and floor plates near the top of the patch bay layout.
- D. Locate sends and tielines near the bottom of the patch bay.
- E. Patch bays shall be normalled as directed by the Owner.

F. Provide 24"x32" reference diagram of the patch bay system. The layout shall be easily understood, mount diagram behind plexiglass and mount in the control room close to the patch bay rack.

G. Diagram shall show all input locations, patch normals, and any console connections, and interconnection of control room equipment.

3.04 LABELING

A. Provide, for each piece of rack-mounted equipment, an engraved lamicoid label and attach to the front of the equipment. Install in a plumb, level, and permanent manner. Provide rear mounted labeling for all rack mounted equipment.

B. Provide engraved label over each user-operated control that describes the function or purpose of the control. Adjust size of label to appropriate size for location.

C. Provide each terminal strip with a unique descriptor and a numerical designator for each strip. Show strip information on the drawings.

D. Provide logical and legible cable and wiring labels permanently attached for easy identification to each cable, both ends.

E. Label on cables shall be adhesive style striping covered with clear heat shrink tubing sized appropriately for the cable.

F. Wiring designator shall be alphanumeric code unique for each cable.

G. Each cable type shall be labeled starting with different designations (i.e. mic series "Mxxx", speaker series "Sxxx", etc.)

H. Locate the cable designator at the origination and the destination of each circuit. Locate cable designator within 2" of connection point.

3.05 CONTRACTOR COMMISSIONING

A. Prior to energizing or testing the system, ensure the following:

1. All products are installed in a proper and safe manner per the manufacture's instructions.
2. Insulation and shrink tubing are present where required.
3. Dust, debris, solder, splatter, etc. is removed.
4. Cable is dressed, routed, and labels, and all connections are all consistent with regard to polarity.
5. All labeling has been provided and installed.
6. All products are neat, clean and unmarred and securely fastened.
7. All debris has been cleaned and removed from the site.
8. All electronic devices are properly grounded.

B. Perform the following test, Record all results in the final project manual

1. Test each AC power outlet for proper connections for hot, neutral and ground
2. Measure the and record the DC resistance for the technical ground in the equipment racks and console. Resistance should be 0.15 ohms or less.
3. Measure the impedance of each speaker line from the amplifier rack.

C. System Adjustment:

1. Adjust all video components utilizing proper test equipment for a

clean, non-ghosting signal for maximum signal strength.

2. Perform Color Bar tests for proper alignment of each video component including Video Projector.

3. Eliminate any signal imperfections to provide a clean precise video signal at each component and video screen.

D. Input Verification Test:

1. Verify video signal presence at each component input with test equipment and verify the proper signal and uniform strength.

2. Perform compete system operation to verify proper system operation

3. In a similar manner check any other inputs or tielines as appropriate.

E. Notification:

1. Once all of the above the system is ready for inspection. Formally notify the Owner at least seven days prior to desired inspection date.

2. Final adjustments will be conducted at the time of inspection.

3.07 APPLICABLE FEDERAL SPECIFICATIONS (The list below forms only a part of this specification.)

J-C--30A & AM-1 Cable and Wire, Electrical (Power, fixed Installations)

W-C-3735B Circuit Breakers, Molded Case, Branch Circuit, and Service

W-C-586C Conduit outlet boxes, bodies and entrance caps, electrical: cast metal

W-C-596E/Gen Connector, Electrical, Power, General Specifications

W-F-406B Fittings for Cable, Power, Electrical and Conduit, Metal, Flexible

W-F-408C Fittings for Conduit, Metal, Rigid, (Thick wall and EMT)

W-J-800D Junction Box: Extension, Junction Box; Cover, Junction Box (Steel, Cadmium, or Zinc Coated)

HH-I-553C Insulation Tape, Electrical (Rubber, Natural, or Synthetic)

HH-I-595C Insulation Tape, Electrical, Pressure Sensitive Adhesive, Plastic

WW-C-00540C Conduit, Metal, Rigid: and Coupling, Elbow, and Nipple, Electrical Conduit: Aluminum

WW-C-566C Conduit, Metal, Flexible

WW-C-581E Conduit, Metal, Rigid, and Intermediate: and Coupling, Elbow and Nipple, Electrical Conduit: Steel Zinc Coated

C2-1990 National Electrical Safety Code

C97.1-1972 Low Voltage Cartridge Fuses 600V or Less

Institute of Electrical and Electronic Engineers (IEEE)

142-1982 Recommended Practice for Grounding of Industrial and Commercial Power Systems

-- End of Section --

SECTION 10110

AUDIO/VISUAL SYSTEMS

07/02 (REVISED 10/03/03)

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

ANSI Z97.1 (1984; R 1994) Safety Performance Specifications and Methods of Testing for Safety Glazing Materials Used In Buildings

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM B 221 (2000) Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes

ASTM B 221M (2000) Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes (Metric)

ASTM C 1048 (1997b) Heat-Treated Flat Glass - Kind HS, Kind FT Coated and Uncoated Glass

ASTM E 84 (2001) Surface Burning Characteristics of Building Materials

ASTM F 148 (1995) Binder Durability of Cork Composition Gasket Materials

ASTM F 152 (1995; R 2002) Tension Testing of Nonmetallic Gasket Materials

ASTM F 793 (1993; R 1998) Wallcovering by Durability Characteristics

1.2 GENERAL REQUIREMENTS

1.3 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-03 Product Data

Theatre Rigging; G A/E

Theatre Lighting System; G A/E

Sound System; G A/E

Manufacturer's descriptive data and catalog cuts.
Manufacturer's installation instructions, and cleaning and
maintenance instructions.

07 Certificates

Theatre Rigging

Theatre Lighting System; G A/E

Sound System; G A/E

Certificate of compliance signed by Contractor attesting that
Theatre Rigging conform to the requirements specified.

1.3.1 Theater Rigging

A. Provide the following for approval sixty days after Notice to Proceed
and prior to commencement of Work:

- a. A complete list of all products to be incorporated within the work
with all quantities listed. Each product shall be listed with
specification section references in Excel format.
- b. Complete functional diagrams of each system required for a complete
and operational system with descriptive narratives of any deviations from
the specified system design.
- c. All shop drawings as defined in this section.

B. Shop Drawings:

1. Shall not be smaller than 24"x36" and shall be sized as appropriate
for thorough understanding of systems.
2. All drawings shall be scaled appropriately but no less than 1/8" = 1'
3. Schematic detailed wiring diagrams showing interconnection of
contractor provided components and fabricated products, wiring and cabling
diagrams depicting cable types, and devise designators. Each component
shall have a unique designator and use same designator throughout the
project.
4. Show location of all equipment in racks, consoles, or on tables, with
complete dimensions, wire routing and cabling within housing.
5. Show all A.C. power outlet locations and terminal strip locations with
in each equipment rack.
6. Plans and sections of the building and adjacent grounds showing the
location of all installed equipment such as loudspeakers, racks, consoles,
plates/panels and antennas, (etc.).
7. Full fabrication details of custom enclosures and millwork indicating
dimensions, material, finish, and openings for equipment.
8. Provide complete drawings for all fabricated plates and panels.
Drawings shall include dimensioned locations of components, component type,

engraving information, plate color information, and a complete bill of materials for each plate.

9. Provide a complete conduit riser and associated conduit plans for a complete conduit system. Include a Junction Box schedule showing type, size mounting style and location of each box.

C. Submittal Format:

1. Each submittal shall be in three ring binders no larger than 3" spines and sized for 150% of material enclosed. Use multiple volumes if necessary.
2. Arrange product data in alphanumeric order.
3. Separate major groupings with labeled binder tabs.
4. Index product data sheets by manufacture and model or part number.
5. Each submittal shall include a unique number scheme and be numbered in consecutive order.
6. Each submittal shall include a complete table of contents with the following information:
 - a. Project title and number.
 - b. Submittal number.
 - c. Date of submission.
7. Referenced addendum or change order numbers as applicable
8. Referenced specification section, part, article, paragraph and page or drawing reference as applicable.

1.4 DELIVERY, STORAGE AND HANDLING

Materials shall be delivered to the building site in the manufacturer's original unopened containers and shall be stored in a clean dry area with temperature maintained above 50 degrees F. Materials shall be stacked according to manufacturer's recommendations. Visual display boards shall be allowed to acclimate to the building temperature for 24 hours prior to installation.

1.5 WARRANTY

Manufacturer's standard performance guarantees or warranties that extend beyond a one year period shall be provided.

1.5.1 Theater Rigging

A. All equipment provided by the Contractor shall be installed per manufacturer's specifications and warranted by the Contractor for a period of one (1) year from date of written acceptance to meet all performance requirements outlined herein. Warranties may not be pro-rated. For all Owner-provided equipment, include pricing for an initial one-year service contract

B. During the warranty period, no charges shall be made for any labor, equipment, or transportation to maintain performance and functions.

C. The Contractor shall respond with remedy to a trouble call within twenty-four (24) hours after receipt of such a call, and shall provide a 24-hour service phone number. Uptime for system(s) shall be no more than 24-hour period. All replacement parts/components shall be of equal or higher level for service.

D. Equivalent replacement equipment shall be temporarily provided when immediate on-site repairs cannot be made.

E. At least two routine inspection and adjustment visits will be scheduled for the first year. Submit reports to the Owner.

F. Provide a separate price for an optional yearly service contract for five years, to begin at the end of the initial warranty and service contract. Provide details on coverage and options.

1.6 THEATER RIGGING

Provide all wiring, plates, connections, and miscellaneous equipment for a complete and operational system whether specified in this or other related documents or not.

1.6.1 Scope of Work

A. The Contractor shall provide theater riggings compatible with the building structure and theater performance space.

B. The Contractor shall provide equipment that, where required, shall conform to the applicable requirements of the Underwriter's Laboratories, Inc., local codes, the National Electrical Code and any other governing codes. Such items shall bear a label or mark indicating their conformance to the above requirements.

C. The Contractor shall provide a complete and operational system configured and installed for user-friendly operation and low maintenance. On-site factory technical support shall be provided if necessary to assure performance.

