Contra Costa College
Knox Performing Arts Center
Replacing Existing Rigging
Contra Costa, CA

Specifications

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SECTION 11 61 33 - STAGE RIGGING

1. GENERAL

1.1. SUMMARY

A. This section describes systems, equipment, and installation of the stage rigging in the Contra Costa College Knox Theatre. The work in this section is for replacement or upgrade of existing rigging with new rigging parts as indicated in the Appendix A Rigging Schedule and Appendix B Rigging report. Essentially all moving parts are being replaced with new units. The work includes supply and installation and testing of the equipment for a complete rigging system.

B. Note that there is associated Fire Curtain replacement work specified under section 11 61 34 Fire Curtain.

C. Project schedule: All onsite work for each phase must be completed between the start date and completion date indicated.

PHASE 1: Replacement of existing trim chains with new batten clamps and turnbuckles only for all 21 linesets.
Phase 1 has been completed.

PHASE 2: All Other work, including fire curtain replacement
Start Date: TBD
Project Completion Date: TBD

D. Coordinate electrical work with Electrical Contractor. Electrical work will be provided by Electrical Contractor under a separate agreement.

1.2. SECTION INCLUDES

A. General: Provide all labor, materials, tools, equipment, transportation, temporary construction and special or occasional services required to make complete working installations, as shown on the drawings or described under this section. The work includes fabrication, installation, adjusting, and demonstrating specified performance of all rigging, and other related equipment.

B. Counterweight rigging systems on 'T' guides.

C. Replacement of existing battens with new truss battens.

D. Replacement of Electrics battens including side tab electrics with new top and bottom battens, hanging irons that support existing connector strips.

E. Furnish and install feeder cables for electrics lineset and side tab electrics linesets which are being replaced. Rigging of feeder cable for electrics linesets. Strike and rehang connector strips. (Electrical work by Electric Contractor).

F. Addition of third loft block and associated rigging to side tab electric linesets.

G. Replace arbors.

H. Replace electrics arbors.

I. Replace lock rail. (Existing lock rail may be re-used if rigging contractor verifies connection of lock rail to floor is as noted in original building plans. Connection to be approved by project structural engineer. The existing connection to floor appears to have a thin layer of concrete covering connection. Rigging contractor to provide onsite investigation of condition. Condition to be approved by Project Structural Engineer.)

J. Replace rope locks

K. Replace floor tension blocks.

L. Replace head blocks.
M. Replace loft blocks.
N. Replace mule blocks.
O. Replace all wire rope and connections.
P. Replace trim chains with turnbuckles and batten clamps.
Q. See associated work for replacement of manual fire curtain rigging with motor-operated line shaft fire curtain. Rigging and release mechanism is specified under section 11 61 34 Fire Curtain. Fire curtain fabric, smoke pockets, track and carriers are to be re-used.
R. Counterweight assist motor winch for electric linesets.
   1. See Alternate #1 for 1st Electric
   2. See Alternate #2 for 2nd and 3rd Electrics.
S. Additional linesets.
   1. See Alternate #3.
T. Mule blocks, rollers and other devices required to align and lift wire rope.
U. Supporting brackets, clips, drilled anchors, and miscellaneous iron supports where required for installation of the work of this section and not furnished under another section.
V. Submittals, Maintenance and Service Manuals.
W. Testing and demonstration of the completed installation.
X. All drawings to be stamped by a registered Professional Engineer (P.E.) with a license in the State of California.
Y. Strike and rehang curtain tracks and drapery, and other equipment hanging on battens. Follow Owner’s Technical Director shall provide direction for storage location and for re-hanging of tracks and drapery locations for a typical “house hang”. Lighting fixture strike and rehang will not be part of the work.
Z. Remove and dispose or recycle equipment being replaced.

1.3. PROJECT SCOPE PHASES
A. Phase 1
   1. Replacement of existing trim chains for all 21 linesets with new batten clamps and turnbuckles. The batten clamps and turnbuckles are intended to be reused in Phase 2.
B. Phase 2
   1. All other work including replacement of lineset moving parts as noted in this section and in the drawings, alternates (as determined by the owner) and the fire curtain replacement.
C. Schedule for Phases
   1. See 1.01 Summary above.

1.4. ALTERNATES
A. Alternate # 1: Motorized 1st Electric
   1. Motorization of 1st electric with added winch at stage floor level to provide counterweight assist.
   2. Electrical work: Provide new power and control. Include conduit and wiring. (By Electrical Contractor.)
B. Alternate # 2: Motorize 2nd and 3rd Electric
   1. Motorization of 2nd electric and 3rd electric with added winch at stage floor level to provide counterweight assist.
   2. Electrical work: provide new power and control include conduit and wiring. (By Electrical Contractor.)
C. Alternate #3: Addition of extra linesets. Provide price per lineset.
   1. Add extra line sets.

b. Open space between LS 7 and LS 8. Add 2 linesets (#7.5 and #7.6). Add new T-Bar track required (confirm).


2. For each added lineset:

   a. Include truss batten, connections, loft block, head block, tension floor block, wire rope, arbor and all parts necessary for a complete functional lineset. Add new T-Bar guide track for 4 sets as noted.

D. Alternate #4: Replacement of existing floor blocks on Traveler curtains

   1. Replace traveler curtain floor blocks that stage screw to floor with sandbag tension pulley.

   2. Replace with sandbag tension pulley on 2 traveler curtains and main curtain. Product equal to H&H Specialties model 643.

1.5. RELATED SECTIONS

A. APPENDIX A, Rigging Schedule and APPENDIX B, Rigging Report are part of this section.

B. 11 61 34 Fire Curtain Replacement

C. Electrical rough-in and connection of equipment to building electrical system by Electrical Contractor under separate agreement with Contra Costa College.

1.6. DEFINITIONS

A. Provide: Furnish and install item(s) in building unless noted otherwise.

B. Furnish: Deliver item(s) to site.

C. Install: Install item(s) in the building regardless of who supplies item(s).

D. Consultant: Consultant responsible for drawings and specifications: Landry & Bogan, Theatre Consultants, 733 West Evelyn Ave., Mountain View, CA 94041-1316 (650) 969-5195 (650) 969-4965 fax. Contact: Kent Conrad.

E. Architect: The Architect or the Owner if no architect.

F. Owner: An authorized representative of the Owner, Contra Costa College.

1.7. SUBMITTALS

A. Submit all shop drawings and related documents in accordance with Division 1 and requirements of this Section.

B. Submit shop drawings and related documents for review in ample time for completion of the Work of the Contract. Prior to fabrication or delivery of equipment or materials to the site, receive submittals back from Architect stamped "Reviewed - resubmission not required".

C. Include with each submittal a cover letter with a list of the items and data under submission. Contractor agrees that submittals processed by the Architect are not change orders and that the purposes of the submissions are to demonstrate the Contractor’s understanding of the design by describing in detail equipment and installation methods.

D. Submit copies of materials list, specifications, catalog cuts, data sheets, and drawings to scale of how items are to be fabricated and how they are to be connected. Drawings based solely on the construction documents which do not show fabrication information will be rejected summarily.

E. Submission type and quantity:

   1. Lists and data sheets: Electronic submittal is acceptable. Submit one electronic PDF set or Submit not less than four hard copy sets.

   2. Drawings: Each set of drawings shall include one full size PDF electronic submittal or four full size sets of black line drawings for each submittal. Show scale details, sizes,
dimensions, performance characteristics, wiring diagrams, controls, and all other pertinent details.

a. Drawings shall show all elements of the system and illustrate all conditions for mounting
b. Plans
c. Sections

3. Manufactured Items: Submit on electronic PDF set or four copies of manufacturer's catalog cuts of data sheets for each submission showing illustrations of the item to be furnished.

4. Submit at least the following items:
   a. Complete list of purchased manufactured items, with manufacturer's name and model number, including anchors, rope clips, fasteners, etc. Provide evidence of quality and load capacity for any item involved in the support of loads.
   b. Details of rigging layouts and added supporting steel (if any).
   c. Rigging batten and block layout including muling.
   d. Details of rigging tee guides, locking rail, and attachment to structure.
   e. Details of counterweight arbors.
   f. Details and attachment of head, loft, and mule blocks.
   g. Splice points of all members with field joints (tees, battens, etc.) and details of splice to maintain continuity.
   h. Details of stage fire curtain rigging and emergency operation.
   i. Details of electric motor winches including dimensions, mounting, motor and gearbox catalog and nameplate data, calculations for line speed and load capacity, and electrical diagrams for power and control equipment.

F. Deviations from requirements of Contract Documents: Bring any deviations to the Architect's attention in writing at the time the drawings are submitted for review.