D. The Contractor shall restore finish hardware to original condition, including painting, ceiling modifications and attachments.

E. Work shall be in compliance with all applicable standards listed above and all governing codes and regulations of the authorities having jurisdiction and the Contract Documents.

F. Coordinate exact location and installation of the equipment, power, conduit, and raceway systems with the Contracting Officer.

G. Provide all necessary labor, materials, equipment accessories, transportation and services required for the installation of a totally integrated self-contained line shaft hoist system consisting of rigging as specified herein.

H. All items of work included in this section shall be furnished and installed under a single contract.

I. In order to maintain a level of proficiency, bidder shall be an experienced theatre contractor. Bids from jobbers, dealers, manufacturers' representatives and the like will not be considered.

J. The rigging system shall consist of (3) three line shaft hoist systems as part of the Base Building system. Bidders shall provide a Base Building Theatrical Rigging Price.

K. The three (3) Base Building Line Shaft sets shall be supplied with Tri-Batten assemblies each.

L. Supply and interface a complete and operational Rigging Control Panel and mounted in the location shown on the drawings.

1.6.2 Related Work

A. Conduits: Review all conduit runs, junction boxes, and electrical outlets provided and installed by the electrical contractor, and provide fit-up drawings based on these. Verify and inspect rough in of all necessary conduits and outlets. Provide a written acceptance of all field conditions, or a list of any discrepancies, within ten (10) working days from Notice To Proceed.

B. Structure: Review all structure that will support the rigging system(s) provided and installed by others and provide coordinated drawings to reflect field conditions. Verify that field conditions will allow for the proper installation and operation of the rigging system.

1.6.3 Bid/Technical Proposals

A. The Theatrical Rigging System Contractor shall be experienced in the provisions of systems similar in complexity to those required for this project and at least meet the following criteria

1. The primary business of the contractor/installer shall be the installation of rigging systems.
2. At least five years experience with the specified equipment and systems.
3. Experience with at least one project of similar size and complexity as outlined in these specifications
4. If installer does not have said experience then it shall be the installer's responsibility to hire a subcontractor that does meet this criterion without additional cost to the Owner.
5. Be a franchised dealer and service facility for the products furnished.
6. Maintain a fully staffed installation crew and service crew for maintenance and installation of the specified systems.
7. At the request of the Owner, Contractor shall demonstrate that he has:
 - a. Adequate facilities and equipment for this work.
 - b. Adequate staff with the appropriate technical expertise and experience for this project.

B. Provide a list of five (5) references with locations, names of contacts, and contact phone information with brief system descriptions and dollar amounts for each reference. References shall be no more than three (3) years old.

C. A detailed list in Microsoft Excel format (both hard copy and disk) showing Item Number, Item Description, Manufacturer, Part Number, Quantity, and Price. Include manufacturer's specification sheets for each piece submitted. This shall be generated from this document and related drawings.

1.7 PROJECT CONDITIONS

1.7.1 Theater Rigging

- A. Verify conditions on the job site applicable this work. Notify Contracting Officer in writing of discrepancies, conflicts, or omissions promptly upon discovery.
- B. If conditions exist on the job site which make it impossible to install work as shown on the drawings or detailed in the specifications, recommend solutions and submit drawings to the Owner for approval showing how the work may be installed.

1.8 FINAL INSPECTION AND TESTING

1.8.1 Theater Rigging

- A. Upon completion of installation and contractor commissioning, the Consultant shall perform inspection and testing.
- B. To assist the Consultant provide a minimum of one person for inspection and two persons for testing who are familiar with all aspects of the system(s).
- C. Process of testing the system(s) may necessitate moving and adjusting certain components.
- D. Testing will include operation of each system and any components deemed necessary. Provide required test equipment, tools, and materials required to perform necessary repairs or adjustments.
- E. In the event further adjustments or work is required during testing, the Contractor shall continue his work until the system(s) is acceptable at no addition to the contract price. If approval is delayed due to defective equipment or failure of equipment or installation to meet the requirements of this specification, the Contractor shall pay for additional time and expenses of the Owner at the rate as specified by the Owner.

1.9 INSTRUCTION OF OWNER PERSONNEL

1.9.1 Theater Rigging

- A. After final inspection and completion, provide instruction to Owner designated personnel on the operation and maintenance of the System(s).
- B. Develop an instructional course based on the use of the system(s) and manufacture's recommendations. Provide a minimum of 5 hours of instruction. Arrange course so that operational and maintenance lasses are separate.
- C. Submit an outline of the course with sample instructional aids for approval 30 days prior to scheduled instruction sessions.

1.10 EXCLUDED WORK

- A. All conduit pull boxes and High Voltage field wiring for rigging.
- B. Structural steel support not specifically called out as part of this section.

1.11 OPERATION AND MAINTENANCE DATA

- A. Submit operation and maintenance data.
- B. Information to specifically include the following:
 - 1. Operating instructions for all systems.
 - 2. User maintenance instructions.
 - 3. Reduced 11" x 17" drawings of all systems.

1.12 THEATRICAL LIGHTING SYSTEM

PART 1 - THEATRICAL LIGHTING SYSTEM GENERAL

1.01 SECTION INCLUDES

- A. General: Comply with all Contract Documents, including Divisions 1 through 16 of the general contract specifications.
- B. Statement of Work: The work of this section includes, but is not necessarily limited to, the following:
 - 1. Provide, and install complete and operational Theatrical Lighting System as outlined in these specifications and related drawings and documentation requirements as set forth in this documentation.
 - 2. It is the responsibility of the Contractor to provide all wiring, plates, connections, and miscellaneous equipment for a complete and operational system weather specified in this or other related documents or not.
- C. Coordination, provision, installation, inspection, testing, instruction, and warranties of the Theatrical Lighting System.
- D. All facilities, materials, equipment, transportation, and necessary labor for a complete and operational Theatrical Lighting System.
- E. Additional Section information:
 - 1. Required licenses and permits including any required bonding or insurance requirements that comply with General Conditions of specifications and contract documentations.
 - 2. Verification of dimensions and conditions at the job site.
 - 3. Installation in accordance with the contract documentation, applicable installation procedures or codes as set forth by the state or county of the project or manufactures recommendations.
 - 4. Submittal information and provisions.
 - 5. Instruction of operating personnel.

6. Manuals and provisions thereof.
7. Maintenance and warranties.

F. Definitions:

1. "Contractor" - Installer who has been awarded the contract to perform the work.
2. The term "shall" is mandatory, the term "will" is informative, and the term "should" is advisory.
3. "Provide and install" - To supply, install, and connect up complete and ready for safe and regular operation.
4. "Indicated", "shown", or "noted" - As indicated, shown or noted on drawings or specifications.
5. "Equivalent", "similar", or "equal" - Of base bid manufacturer, equal in materials, size, color, design, and efficiency of specified product, conforming to base bid manufacturers.
6. "Reviewed", "satisfactory", "accepted", "approved", "directed" - As reviewed, satisfactory, accepted, approved, or directed by the Owner.
7. "Professional grade" - Equipment that is intended for commercial, not residential, use and is rated for continuous duty.
8. "User-friendly controls" - Controls that are designed and laid out for ease of use, in a logical, easily recognizable format that utilizes industry standard symbols wherever applicable.
9. "Labels" - All labels on audio-visual equipment and racks shall be self-adhering black laminate with white engraved letters as specified in sections 3.3 and 3.4.

G. Below is a listing of specification standards, tests or recommended installation methods or procedures or applicable installation or safety codes:

1. National Electric Code (NEC)
2. National Electrical Manufacture's Association (NEMA)
3. Underwriters Laboratories (UL)
4. Electronics Industries Association (E.I.A.)
5. American National Safety Institute (ANSI)

1.02 SCOPE OF WORK

A. The Contractor shall provide Theatrical Lighting compatible with the Owner's communications systems and operations.

B. The Contractor shall provide equipment that, where required, shall conform to the applicable requirements of the Underwriter's Laboratories, Inc., local codes, the National Electrical Code and any other governing codes. Such items shall bear a label or mark indicating their conformance to the above requirements.

C. The Contractor shall provide a complete and operational system configured and installed for user-friendly operation and low maintenance. Assist the Owner in a first session fixture focusing training session. On-site factory technical support shall be provided if necessary to assure performance.

D. The Contractor shall restore finish hardware to original condition, including painting, ceiling modifications and attachments.

E. Work shall be in compliance with all applicable standards listed above and all governing codes and regulations of the authorities having

jurisdiction and the Contract Documents.

F. Coordinate exact location and installation of the equipment, power, conduit, and raceway systems with the Architect.

1.03 SYSTEM DESCRIPTION AND REQUIREMENTS

A. The following is for a basic system description and is not intended to be exhaustive in nature and is not complete for proper installation or operation of system.

B. Provide a Theatrical Lighting System for the Gym/Auditorium. System shall contain one 24 bay dual dimmer rack with a total of 48 total dimmable circuits. Dimming system shall be capable of Dimming Double for and additional 48 dimmable circuits if required (not provided for in this specification) Dimmer rack shall supply circuits to four floor box locations, two on-stage power locations integrated with the rigging system and two valance locations located in front of the proscenium area.

C. A 24/48-control console shall be supplied with the system for complete control and presets of the lighting systems. Console shall allow for easy, "on-the-fly" adjustments of more elaborate show type controls.

D. An assortment of fixtures shall be supplied with the system. Fixtures shall be supplied with lamps, safety cables and "C" clamps

1.04 RELATED WORK

A. Conduits: Review all conduit runs, junction boxes, and electrical outlets provided and installed by the electrical contractor, and provide fit-up drawings based on these. Verify and inspect rough in of all necessary conduits and outlets. Provide a written acceptance of all field conditions, or a list of any discrepancies, within ten (10) working days from Notice To Proceed.

1.05 DELIVERY, STORAGE, AND HANDLING

A. The Contractor shall carefully control handling and installation of all items, which are not immediately replaceable, so that completion of the work will not be delayed by hardware or equipment losses before, during, and after installation. The Contractor is responsible for all items until final acceptance.