G. Resubmittal: Do not resubmit drawings which have been stamped "Resubmittal not required."

H. All drawing are to be stamped by a registered Professional Engineer (P.E.) licensed in the State where the project is being constructed. Provide data calculations where appropriate.

1.8. SUBSTITUTIONS

A. See District's Supplementary General Conditions. Submit proposed substitutions, if any, as specified under Division 1, Supplementary General Conditions and meeting the requirements below.

B. Manufacturers, trade names, and model numbers are given for the purposes of identification, and are not intended to be exclusive of other items of equal suitability. However, the design is based on components of individual characteristics, in combinations proven in use.

C. Requests for substitutions will be considered if the request to substitute is reflected in a list of materials, catalog cuts, performance data, electrical characteristics submitted to the Architect within the specified time.

D. The following criteria will govern the consideration of requests for substitutions:
   1. The item considered must be on the whole equal to or better than the item specified and have a satisfactory field history at installed locations for at least 6 months of operation after date of acceptance of the installation.
   2. The item must be equally suited to the design as a whole. If modification of the design is necessary to accommodate the item, it may be rejected on this ground alone.
   3. If the item specified is a factory production standard, the Architect may reject proposed substitutions which must be specially modified in order to be equal.
   4. If in the opinion of the Architect either the acceptance or the necessary evaluation of a proposed substitution may delay completion of the Work beyond the Contract Time, he may summarily reject it if sufficient technical data are not received within the specified time.
5. Materials specified by manufacturer or trade name are based on the manufacturer's ability and experience. In some cases, continued service beyond the warranty period and spare parts are a factor in the choice of a particular supplier. Proposed substitutions must be manufactured by a firm of equal reputation, qualifications and stability to the specified manufacturer.

1.9. QUALITY ASSURANCE

A. Regulatory Requirements
   1. Conform to all current State rules and all local codes and ordinances.
   2. Where these Specifications call for a higher standard than the above-mentioned rules, the Specifications shall govern.
   3. Nothing in these Drawings or Specifications is to be construed to permit work not conforming to Codes.

B. Contractor's Qualifications: The Contractor for the work of this Section shall:
   1. Have been continuously in the business of fabricating and installing stage rigging for at least five years.
   2. Maintain a shop adequately equipped and staffed for the fabrication and setup of the work of this Section.
   3. Have successfully completed during the past five years five rigging projects of scope and complexity at least equal to this project.
   4. Have in permanent employ or association engineers and other technical staff capable of the layout, detailing and engineering of the work of this section.
   5. Have all licenses and local qualifications required to perform the work of this section in the project location.
   6. Provide proof of qualification as part of bid submission which includes a list of similar projects completed, including names and current phone numbers of references.
   7. Factory authorized service representative within 300 miles of project.

C. The following companies shall be a standard of qualification for installers:
   2. LA Propoint, 10870 La Tuna Canyon, Sun Valley, CA 91352, 818-767-6800, 818-767-3900 (fax)
   3. Legend Theatrical, 103 Whispering Pines Dr. #E, Scotts Valley, CA 95066, 888-485-2485
   4. Musson Theatrical, 890 Walsh Avenue, Santa Clara, CA 95050, 1-800-843-2837
   5. Protech Theatrical Services, Inc., 3431 N. Bruce St., North Las Vegas, NV 89030, 702/639-0290
   7. Secoa Corporation, 8650 109th Ave North, Champlin, MN 55316-3789, (763) 506-8800

1.10. BUILDING DRAWINGS AND SITE CONDITIONS

A. Layout: General layout shown on the drawings shall be followed except where other work or existing conditions may conflict.

B. Accuracy:
   1. Drawings for the work under this section are diagrammatic.
   2. Plans and specifications are complementary, what appears in one shall be binding in both.
   3. Contractor shall verify lines, levels, and dimensions shown on the drawings and shall be responsible for the accuracy of the setting out of work and for its strict conformance with the existing conditions at the site.

C. Location: If changes in the indicated locations or arrangements for the work under this section become necessary due to field conditions or relocation of equipment, make such changes without extra cost to the Owner, provided no extra material is required.
D. Cutting and patching: If cutting and patching become necessary due to irregular or improperly located or omitted openings, perform such work without extra cost to the Owner. Do not cut or drill any structural member without prior written approval by the Architect.