B. Prior to installation, protect exposed surfaces with material, which is easily removed without marring finishes.

C. Without cost to the Owner replace product damaged during storage or handling.

1.06 SCHEDULING

A. The Contractor shall submit a schedule to the Owner for approval. Show sequence of work, etc. from time of notice to proceed to final sign off of project. This schedule shall be submitted on Microsoft Project both paper and electronic form with submittals.

B. It shall be the responsibility of the Contractor to coordinate the installation of the system to be compatible with the work of other trades. The Contractor shall attend weekly progress meetings and provide continuous on-site project management.

C. It shall be the responsibility of the Contractor to arrange with The Owner a mutually acceptable time for Acceptance Testing, based upon the dates provided in the Solicitation.

D. The Contractor shall provide operating personnel with extensive training for each system type and room type as outlined in section 1.03.

1.07 BID/TECHNICAL PROPOSALS

A. A mandatory pre-bid site visit will be utilized to allow the contractor to see the current jobsite conditions. This meeting will be scheduled in advance with the owner.

B. The Theatrical Lighting System Contractor shall be experienced in the provisions of systems similar in complexity to those required for this project and at least meet the following criteria

1. The primary business of the contractor/installer shall be the installation of theater lighting systems.
2. At least five years experience with the specified equipment and systems.
3. Experience with at least one project of similar size and complexity as outlined in these specifications
4. Be a franchised dealer and service facility for the products furnished.
5. Maintain a fully staffed installation crew and service crew for maintenance and installation of the specified systems.
6. Lead installed shall have factory trained DSP and digital format classes for equipment specified in this specification.
7. Theatrical Lighting System shall be approved by the Owner, Architect and Consultant.
8. At the request of the Owner, Contractor shall demonstrate that he has:
 - a. Adequate facilities and equipment for this work.
 - b. Adequate staff with the appropriate technical expertise and experience for this project.

C. Provide a list of five (5) references with locations, names of contacts, and contact phone information with brief system descriptions and dollar amounts for each reference. References shall be no more than three (3) years old.

D. A detailed list in Microsoft Excel format (both hard copy and disk) showing Item Number, Item Description, Manufacturer, Part Number, Quantity, and Price. Include manufacturer's specification sheets for each piece submitted. This shall be generated from this document and related drawings.

1.08 SUBMITTALS

A. Provide the following for approval sixty days after Notice to Proceed and prior to commencement of Work:

1. A complete list of all products to be incorporated within the work with all quantities listed. Each product shall be listed with specification section references in Excel format.
2. Complete functional diagrams of each system required for a complete and operational system with descriptive narratives of any deviations from the specified system design.
3. All shop drawings as defined in this section.

B. Shop Drawings:

1. Shall not be smaller than 24"x36" and shall be sized as appropriate for thorough understanding of systems.
2. All drawings shall be scaled appropriately but no less than 1/8" = 1'
3. Schematic detailed wiring diagrams showing interconnection of contractor provided components and fabricated products, wiring and cabling diagrams depicting cable types, and device designators. Each component shall have a unique designator and use same designator throughout the project.
4. Show location of all equipment in racks, consoles, or on tables, with complete dimensions, wire routing and cabling within housing.
5. Show all A.C. power outlet locations and terminal strip locations within each equipment rack.
6. Plans and sections of the building and adjacent grounds showing the location of all installed equipment such as dimmers, connector strips, floor boxes (etc.).
7. Full fabrication details of custom enclosures and millwork indicating dimensions, material, finish, and openings for equipment.
8. Provide complete drawings for all fabricated plates and panels. Drawings shall include dimensioned locations of components, component type, engraving information, plate color information, and a complete bill of materials for each plate.
9. Complete labeling schemes for all cabling and equipment components for project. Include font size and styles along with a sample of cable label and equipment label. All labeling shall be consistent within the project scope.
10. A complete wire schedule showing source and destination and indicating conduit location and sizing. Provide conduit sizing and layout with at least a 20% oversize for project utilization for future system growth.
11. Provide a complete conduit riser and associated conduit plans for a complete conduit system. Include a Junction Box schedule showing type, size mounting style and location of each box.

C. Submittal Format:

1. Each submittal shall be in three ring binders no larger than 3" spines and sized for 150% of material enclosed. Use multiple volumes if necessary.
2. Arrange product data in alphanumeric order.
3. Separate major groupings with labeled binder tabs.
4. Index product data sheets by manufacture and model or part number.
5. Each submittal shall include a unique number scheme and be numbered in consecutive order.
6. Each submittal shall include a complete table of contents with the following information:
 - a. Project title and number.
 - b. Submittal number.
 - c. Date of submission.
 - d. Referenced addendum or change order numbers as applicable
 - e. Referenced specification section, part, article, paragraph and page or drawing reference as applicable.

1.09 PROJECT CONDITIONS

- A. Verify conditions on the job site applicable this work. Notify Owner's Representative in writing of discrepancies, conflicts, or omissions promptly upon discovery.
- B. If conditions exist on the job site which make it impossible to install work as shown on the drawings or detailed in the specifications,

recommend solutions and submit drawings to the Owner for approval showing how the work may be installed.

1.10 FINAL INSPECTION AND TESTING

- A. Upon completion of installation and contractor commissioning as outlined in Section 3, the Consultant shall perform inspection and testing.
- B. To assist the Consultant provide a minimum of one person for inspection and two persons for testing who are familiar with all aspects of the system(s).
- C. Process of testing the system(s) may necessitate moving and adjusting certain components.
- D. Testing will include operation of each system and any components deemed necessary. Provide required test equipment, tools, and materials required to perform necessary repairs or adjustments.
- E. In the event further adjustments or work is required during testing, the Contractor shall continue his work until the system(s) is acceptable at no addition to the contract price. If approval is delayed due to defective equipment or failure of equipment or installation to meet the requirements of this specification, the Contractor shall pay for additional time and expenses of the Owner at the rate as specified by the Owner.

1.11 WARRANTY

- A. All equipment provided by the Contractor shall be installed per manufacturer's specifications and warranted by the Contractor for a period of one (1) year from date of written acceptance to meet all performance requirements outlined herein. Warranties may not be pro-rated. For all Owner-provided equipment, include pricing for an initial one-year service contract.
- B. During the warranty period, no charges shall be made for any labor, equipment, or transportation to maintain performance and functions.
- C. The Contractor shall respond with remedy to a trouble call within twenty-four (24) hours after receipt of such a call, and shall provide a 24-hour service phone number. Uptime for system(s) shall be no more than 24-hour period. All replacement parts/components shall be of equal or higher level for service.
- D. Equivalent replacement equipment shall be temporarily provided when immediate on-site repairs cannot be made.
- E. At least two routine inspection and adjustment visits will be scheduled for the first year. Submit reports to the Owner.
- F. Provide a separate price for an optional yearly service contract for five years, to begin at the end of the initial warranty and service contract. Provide details on coverage and options.

1.12 INSTRUCTION OF OWNER PERSONNEL

- A. After final inspection and completion, provide instruction to Owner designated personnel on the operation and maintenance of the System(s).
- B. Develop an instructional course based on the use of the system(s) and manufacture's recommendations. Provide a minimum of 12 hours of instruction. Arrange course so that operational and maintenance classes are

separate.

C. Submit an outline of the course with sample instructional aids for approval 30 days prior to scheduled instruction sessions.

D. Theatrical Lighting System Contractor shall be present at first system use event.

1.13 SOUND SYSTEM

PART 1 - SOUND SYSTEM GENERAL

1.01 SECTION INCLUDES

A. General: Comply with all Contract Documents, including Divisions 1 through 16 of the general contract specifications.

B. Statement of Work: The work of this section includes, but is not necessarily limited to, the following:

1. Provide, and install complete and operational Sound System (s) as outlined in these specifications and related drawings and documentation requirements as set forth in this documentation.

2. It is the responsibility of the Contractor to provide all wiring, plates, connections, and miscellaneous equipment for a complete and operational system weather specified in this or other related documents or not.

C. Coordination, provision, installation, inspection, testing, instruction, and warranties of the Sound System.

D. All facilities, materials, equipment, transportation, and necessary labor for a complete and operational Sound System.

E. Additional Section information:

1. Required licenses and permits including any required bonding or insurance requirements that comply with General Conditions of specifications and contract documentations.

2. Verification of dimensions and conditions at the job site.

3. Installation in accordance with the contract documentation, applicable installation procedures or codes as set forth by the state or county of the project or manufactures recommendations.

4. Submittal information and provisions.

5. Documented sound system testing procedures.

6. Instruction of operating personnel.

7. Manuals and provisions thereof.

8. Maintenance and warranties.

F. Definitions:

1. "Contractor" - Installer who has been awarded the contract to perform the work.

2. The term "shall" is mandatory, the term "will" is informative, and the term "should" is advisory.

3. "Provide and install" - To supply, install, and connect up complete and ready for safe and regular operation.

4. "Indicated", "shown", or "noted" - As indicated, shown or noted on

drawings or specifications.

5. "Equivalent", "similar", or "equal" - Of base bid manufacturer, equal in materials, size, color, design, and efficiency of specified product, conforming to base bid manufacturers.
6. "Reviewed", "satisfactory", "accepted", "approved", "directed" - As reviewed, satisfactory, accepted, approved, or directed by the Owner.
7. "Professional grade" - Equipment that is intended for commercial, not residential, use and is rated for continuous duty.
8. "User-friendly controls" - Controls that are designed and laid out for ease of use, in a logical, easily recognizable format that utilizes industry standard symbols wherever applicable.
9. "Labels" - All labels on audio-visual equipment and racks shall be self-adhering black laminate with white engraved letters as specified in sections 3.3 and 3.4.

G. Below is a listing of specification standards, tests or recommended installation methods or procedures or applicable installation or safety codes:

1. National Electric Code (NEC)
2. National Electrical Manufacture's Association (NEMA)
3. Underwriters Laboratories (UL)
4. Electronics Industries Association (E.I.A.)
5. American National Safety Institute (ANSI)
6. Sound System Engineering, by Davis and Davis Second Addition published by SAMS
7. Audio System - Design and Installation, by Giddings published by SAMS

1.02 SCOPE OF WORK

A. The Contractor shall provide audio-visual systems compatible with the Owner's communications systems (i.e. telephone, video, and computer systems) and operations.