1.11. SERVICE AND MAINTENANCE MANUALS:
A. Before completion of the installation, furnish Service and Maintenance instructions, data sheets for the exact equipment installed, manufacturer's parts lists and part numbers or other identification established by the original manufacturer, schematic diagrams of motor units, controls, and other diagrams not included as part of the manufacturer's data sheets.
B. Include Record Drawings in the Service Manuals. Group sections in a logical manner and separate each group with indexed divider sheets corresponding to a table of contents. Fold large drawings to 8-1/2-inches x 11-inches for binding.
C. Place all information in heavy-duty 3-ring binders having the name of the project, Owner, Consultant, Contractor, Rigging Contractor, and date of completion on the spine.
D. Deliver two preliminary copies of the information to the Architect for approval prior to completion of the manuals. If additions or revisions are required, make them and resubmit a preliminary manual. After approval in writing by the Architect, deliver four copies to the Architect.

1.12. WARRANTY
A. See Division 1 for District's requirements. In addition to the District's requirements the following requirements shall be met.
B. Guarantee equipment against defective material and workmanship for one year from date of completed installation (including completion of punch-list work) except where longer periods are specified.
C. During the guarantee period, furnish emergency service without additional cost. The emergency service includes on-site adjustment, repair, and replacement of parts necessary to return the equipment to satisfactory operating status.
D. Provide the emergency service within 24 hours of notification (unless agreed to in advance by the Owner).
E. When any component fails at any time during the guarantee period, the guarantee period for replaced components and all other components which are inactive because of the failure shall be extended for a period as long as the inactivity or for two months, whichever is longer.

1.13. SYSTEM STARTUP
A. After installation is complete, test the systems for conformance to the requirements of the Contract Documents. At the satisfactory completion of the testing program, and after delivery of the preliminary Service Manual to the Architect, notify the Architect in writing that the systems meet the Contract requirements and are complete and ready for final inspection and tests by the Architect.
B. During the inspection, operate all items to demonstrate specified performance, including but not limited to the following operations:
   1. Operate fire curtain in normal and emergency modes and confirm rate of fall.
   2. Move all linesets from highest position to lowest position and return.
   3. Operate traverse curtains through all modes of travel.
C. Correct deficient work cited on a punch list (if any) prepared during inspection and tests of the complete installation. When the conditions cited on the punch list are corrected, notify the Architect in writing that the work is completed and ready for a second inspection.
D. If necessary, as part of punch list work, rearrange loft blocks and battens as directed by the Architect to provide clearance, reduce noise or friction, or otherwise bring the work to the standards specified.
E. If the second inspection shows the need for corrective work of such an extent that additional visits to the site by the Architect are required to verify completion of the work, such visits shall be at the expense of the Contractor. The Owner shall pay fees and expenses for such visits and deduct them from any payments due the Contractor. Per diem fee shall be at the Architect's standard rate plus incurred expenses.

F. Conditions which, if not corrected during the inspection, may require such additional visits shall include, but not be limited to:
1. Wire rope rubs, sheave rubs, and battens out of level.
2. Excessive noise or friction in guides, blocks, or traverse tracks.
3. Miswiring of controls.
4. Failure of fire curtain to operate per IBC 2000.
5. Any condition that prevents inspection and operation of items in their final locations.

1.14. OWNER'S INSTRUCTIONS
A. Allow a minimum of four hours for demonstration of the systems including operation, safety procedures, review of routine service and adjustments. Demonstration shall be at a time mutually agreed to by Owner and Contractor.

2. PRODUCTS

2.1. NOMENCLATURE
A. When manufacturer's trade names or model numbers are given in conjunction with other information about details, performance or installation, the intent is to specify an item in general similar in character and quality to the standard item identified by manufacturer's designation, but modified to conform in all respects to these documents.

2.2. MANUFACTURERS/STANDARDS
A. Products from the following sources shall serve as a standard of quality.
B. For Rigging Hardware:
   2. H & H Specialties, South El Monte, CA.
   3. Tru-Roll Corporation, Monrovia, CA.
   4. Secoa Corp., Champlin, MN.
   5. Protech Theatrical Services, North Las Vegas, NV.
C. For related hardware:
   1. Automatic Devices Co., Allentown, PA.
   2. H & H Specialties, South El Monte, CA.
   3. Tru-Roll Corporation, Monrovia, CA.