B. The Contractor shall provide equipment that, where required, shall conform to the applicable requirements of the Underwriter's Laboratories, Inc., local codes, the National Electrical Code and any other governing codes. Such items shall bear a label or mark indicating their conformance to the above requirements.

C. The Contractor shall provide a complete and operational system configured and installed for user-friendly operation and low maintenance. Provide for two reprogrammings of the remote control software, as directed by the Owner, before Final Acceptance. Provide for two level adjustments of the audio systems, as directed by the Owner, before Final Acceptance. On-site factory technical support shall be provided if necessary to assure performance.

D. The Contractor shall restore finish hardware to original condition, including painting, ceiling modifications and attachments.

E. Work shall be in compliance with all applicable standards listed above and all governing codes and regulations of the authorities having jurisdiction and the Contract Documents.

F. Coordinate exact location and installation of the equipment, power, conduit, and raceway systems with the Architect.

1.03 SYSTEM DESCRIPTION AND REQUIREMENTS

A. The following is for a basic system description and is not intended to be exhaustive in nature and is not complete for proper installation or operation of system.

B. The Sound System shall be comprised of the Gym sound system capable of supplying clean crisp high quality audio reinforcement for music, vocal, and live performances throughout the seating area. The volume coverage supplied by the speaker system shall obtain within 3dB coverage from and seating area in the Gym area at 2,000Hz. The main speaker system shall consist of a Left and Right full range speaker mounted in cavities with grille cloth covering the front on either side of the proscenium. A single mono delay speaker mounted on the rear side of the moveable partition shall supply coverage to the rear seating area. The system shall multiple source input decks and wireless microphones. A 24 channel mixing console shall be located in the booth for control of any of the source inputs.

C. A monitor system shall allow playback of audio to the stage area, either stage-flown speakers or floor monitors.

D. A Back Ground System shall be supplied for the Gym Foyer area and the two restrooms located just off of the Gym Foyer. A volume control panel, located in the booth equipment rack will allow independent adjustment of each of the three zones.

E. A small two-channel production intercom system shall allow for intercommunications from the booth to the stage area at five belt pack locations

1.04 RELATED WORK

A. Conduits: Review all conduit runs, junction boxes, and electrical outlets provided and installed by the electrical contractor, and provide fit-up drawings based on these. Verify and inspect rough in of all necessary conduits and outlets. Provide a written acceptance of all field conditions, or a list of any discrepancies, within ten (10) working days from Notice To Proceed.

1.05 DELIVERY, STORAGE, AND HANDLING

A. The Contractor shall carefully control handling and installation of all items, which are not immediately replaceable, so that completion of the work will not be delayed by hardware or equipment losses before, during, and after installation. The Contractor is responsible for all items until final acceptance.

B. Prior to installation, protect exposed surfaces with material, which is easily removed without marring finishes.

C. Without cost to the Owner replace product damaged during storage or handling.

1.06 SCHEDULING

A. The Contractor shall submit a schedule to the Owner for approval.

Show sequence of work, etc. from time of notice to proceed to final sign off of project. This schedule shall be submitted on Microsoft Project both paper and electronic form with submittals.

B. It shall be the responsibility of the Contractor to coordinate the installation of the system to be compatible with the work of other trades. The Contractor shall attend weekly progress meetings and provide continuous on-site project management.

C. It shall be the responsibility of the Contractor to arrange with The Owner a mutually acceptable time for Acceptance Testing, based upon the dates provided in the Solicitation.

D. The Contractor shall provide operating personnel with extensive training for each system type and room type as outlined in section 1.10.

1.07 BID/TECHNICAL PROPOSALS

A. A mandatory pre-bid site visit will be utilized to allow the contractor to see the current jobsite conditions. This meeting will be scheduled in advance with the owner.

B. The Sound System installer shall be experienced in the provisions of systems similar in complexity to those required for this project and at least meet the following criteria

1. The primary business of the contractor/installer shall be the installation of audio or video systems.
2. At least five years experience with the specified equipment and systems.
3. Experience with at least one project of similar size and complexity as outlined in these specifications
4. Experience with rigging and tuning large scale fixed loudspeaker clusters similar to that specified with installation of similar cluster within the last two years. If installer does not have said experience then it shall be the installer's responsibility to hire a subcontractor that does meet this criterion without additional cost to the Owner.
5. Be a franchised dealer and service facility for the products furnished.
6. Maintain a fully staffed installation crew and service crew for maintenance and installation of the specified systems.
7. Lead installed shall have factory trained DSP and digital format classes for equipment specified in this specification.
8. Sound System shall be approved by the Owner, Architect and Consultant.
9. At the request of the Owner, Contractor shall demonstrate that he has:
 - a. Adequate facilities and equipment for this work.
 - b. Adequate staff with the appropriate technical expertise and experience for this project.

C. Provide a list of five (5) references with locations, names of contacts, and contact phone information with brief system descriptions and dollar amounts for each reference. References shall be no more than three (3) years old.

D. A detailed list in Microsoft Excel format (both hard copy and disk) showing Item Number, Item Description, Manufacturer, Part Number, Quantity, Heat in Watts, Weight, and Price. Include manufacturer's specification sheets for each piece submitted. This shall be generated from this document and related drawings.

1.08 SUBMITTALS

A. Provide the following for approval sixty days after Notice to Proceed and prior to commencement of Work:

1. A complete list of all products to be incorporated within the work with all quantities listed. Each product shall be listed with specification section references in Excel format.
2. Complete functional diagrams of each system required for a complete and operational system with descriptive narratives of any deviations from the specified system design.
3. All shop drawings as defined in this section.
4. Suspended loudspeakers rigging design with a Professional Engineer's certification. Loudspeaker clusters shall not be installed before Engineer's certification has been submitted. Stamped approval of all rigging shall be made from this same Engineer within the State of the project.

B. Shop Drawings:

1. Shall not be smaller than 24"x36" and shall be sized as appropriate for thorough understanding of systems.
2. All drawings shall be scaled appropriately but no less than 1/8" = 1'
3. Schematic detailed wiring diagrams showing interconnection of contractor provided components and fabricated products, wiring and cabling diagrams depicting cable types, and devise designators. Each component shall have a unique designator and use same designator throughout the project.
4. Show location of all equipment in racks, consoles, or on tables, with complete dimensions, wire routing and cabling within housing.
5. Show all A.C. power outlet locations and terminal strip locations with in each equipment rack.
6. Plans and sections of the building and adjacent grounds showing the location of all installed equipment such as loudspeakers, racks, consoles, plates/panels and antennas, (etc.).
7. Patch panel layouts and labeling strips, including color schemes as necessary.
8. Full fabrication details of custom enclosures and millwork indicating dimensions, material, finish, and openings for equipment.
9. All speaker mounting details including hardware types and load capacity. Structural information with design calculations and a copy of the PE's certifications for each item/drawing.
10. Provide complete drawings for all fabricated plates and panels. Drawings shall include dimensioned locations of components, component type, engraving information, plate color information, and a complete bill of materials for each plate.
11. Complete labeling schemes for all cabling and equipment components for project. Include font size and styles along with a sample of cable label and equipment label. All labeling shall be consistent with-in the project scope.
12. A complete wire schedule showing source and destination and indicating conduit location and sizing. Provide conduit sizing and layout with at least a 20% oversize for project utilization for future system growth.
13. Provide a complete conduit riser and associated conduit plans for a complete conduit system. Include a Junction Box schedule showing type, size mounting style and location of each box.

C. Submittal Format:

1. Each submittal shall be in three ring binders no larger than 3" spines and sized for 150% of material enclosed. Use multiple volumes if necessary.
2. Arrange product data in alphanumeric order.
3. Separate major groupings with labeled binder tabs.
4. Index product data sheets by manufacture and model or part number.
5. Each submittal shall include a unique number scheme and be numbered in consecutive order.
6. Each submittal shall include a complete table of contents with the following information:
 - a. Project title and number.
 - b. Submittal number.
 - c. Date of submission.
7. Referenced addendum or change order numbers as applicable
8. Referenced specification section, part, article, paragraph and page or drawing reference as applicable.

1.08 PROJECT CONDITIONS

- A. Verify conditions on the job site applicable this work. Notify Owner's Representative in writing of discrepancies, conflicts, or omissions promptly upon discovery.
- B. If conditions exist on the job site which make it impossible to install work as shown on the drawings or detailed in the specifications, recommend solutions and submit drawings to the Owner for approval showing how the work may be installed.

1.09 FINAL INSPECTION AND TESTING

- A. Upon completion of installation and contractor commissioning as outlined in Section 3, the Consultant shall perform inspection and testing.
- B. To assist the Consultant provide a minimum of one person for inspection and two persons for testing who are familiar with all aspects of the system(s).
- C. Process of testing the system(s) may necessitate moving and adjusting certain components such as speaker aiming and transformer tap values.
- D. Testing will include operation of each system and any components deemed necessary. Provide required test equipment, tools, and materials required to perform necessary repairs or adjustments.
- E. In the event further adjustments or work is required during testing, the Contractor shall continue his work until the system(s) is acceptable at no addition to the contract price. If approval is delayed due to defective equipment or failure of equipment or installation to meet the requirements of this specification, the Contractor shall pay for additional time and expenses of the Owner at the rate as specified by the Owner.

1.10 WARRANTY

- A. All equipment provided by the Contractor shall be installed per manufacturer's specifications and warranted by the Contractor for a period of one (1) year from date of written acceptance to meet all performance requirements outlined herein. Warranties may not be pro-rated. For all Owner-provided equipment, include pricing for an initial one-year service contract.
- B. During the warranty period, no charges shall be made for any labor, equipment, or transportation to maintain performance and functions.
- C. The Contractor shall respond with remedy to a trouble call within

twenty-four (24) hours after receipt of such a call, and shall provide a 24-hour service phone number. Uptime for system(s) shall be no more than 24-hour period. All replacement parts/components shall be of equal or higher level for service.

D. Equivalent replacement equipment shall be temporarily provided when immediate on-site repairs cannot be made.

E. At least two routine inspection and adjustment visits will be scheduled for the first year. Submit reports to the Owner.

F. Provide a separate price for an optional yearly service contract for five years, to begin at the end of the initial warranty and service contract. Provide details on coverage and options.

1.11 INSTRUCTION OF OWNER PERSONNEL

A. After final inspection and completion, provide instruction to Owner designated personnel on the operation and maintenance of the System(s).

B. Develop an instructional course based on the use of the system(s) and manufacture's recommendations. Provide a minimum of 32 hours of instruction. Arrange course so that operational and maintenance classes are separate.

C. Submit an outline of the course with sample instructional aids for approval 30 days prior to scheduled instruction sessions.

D. Sound system Contractor shall be present at first three system use events and three additional events as requested by the Owner.

PART 2 PRODUCTS

2.1 THEATER RIGGING

A. System to consist of 3(three) total self-contained line shaft hoists. Each line shaft hoist price shall be a complete and operational system with all necessary components to have a working system. Each batten to be equipment with drums, for 40 ft. of travel. Each hoist to consist of a mounting steel frame (complete with necessary mounting hardware), an electric motor with a fail safe brake, a gear box with a secondary braking system, tandemly connected helically grooved cable drums, a reversing starter, fused disconnect and a 4-element limit switch. Contractor shall provide three 35' Tri-Batten assemblies.

B. Control of the electric motors to be by a key-operated motor control panel mounted on the stage wall.

C. Materials

1. Line Shaft Hoist

a. Live load capacity to be 2,000 pounds, speed 23 FPM, travel distance 40 feet.

b. Motor power to be 208-230/460 VAC, 3 Phase, 60 Hertz. Each brake motor to be equipped with integral 220/440 Volt, Single Phase, spring

loaded, electrically released disc brakes capable of stopping the rated load at full speed within a maximum distance of 6". Horsepower to be as required. Minimum service factor to be 1.15.

c. Speed reducers to be self-locking, single or double worm gear unit, direct shaft connected to both the motor/brake and the drums. Open gears, chains or V-belt drives will not be allowed. Minimum service factor to be 1.0.

d. Winch cable drums to have a minimum diameter of 7.5" with helical grooves machined into the drum surface for
Required cable size and 40 ft of travel. Maximum allowable distance between the lines is 12 feet.

e. Wire rope shall be 7 x 19 galvanized aircraft cable, sized for minimum factor of safety of 8. Maximum load to be determined based on continuous beam theory.

f. Equip each winch with adjustable four-element rotary limit switch to stop winch at top and bottom extremes of travel, as well as upper and lower trim heights. Second set of limit switches is to serve as back up to normal operating limit switches.

2. Pipe Battens/Tri-Battens

a. Battens: Spliced piece of 1-1/2" Schedule 40 black steel pipe. Weld splices with 12" solid steel sleeves with welded/bolted connections.

b. Tri-Battens: Provide Tri-Batten systems for connection to the Line Shaft System(s) as noted on drawings and stated in related specifications. Tri-Battens shall be provided with all necessary mounting accessories and curtain accessories to provide a complete operational system.

3. Steel Mounting Frame (Self-Contained)

a. Supply a 1.25 foot wide tubular steel frame to support the entire assembly, including winch, drums and shaft, plus pre-wired motor control panels. Length to be as required.

4. Control Panel

a. Provide a wall-mountable control panel, to allow operation of all hoists. PAC Model 626W series. The panel to be a NEMA 12 enclosure, equipped with the following:

- An On/Off key switch.
- A power "On" indicator light.
- Mushroom head, illuminated, maintained Emergency Stop button.
- An Up/Off/Down, spring return to center, rocker switch, one for each hoist.

b. Panel to be located as shown on the drawings

2.2 THEATRICAL LIGHTING SYSTEM

PART 2 - THEATRICAL LIGHTING PRODUCTS

2.01 MANUFACTURERS

- A. Electronic component models shall be commercially available for at least one (1) year prior to bid, or be approved by The Owner.
- B. All equipment and material shall be new.
- C. All equipment must be UL listed or built to UL standards, where required.

2.02 GENERAL

- A. All equipment shall be professional grade and rated for continuous duty. Basic guidelines have been prepared with manufacturer names, makes, and model numbers included as minimum performance requirements. These must be satisfied, unless a variance (separate document) is submitted and approved by the Owner.
- B. System shall be installed and configured for simplicity of operation, with user-friendly controls.
- C. Product quantity is as required for a complete and operable system. If any quantities are given, Theatrical Lighting System Contractor shall provide at least the given amount. Some of the product listed under this section may not be required to fulfill the work as outlined.
- D. Regardless of the length or completeness of the descriptive paragraphs listed herein, each device shall meet published manufacture's specifications.
- E. Remove all manufacture's nameplates or logos from product within the public site lines or spaces.
- F. Paint all wall and ceiling mounted speaker grilles and enclosures as directed by the Architect.
- G. System shall be installed and configured for simplicity of operation, with user-friendly controls.

2.03 DIMMING RACKS/POWER DISTRIBUTION

- A. Dimmer Rack (SENSOR SR24):
 - 1. 24 Dual 20Amp Slots
 - 2. Dimming Double Capable
 - 3. Up To 32 Backup looks in Memory
 - 4. DMX 512Controlable, ETC Link
 - 5. Equipped w/ Sound Suppression Hood System
 - 6. Single or Three Phase Power
 - 7. 100k AIC Rack Rating
- B. Connector Strips (CONNECTOR STRIP):
 - 1. 18 gauge steel
 - 2. Connectors Available: U-Ground, Stage Pin, Twist lock, DMX
 - 3. Various Lengths and Connector Spacing Capable
 - 4. Surface Connectors or pigtails
 - 5. DMX outlet capable
 - 6. Supplied with hangers
- C. Theater Lighting Junction Boxes (JB "X"):

1. 18/14 gauge steel
 2. Barrier strips/connectors for quick installation
 3. DMX outlet box available
 4. Compatible with lighting control system
- D. Theater Lighting Floor Boxes (FB2):
1. 16 gauge steel housing
 1. 3/8" grade cast iron hinged cover
 2. Insert plate with power connectors
 3. Supplied with wood screws
 4. Color: Black

2.04 THEATERICAL LIGHTING CONSOLE

- A. Light Control Console (CONSOLE):
1. 48 channels
 2. 1024 DMX outputs
 3. 600 cues, 500 groups, 2000 macros
 4. 2 scene presets, preset focus points
 5. MIDI Show control
 6. On-Board diskette drive
 7. Single VGA output
 8. Print port

2.05 FIXTURES

- A. Lighting Fixtures:
1. Die cast Aluminum
 2. 25deg rotate able shutter
 3. 20 gauge stainless steel shutters
 4. Two accessories slots and top mounted gel frame
 5. Lamp: 750W max
 6. Supplied with Steel C-Clamp
 7. Available in 5, 10, 19, 26, 36, 50deg versions
 8. Plastic fresnel lens
 9. Acceptable product:
- Source Four - Supply the following:

- 10 - 450A
- 5 - 436A
- 10 - 426A
- 10 - PAR-EA-A
- 35 - 400SC
- 40 - HPL575/115

2.06 PLATES AND PANELS:

- A. Provide plates and panels as described in the drawings and as required for a fully operation system.
- B. Custom plates shall be 1/8" thick aluminum, standard EIA sizes, brushed black anodized finished unless otherwise noted
- C. Plastic plates are not allowed
- D. Lettering shall be in all caps and numbers engraved with a color contrasting to the base material with a minimum size of 0.25".

2.07 CABLES AND WIRING:

- A. All audio cable shall be stranded cooper.
- B. Shielded cables located in raceways shall have aluminum foil shield with drain wire.
- C. Where speaker cables are run exposed in return plenum space provide plenum rated cable.
- D. Where cables are routed through cable tray provide tray rated cable of equal gauge
- E. Provide the following as required for a fully operable system:
 - 1. Microphone level cables: No. 22 shielded jacketed - West Penn 452 with gray jacket
 - 2. Line level cables: No 22 shielded jacketed - West Penn 452 with gray jacket
 - 3. Constant voltage speakers: amplifier to zone: Min No. 14 gauge jacketed - West Penn 226
 - 4. Constant voltage speakers: plenum rated amplifier to zone: No. 14 gauge jacketed - West Penn 25226.
 - 5. Constant voltage speakers: within zone No. 16 gauge jacketed - West Penn 225
 - 6. Constant voltage speakers: within zone plenum No. 16 gauge jacketed - West Penn 252225
 - 7. Communication Outlet Cables: No. 20 shielded - West Penn 293
 - 8. Control cables: No. 20 shielded - West Penn 293
 - i. Loudspeaker Cable: No. 10 THHN provide different colors for each pass band type, supply plenum as required.
 - j. Antenna Cable: RG-59 minimum refer to manufactures specifications and recommendations as required.
 - k. RGB Video Cable: Belden 1406B, 1407B, 1417B as required
 - l. RGB Riser: Belden 7710A, 7711A, 7712A, 7713A as required
 - m. RGB Plenum Rated: Belden 1824A, 1825A, 1826A as required
 - n. SVHS Cables: Belden 1808A as required
 - o. Precision Video Cable: Belden 8281 as required

2.08 PROPOSED SUBSTITUTIONS

- A. Where specific equipment is described, it is not the intention to discriminate against the products of other manufacturers, but rather to establish a standard of quality. All proposed substitutions should be submitted as alternates with complete data.
- B. The Owner requires manufacturer's original specification tests. The Owner will evaluate and approve all substitutions.
- C. Items designated "no substitution" will be specified item only. Submission of items other than specified will not be considered.

2.3 SOUND SYSTEM

PART 2 - SOUND SYTEM PRODUCTS

2.01 MANUFACTURERS

A. Electronic component models shall be commercially available for at least one (1) year prior to bid, or be approved by The Owner.

B. All equipment and material shall be new.

C. All equipment must be UL listed or built to UL standards, where required.

2.02 GENERAL

A. All equipment shall be professional grade and rated for continuous duty. Basic guidelines have been prepared with manufacturer names, makes, and model numbers included as minimum performance requirements. These must be satisfied, unless a variance (separate document) is submitted and approved by the Owner.

B. System shall be installed and configured for simplicity of operation, with user-friendly controls.

C. Product quantity is as required for a complete and operable system. If any quantities are given, Sound System Contractor shall provide at least the given amount. Some of the product listed under this section may not be required to fulfill the work as outlined.

D. Regardless of the length or completeness of the descriptive paragraphs listed herein, each device shall meet published manufacture's specifications.

E. Remove all manufacture's nameplates or logos from product, such as found on speaker(s) within the public site lines or spaces.

F. Paint all wall and ceiling mounted speaker grilles and enclosures as directed by the Architect.

G. System shall be installed and configured for simplicity of operation, with user-friendly controls.

2.03 INPUT SOURCES

- A. Combo Cassette/CD Player (COMBO):
1. Independent Cassette and CD Player
 2. Cassette Recording and playback capable
 3. CD to Cassette recording capable
 4. Dolby B & C noise reduction
 5. Pitch Control
 6. Wired Remote shall be included
 7. Deck shall be rack mounted

2.04 SIGNAL PROCESSING

- A. Digital Signal Processors (DSP):
1. All system parameters shall be software controllable via serial port
 2. Software shall be supplied with DSP
 3. System signal processing shall include crossover functions, parametric and graphic equalization, delay, compression, limiting, and feedback suppression
 4. Software shall allow for easy and flexible configuration of the DSP

5. DSP shall have at least 4 inputs with at least 8 outputs configurable in any configuration.
 6. DSP shall include user definable preset configurations
 7. All input and outputs shall be electronically balanced
 8. Provide appropriate serial cables as required for computer interface
 9. Contractor shall utilize software configuration as supplied by Consultant and shall submit finals for approval
 10. Provide the latest release version of software
 11. Processor shall be rack mounted
- B. 1/3oct. Graphic Equalizer (EQ)
1. Graphic Equalizer with Limiter and Type III Noise Reduction
 2. Shall be single channel or dual channel as required
 3. Shall have XLR, 1.4" and Barrier strip inputs and outputs
 4. LED ladders for metering
 5. Processor shall be rack mounted
- C. Effect Processor (EFFECT)
1. Professional multi-effect processor
 2. True stereo 2 input 2 output
 3. Sampling frequency of 44.1khz
 4. Preset memory up to 99
 5. User memory card capable
 6. Midi controllable
 7. Processor shall be rack mounted

2.05 CONSOLES AND MIXERS

- A. FOH Reinforcement Console (CONSOLE):
1. 22 mono channels with 2 stereo channels
 2. 2 stereo channels located to the right of the center master section
 3. 4 groups
 4. 6 aux sends
 5. FOH or monitor console configurable
 6. Inserts on all channels and groups
 7. 2 stereo returns
 8. Provide console lights as required to populate console light connectors

2.06 AMPLIFIERS

- A. Power Amplifiers
1. Amplifiers shall be of same amplifier family and manufacture whenever possible
 2. Input connectors shall be Phoenix style
 3. Level control shall be a detented position control per channel located on the back of the amplifier
 4. Single mode switch shall allow amplifier adjustment to different operation modes
 5. Fan cooled variable speed
 6. Damping of greater then 500 for dual channel and greater then 180 for multichannel
 7. Total harmonic distortion of <0.05%
 8. Amplifiers shall allow the use of DSP or amp control modules
 9. Products:
 - Type 1 300watts per channel at 8ohms or 70v
 - Type 2 600watts per channel at 8 ohms or 70v
 - Type 3 1000watts per channel at 8ohms or 70v
 - Type 4 60 watts single channel at 8ohms or 70v

2.07 AMPLIFIER CONTROL

A. Not used

2.08 CONTROL SYSTEMS:

A. Not used

2.09 SPEAKERS

A. Reinforcement Speaker (LEFT/ RIGHT MAIN SPEAKERS):

1. Nominal coverage 90x90
2. Full Range Speaker
3. Passive
4. Long term 124dB

B. Reinforcement Speaker (DELAY SPEAKER):

1. Nominal Coverage 120x60
2. Full range speaker
3. Long term 119dB

C. Stage Monitors (STAGE 1):

1. Compact multiangle speaker cabinet
2. Low profile
3. 85x85 coverage
4. Full range two way speaker

D. Full Range Reinforcement Speakers (FR-1):

1. Compact multiangle speaker cabinet
2. Low profile
3. 85x85 coverage
4. Full range two way speaker
5. Supply w/ integral mounting bracket

E. Ceiling Speaker (Type 1)

1. 4" Ceiling type with self contained enclosure
2. Speaker shall have 4" woofer and tweeter
3. Formed steel back can
4. Wattage taps - 3.7, 7.5, 15, 30

F. Ceiling Speaker (Type 2)

1. 6" Ceiling type with self contained enclosure
2. Speaker shall have 6" woofer and tweeter
3. Formed steel back can
4. Wattage taps - 7.5, 15, 30, 60

G. Stage Monitor Speaker Cable:

1. Provide (4) 25' speaker cables
2. Provide (4) 10' speaker cables
3. Wire gauge shall be #12 rubber jacketed
4. All cables shall be NL4 type and mate with connector plates and speakers
5. Provide (2) barrel adapters to allow for connection of two cables together

- H. Cue/Booth Monitors (CUE)
 - 1. Self Powered self contained speaker
 - 2. Full range
 - 3. Shall have a 5.25" woofer and tweeter
 - 4. Capable of 100w LF and 50w HF
 - 5. Provide with wall mounts such as those by Omni Mount sized for the speaker

- I. System Headphones:
 - 1. Professional Headphones
 - 2. Cushioned and high quality

2.10 PRODUCTION INTERCOM SYSTEM:

- A. Master Station (MS):
 - 1. Two channel capable
 - 2. Headphone connection for two channels
 - 3. Supply with microphone appropriate for application at least 8"
 - 4. Illuminated Channel call lights and talk buttons
 - 5. Supply with rack ears

- B. Station Call Light (CL):
 - 1. Yellow or Orange type call light small dome type
 - 2. Interface to main station or biscuit as required
 - 3. Mount in appropriate location for operator convenience and site lines

Wall Plates (WP-2):

- 4. Single gang wall plate
 - 5. Two channel capable
 - 6. Selector switch for channel selection
 - 7. Single 3 pin XLR connector for belt pack connection
- C. Belt Pack:
 - 1. Two channel capable
 - 2. Selector switch for channel selection
 - 3. Party line capable
 - 4. Headset volume control
 - 5. Compatible with main station and power supply system
 - 6. Supply with appropriate connecting capable
 - 7. Supply with appropriate headsets

2.11 HEARING ASSISTANCE SYSTEM:

- A. FM Hearing Assist System:
 - 1. Field Strength Maximum 8000 micro volts
 - 2. Transmitter input balanced bridging with level of .03 to 1 volt
 - 3. Antenna type 75ohm
 - 4. Receiver to be battery powered and have approximately a 15 hour life when used with alkaline batteries

2.12 MISCELLANOUS EQUIPMENT

- A. Equipment Racks:
 - 1. Frame and side panels with locking rear door
 - 2. 31.5" overall depth
 - 3. Locate racks as shown on drawings
 - 4. Racks shall be 70" or as shown on drawings
 - 5. Provide with appropriate side panels as required

6. Provide with top vent panels as required or fan panels as required when utilized for amplifier housing
 7. Provide with vented locking front door
 8. Provide with Cable Chase for multi rack ganging one between each ganged rack
 9. Provide quantity as required as per section 3.5.
 10. Provide with one D-3 Rack Drawer
 11. Supply black in color
- B. Equipment Rack Power:
1. Specifically designed integrated rack power system
 2. Module for system installation flexibility
 3. Provides for Remote sequenced on/off
 4. Sized to fit within Equipment Racks
 5. All outlets shall allow local switch and monitoring of status
 6. 20amp Outlets shall allow Isolated Ground Outlets
 7. Provide for Complete integration and proper operation
 8. Provide with wall mounted USC-KL Key switch Plate located in Booth for controlled power up/down.
- C. Desktop Turret:
1. 16 gauge frame
 2. Ten rack spaces
 3. Provide with PDS-615R sequenced from USC-6R

2.13 MICROPHONES AND ACCESSORIES

- A. Handheld Microphones:
1. Vocal microphone for performances and announcements
- B. Hanging Microphones:
1. Hanging/suspended type for general use
 2. Supply with 30' factory installed cable
- C. General purpose Microphones:
1. Instrument Microphones (quantity 4)
 2. Condenser Style Microphones (quantity 2)
- D. Wireless Microphone (RF):
1. UHF w/ 99 channel selectable
 2. Dual diversity
 3. Provide with rack mount
 4. Provide with antenna and cabling as shown on drawings
 5. Product:
 - (quantity 2)
 - (quantity:2)
- E. Stands and Mounting Hardware:
1. Vocalist Stand w/ one touch control (quantity 4)
 2. Instrument Stand (quantity 4)
 3. Tripod Stand (quantity 4)
 4. Boom Arm (quantity 4)
 5. Large stand w/ wheels (quantity 2)
 6. Desk type stand (quantity 4)
 7. Microphone foam lined portable case sized for quantity (quantity: 2)
- F. Microphone Cables:
1. 10' Microphone cable -blue (quantity: 10)

2. 20' Microphone cable -blue (quantity: 10)
3. 50' Microphone cable -blue (quantity: 2)

2.14 PLATES, PANELS AND FLOOR BOXES:

- A. Provide plates, panels and floor boxes as described in the drawings and as required for a fully operation system.
- B. Custom plates shall be 1/8" thick aluminum, standard EIA sizes, brushed black anodized finished unless otherwise noted
- C. Plastic plates are not allowed
- D. Lettering shall be in all caps and numbers engraved with a color contrasting to the base material with a minimum size of 0.25".
- E. Floor boxes shall be designed for mounting in the stage area or flooring as required
- F. Floor boxes shall have compartmentalized stage areas for separate disciplines
- G. Supply floor boxes with appropriate covers and insert plates
- H. Coordinate final color of plates, panels and floor box covers with Owner
- I. Acceptable Manufactures of Custom Plates and Panels

2.15 CABLES AND WIRING:

- A. All audio cable shall be stranded cooper.
- B. Shielded cables located in raceways shall have aluminum foil shield with drain wire.
- C. Where speaker cables are run exposed in return plenum space provide plenum rated cable.
- D. Where cables are routed through cable tray provide tray rated cable of equal gauge
- E. Provide the following as required for a fully operable system:
 1. Microphone level cables: No. 22 shielded jacketed - West Penn 452 with gray jacket
 2. Line level cables: No 22 shielded jacketed - West Penn 452 with gray jacket
 3. Constant voltage speakers: amplifier to zone: Min No. 14 gauge jacketed - West Penn 226
 4. Constant voltage speakers: plenum rated amplifier to zone: No. 14 gauge jacketed - West Penn 25226.
 5. Constant voltage speakers: within zone No. 16 gauge jacketed - West Penn 225
 6. Constant voltage speakers: within zone plenum No. 16 gauge jacketed - West Penn 252225
 7. Communication Outlet Cables: No. 20 shielded - West Penn 293
 8. Control cables: No. 20 shielded - West Penn 293
 9. Loudspeaker Cable: No. 10 THHN provide different colors for each pass band type, supply plenum as required.
 10. Antenna Cable: RG-59 minimum refer to manufactures specifications and recommendations as required.

2.16 LOUDSPEAKER CLUSTER RIGGING

- A. Provide rigging, hardware, suspension cables, and all appropriate

hardware for the clusters as required for a fully operable system. A structural engineer licensed by the state of the installation must approve the rigging system with stamped drawings.

B. Acceptable Manufacturers for all mounting bars and trusses: Allen Products ZB-880 w/ support cabling.

2.15 PROPOSED SUBSTITUTIONS

A. Where specific equipment is described, it is not the intention to discriminate against the products of other manufacturers, but rather to establish a standard of quality. All proposed substitutions should be submitted as alternates with complete data.

B. The Owner requires manufacturer's original specification tests. The Owner will evaluate and approve all substitutions.

C. Items designated "no substitution" will be specified item only. Submission of items other than specified will not be considered.

PART 3 EXECUTION

3.1 Theater Rigging

3.1.1 Field Quality Control

A. All equipment shall be installed under the direct supervision of an experienced representative of the system manufacturer.

B. All work shall be performed in strict accordance with approved shop and installation drawings.

3.1.2 Noise and Vibration

Unless otherwise specified, all noise and vibration producing equipment shall not exceed NC30 in the first row of the audience, measured at 4 feet above the floor level.

3.1.3 Inspection

Prior to fabrication and installation, the Contractor shall verify field dimensions and structural capabilities.

3.1.4 Installation

A. Rigging

1. Hardware (bolts, nuts, washers, etc.) shall be SAE Grade 5, cadmium or similarly plated.

2. Forged cable clips to be tightened before loading and then torqued to manufacturer's specifications when cable is under load.

3. Compressible copper swage fittings shall be crimped exactly according

to manufacturer's recommendations as to quantity and spacing of crimps. Swage tools must be calibrated prior to beginning work. Trim dead end of cable to within 3/8" of swage. The entire swage shall be taped, including the short dead end of the cable.

4. Only copper sleeves shall be used. Aluminum is not acceptable.
5. Turnbuckles shall have jam nuts. In addition, a hole shall be drilled in the threaded shank of each jaw or eye two threads from the end and have cotter pin installed after final trim position is determined.
6. Wire ropes shall be taped with good quality friction tape prior to cutting.
7. Dead ends of all wire ropes shall be taped snug against the live end wherever cable clips are used.
8. All field wiring shall be done in accordance with system manufacturer's riser as indicated on approved shop drawings and as shown on the plans. For estimating purposes figure 208V, 3 Phase, 4 wires to each motor for power and six #14 control wires from the motor to the control box. Also required is a 120 VAC, 1 Phase, 60 Hertz, 15A supply at the control station.

3.1.5 Adjusting

After the rigging installation is completed and all loads are applied, a representative of the manufacturer will set all of the limit switches and verify the operation of all over travel and safety devices.

3.1.6 Tests and Inspections

- A. The complete job shall be subject to reasonable tests and inspections during construction and at final acceptance.
- B. Upon notice, the contractor shall furnish not to exceed two men (one to be the installation supervisor), and tools as required to conduct tests and inspections for the architect or local authorities.
- C. At the time of final inspection, owner may randomly require a full load test of any hoisting equipment.
- D. All design and performance testing shall be verified by a registered Professional Engineer employed by the stage equipment contractor.

3.1.7 System Demonstration

After the installation is complete and all adjustments have been made, a representative of the contractor shall demonstrate the systems and instruct the owner's personnel, using the written instruction books and maintenance manuals as a guide.

3.2 CLEANING

All surfaces shall be cleaned in accordance with manufacturer's instructions.

3.3 THEATRICAL LIGHTING

PART 3 - THEATRICAL LIGHTING EXECUTION

3.01 INSTALLATION

- A. Electronic equipment shall be permanently mounted in equipment racks.
- B. Follow ASDI standards as a minimum,
- C. Provide shaft locks or security covers on no user operated equipment having front panel access.
- D. Mount all equipment, plates and panels plumb and level.

3.02 EQUIPMENT HOUSING

- A. Install amplifiers in equipment racks according to manufactures recommendations.
- B. Provide adequate ventilation fans to maintain a rack temperature of less then 92 degrees Fahrenheit.
- C. Fill all empty spaces with blank panels, sizing as required painted to match housing.
- D. Locate operator usable equipment and patch panels at an appropriate operating height.
- E. Key all door locks for each housing type (front, rear) alike.
- F. Looking at the equipment racks from the rear of the racks, install all AC power and ground cabling on the left and audio and video cabling on the right.
- G. Provide lights mounted in the top of each rack to illuminate the interior for service or maintenance. Lights to be individually switch able and placed so as to provide maximum illumination throughout the rack.

3.03 LABELING

- A. Provide, for each piece of rack-mounted equipment, an engraved lamicaid label and attach to the front of the equipment. Install in a plumb, level, and permanent manner. Provide rear mounted labeling for all rack mounted equipment.
- B. Provide engraved label over each user-operated control that describes the function or purpose of the control. Adjust size of label to appropriate size for location.
- C. Provide each terminal strip with a unique descriptor and a numerical designator for each strip. Show strip information on the drawings.
- D. Provide logical and legible cable and wiring labels permanently

attached for easy identification to each cable, both ends.

E. Label on cables shall be adhesive style striping covered with clear heat shrink tubing sized appropriately for the cable.

F. Wiring designator shall be alphanumeric code unique for each cable.

G. Locate the cable designator at the origination and the destination of each circuit. Locate cable designator within 2" of connection point.

3.04 CONTRACTOR COMMISSIONING

A. Prior to energizing or testing the system, ensure the following:

1. All products are installed in a proper and safe manner per the manufacture's instructions.
2. Insulation and shrink tubing are present where required.
3. Dust, debris, solder, splatter, etc. is removed.
4. Cable is dressed, routed, and labels, and all connections are all consistent with regard to polarity.
5. All labeling has been provided and installed.
6. All products are neat, clean and unmarred and securely fastened.
7. All debris has been cleaned and removed from the site.
8. All electronic devices are properly grounded.

B. Perform the following test, Record all results in the final project manual

1. Test each AC power outlet for proper connections for hot, neutral and ground
2. Measure the and record the DC resistance for the technical ground in the equipment racks and console. Resistance should be 0.15 ohms or less.
3. Test each circuit and power distribution outlet for proper operation.

4. Notification:

5. Once all of the above the system is ready for inspection. Formally notify the Owner at least seven days prior to desired inspection date.
6. Final adjustments will be conducted at the time of inspection.

3.05 APPLICABLE FEDERAL SPECIFICATIONS (The list below forms only a part of this specification.)

J-C--30A & AM-1 Cable and Wire, Electrical (Power, fixed Installations)

W-C-3735B Circuit Breakers, Molded Case, Branch Circuit, and Service

W-C-586C Conduit outlet boxes, bodies and entrance caps, electrical: cast metal

W-C-596E/Gen Connector, Electrical, Power, General Specifications

W-F-406B Fittings for Cable, Power, Electrical and Conduit, Metal, Flexible

W-F-408C Fittings for Conduit, Metal, Rigid, (Thick wall and EMT)

W-J-800D Junction Box: Extension, Junction Box; Cover, Junction Box (Steel, Cadmium, or Zinc Coated)

HH-I-553C Insulation Tape, Electrical (Rubber, Natural, or Synthetic)

HH-I-595C Insulation Tape, Electrical, Pressure Sensitive Adhesive, Plastic

WW-C-00540C Conduit, Metal, Rigid: and Coupling, Elbow, and Nipple, Electrical Conduit: Aluminum

WW-C-566C Conduit, Metal, Flexible

WW-C-581E Conduit, Metal, Rigid, and Intermediate: and Coupling, Elbow and Nipple, Electrical Conduit: Steel Zinc Coated

C2-1990 National Electrical Safety Code

C97.1-1972 Low Voltage Cartridge Fuses 600V or Less

Institute of Electrical and Electronic Engineers (IEEE)
142-1982 Recommended Practice for Grounding of Industrial and Commercial
Power Systems

3.4 SOUND SYSTEM

PART 3 - SOUND SYSTEM EXECUTION

3.01 INSTALLATION

- A. Electronic equipment shall be permanently mounted in equipment racks.
- B. Follow ASDI standards as a minimum,
- C. Provide shaft locks or security covers on no user operated equipment having front panel access.
- D. Install XLR type connectors wired Pin 2 High, Pin 3 Low, and Pin 1 Shield.
- E. Mount all equipment, speakers, plates and panels plumb and level.
- F. Permanently install all equipment to be firmly mounted and held in place. Provide necessary equipment supports to hold and support loads with at least a 5:1 safety factor.

3.02 EQUIPMENT HOUSING

- A. Install amplifiers in equipment racks according to manufactures recommendations.
- B. Provide adequate ventilation fans to maintain a rack temperature of less then 92 degrees Fahrenheit.
- C. Provide rear support for housing mounted equipment greater then 15" deep.
- D. Allow a minimum of 20% open rack space.
- E. Fill all empty spaces with blank panels, sizing as required painted to match housing.
- F. Locate operator usable equipment and patch panels at an appropriate operating height.
- G. Key all door locks for each housing type (front, rear) alike.
- H. Looking at the equipment racks from the rear of the racks, install all AC power and ground cabling on the left and audio and video cabling on the right.
- I. Provide lights mounted in the top of each rack to illuminate the interior for service or maintenance. Lights to be individually switch able and placed so as to provide maximum illumination throughout the rack.
- J. Provide rear-mounting rails as required for proper mounting.

3.03 PATCH PANELS

- A. Patch panel shall be located in designated racks as shown on drawings
- B. All patch panels shall be in consecutive rack spaces located at approximately 46" above floor.
- C. Locate inputs from microphone input plates and floor plates near the top of the patch bay layout.
- D. Locate sends and tielines near the bottom of the patch bay.
- E. Patch bays shall be normalled as directed by the Owner.
- F. Provide 24"x32" reference diagram of the patch bay system. The layout shall be easily understood, mount diagram behind plexiglass and mount in the control room close to the patch bay rack.
- G. Diagram shall show all input locations, patch normals, and any console connections, and interconnection of control room equipment.

3.04 LABELING

- A. Provide, for each piece of rack-mounted equipment, an engraved lamincoid label and attach to the front of the equipment. Install in a plumb, level, and permanent manner. Provide rear mounted labeling for all rack mounted equipment.
- B. Provide engraved label over each user-operated control that describes the function or purpose of the control. Adjust size of label to appropriate size for location.
- C. Provide each terminal strip with a unique descriptor and a numerical designator for each strip. Show strip information on the drawings.
- D. Provide logical and legible cable and wiring labels permanently attached for easy identification to each cable, both ends.
- E. Label on cables shall be adhesive style striping covered with clear heat shrink tubing sized appropriately for the cable.
- F. Wiring designator shall be alphanumeric code unique for each cable.
- G. Each cable type shall be labeled starting with different designations (i.e. mic series "Mxxx", speaker series "Sxxx", etc.)
- H. Locate the cable designator at the origination and the destination of each circuit. Locate cable designator within 2" of connection point.

3.05 LOUDSPEAKER SUSPENSION

- A. All loudspeakers shall be suspended or mounted at the appropriate operating position in a safe, secure and permanent manner.
- B. The aiming direction of all loudspeakers and speaker clusters shall be adjustable in plus or minus 5-degree increments.
- C. All loudspeakers enclosures being flown or suspended shall have internally integrated mounting brackets to distribute the load to the

rigging points on each speaker cabinet. Contractor shall provide internal bracing as required if not incorporated into the speaker cabinet by the manufacture.

D. At all times speakers to be mounted or flown shall be intentional designed for the purpose of suspension with integrated rigging points designed into the speaker cabinet by the manufacture.

E. All loudspeakers shall have permanently attached grilles with all manufacture logos removed.

F. All loudspeaker cables/wiring shall disconnect from a junction box located in the same speaker cavity as the speakers or clusters. Provide a single loudspeaker cable assembly that connects from the junction box the speaker cluster and allows cable length for testing and powering the cluster while assembled on the floor.

G. Structural support members shall be designed by a licensed structural engineer and stamped by same with in the state of the project

H. All mounting hardware and wire rope shall be stamped and designed by a licensed structural engineer and submitted for approval.

I. All fasteners, bridles, carabineers, quick links, shackles, etc. shall be of forged material whenever possible and shall be manufactured for rigging.

J. All rigging, mounting and support systems for the loudspeaker clusters or suspended speakers shall be reviewed and certified by a registered Structural Engineer licensed in the state of the project. Once the systems are installed, the engineer shall physically inspect the methods and means used for the installation and verify that the installation complies both with the certified documents and code practices. A document from the Structural Engineer stating this compliance shall be supplied to the owner before any final payments will be authorized.

K. All speakers, speaker clusters and rigging equipment shall be painted the same color, if exposed to the public areas.

3.06 OUTDOOR EQUIPMENT MOUNTING

A. All outdoor mounting hardware shall be non-corrosive

B. Any exposed structural supports for speakers or other outdoor components shall be non-corrosive or covered with an inhibiting layer.

C. Any components mounted outside shall be secured in such a way as to prevent movement caused by wind or storms.

D. All speaker, microphone, line, communications enclosures to include grill components capable of protecting the devices and keep the water and elements out of the components.

E. Seal all connections on each speaker with a waterproof silicone sealant.

F. Provide screened covering over all openings in horn type enclosures to keep out birds, insects or small animals.

3.07 CONTRACTOR COMMISSIONING

- A. Prior to energizing or testing the system, ensure the following:
1. All products are installed in a proper and safe manner per the manufacture's instructions.
 2. Insulation and shrink tubing are present where required.
 3. Dust, debris, solder, splatter, etc. is removed.
 4. Cable is dressed, routed, and labels, and all connections are all consistent with regard to polarity.
 5. All labeling has been provided and installed.
 6. All products are neat, clean and unmarred and securely fastened.
 7. All debris has been cleaned and removed form the site.
 8. All electronic devices are properly grounded.
- B. Perform the following test, Record all results in the final project manual
1. Test each AC power outlet for proper connections for hot, neutral and ground
 2. Measure the and record the DC resistance for the technical ground in the equipment racks and console. Resistance should be 0.15 ohms or less.
 3. Measure the impendence f each speaker line form the amplifier rack.
- D. Speaker Verification Test:
1. Provide a low level distinctive tone to each amplifier input.
 2. Systematically turn on each amplifier one by one and verify that the correct speaker is being driven. Correct wiring as required for proper operation.
- E. Constant Voltage Speaker Test:
1. Provide a low level distinctive tone to each amplifier input.
 2. Systematically turn on each amplifier one by one and verify that the correct speaker is being driven. Correct wiring as required for proper operation.
 3. Walk the areas covered by the speakers and check for even level volume coverage. Adjust any speakers that are not correct by changing tap values as required for even volume level.
- F. Speaker Polarity:
1. Use an electronic polarity checker to test each reinforcement speaker. All speakers should have the same relative polarity.
- G. System Gain Adjustment:
1. Adjust each active device to have unity gain from the console output to the input of the amplifiers.
 2. With all amplifiers turned off, connect a sine wave or pink noise to an input of the console. Using a RMS voltmeter adjust the scale to an output between -10 and 0 dBu. Once level has been established, it should remain unchanged throughout testing.
 3. From the console proceed to each electronic device in the signal path and adjust to be uniform based on the input and outputs of the console.
- H. Signal Delay Adjustment:
1. Adjust the delay speakers to ensure proper synchronization between the main speakers and delayed speakers
 2. Using TEF20 or SMARRT Live measure and adjust the arrival times of each speaker to be fully sync'd.
- I. Amplifier Level Adjustment:
1. Adjust the gain of each amplifier to provide consistent and

appropriate levels throughout the seating areas/facility.

2. With the console and other electronic devices feeding the amplifiers adjusted as described above adjust the output of the console to be -10dB on the output VU meter.
3. Adjust the appropriate amplifiers to achieve 85dBA in the area covered by one of speakers. Use a calibrated sound level meter to make the adjustments.
4. If the speaker is utilizing an active crossover mute the individual bandpass sections to adjust each section independently.
5. Start with the speaker closed to the stage area or the booth location as appropriate. Once that speaker has been adjust to the above criteria repeat this procedure for each speaker cabinet.
6. Amplifiers should be set to provide an average of 85dBA plus or minus 1.5dB throughout each seating section.

J. Amplifier Level Adjustment 70 volt system:

1. Adjust the level of the 70-volt systems to achieve a volume level appropriate for their location and intended use.
2. After initial amplifier adjustment as performed in 3.07.I, walk all areas utilizing the 70 volt systems and check for volume uniformity. If any changes of 3dB or more occur adjust that specific area or speaker as required for even coverage.

K. Input Verification Test:

1. Using a microphone or portable signal generator or CD player send signal from every microphone input to the console, check every connection location in the faculty.
2. Verify that the receptacle under test appears at the correct position on the patch bay and is operating properly.
3. In a similar manner check any other inputs or tielines as appropriate.

L. Notification:

1. Once all of the above the system is ready for inspection. Formally notify the Owner at least seven days prior to desired inspection date.
2. Final adjustments and equalization will be conducted at the time of inspection.

3.07 APPLICABLE FEDERAL SPECIFICATIONS (The list below forms only a part of this specification.)

J-C--30A & AM-1 Cable and Wire, Electrical (Power, fixed Installations)
W-C-3735B Circuit Breakers, Molded Case, Branch Circuit, and Service
W-C-586C Conduit outlet boxes, bodies and entrance caps, electrical: cast metal
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W-J-800D Junction Box: Extension, Junction Box; Cover, Junction Box (Steel, Cadmium, or Zinc Coated)
HH-I-553C Insulation Tape, Electrical (Rubber, Natural, or Synthetic)
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WW-C-00540C Conduit, Metal, Rigid: and Coupling, Elbow, and Nipple, Electrical Conduit: Aluminum
WW-C-566C Conduit, Metal, Flexible
WW-C-581E Conduit, Metal, Rigid, and Intermediate: and Coupling, Elbow and Nipple, Electrical Conduit: Steel Zinc Coated
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