2.3. RIGGING HARDWARE
A. Provide all plates, channels, angles, bolts, nuts, washers, brackets, straps, clews, auxiliary steel and other items attached to and supporting rigging and equipment and required for satisfactory completion of the work, whether shown or not. All hardware shall be rated and contain standard industry rating markings. All hardware shall be used for intended purpose and load as recommended by the manufacturer.
B. Remove burrs, rough or sharp corners and edges, rust, scale, oil and other material deleterious to finish. Prime and enamel or lacquer all exposed steel surfaces except galvanized parts, wire rope and bearing surfaces.
C. Non-traction Sheave Standards for Headblocks, Loft Blocks, and Mule Blocks:
   1. Material: See individual block specification for sheave material.
   2. Hub O.D.: 3.5-inch min. for headblocks; 2.0-inch min. for loftblocks.
3. Grooves: Machine-turned to standards below, 1 per lift line plus one for operating line on manual scenery sets; 1 per lift line plus one for feeder cable pickup plus 1 for operating line on manual electrics sets; 1 per lift line plus one for feeder cable pickup plus one for drive line or chain on winched electric sets. Equal pitch diameter grooves for wire rope and handline.
   a. Angle: 30° min.
   c. Rope contact: 40% of rope diameter max.
   d. Depth: 1.5 to 2.0 times nom. rope diameter; set to position centers of all lines equidistant from sheave axis to within 0.008-inch.

4. Bearings for Wire Rope Headblocks: Two Timken Tapered roller bearings rated for applied load but not less than 2000 lbs. for scenery line sets and 3000 lbs. for electrics line sets.

5. Bearings for Wire Rope Loft and mule Blocks: Ball bearings rated for applied load but not less than 300 lbs. Timken Tapered roller bearings or sealed precision ball for 12-inch and larger sheaves.

6. Axles for Wire Rope Blocks: 1-inch min. for head blocks, 1/2-inch min. for 8-inch loft blocks; 1-inch min. for 12-inch and 16-inch loft blocks; with anti-rotation key on axle head mating with keyway in sideplate, and threaded end with self-locking nut and keeper.

D. Upright Head Block: 12-inch dia. gray iron sheave, 10 GA (min.) steel sideplates bolted and welded to two 2-inch x 1-1/4-inch x 1/4-inch base angles with horizontal leg turned in and notched for rope passage, six 1/2-inch pipe spacers anchored with 3/8-inch dia. bolts and nuts, two 1/2-inch thick steel flange clamps with two (min.) 1/2-inch dia. bolts and nuts. Clancy #55 series or H&H 50 series.

E. Upright Loft Block: 8" dia. gray iron sheave: 10 GA (min.) sides plates riveted or welded to 1-1/2" x 1-1/2" x 1/4" (min.) base angles (horizontal legs out), five or more 1/4" pipe spacers between side plates located to prevent rope leaving groove. Clancy #55 series, or H&H equal or Tru-Roll #4080-S series, all with special base angles, mounting holes and relocated spacers where required for mounting as shown.

F. Mule block: 8-inch dia. nylon sheave similar to loft block plus mounting hardware as required to anchor and align block.

G. Take-up Tension Block: 10-inch, 11-inch, or 12-inch dia. sheave, grooved for hand line, 1/2-inch- 5/8-inch O.D. steel axle, oil-impregnated bronze bushing, fiber washers to provide clearance between sheave and inner walls of sideplates, and fiber guide assemblies consisting of 5/16-inch thick fiber guides and 1/4-inch thick steel backup plates both sides. Fiber guide assembly shall permit free vertical movement of block on tee guides as well as self-locking and quick-releasing action; Clancy #6CR-1015, or TRU- ROLL #5080, or H&H Series 70.
   1. Note: Existing locking rail and tension block cause the operating line to get pinched. New locking rail and tension floor block shall not allow such pinching to happen.

H. T-bar / J-Guide Assembly: Note: Intension is to re-use existing T-Bar wall assembly. This section is for reference and for certain parts that need to be replaced such as bottom stop.
   1. General: All parts shop-fabricated for field attachment by hex-head bolts with washers, in slotted holes to erect and maintain tees plumb and true to line regardless of irregularities in building construction. Steel: ASTM A-36.
   2. Guides: 1-3/4" x 1-1/2" x 3/16" extruded aluminum members.
   3. Spreaders: 3/16-inch (min.) x 2-inch, with added width at splices, both sides of tees.
   4. Top and bottom stops: Continuous steel angle with hardwood bumper and neoprene pad as shown on the drawings. Provide special stops for linesets with atypcal high or low trim.
I. Counterweight Arbor, Single Purchase: "U" shaped steel top and bottom plates of 1/4-inch steel with bored eyelets for lift lines, forged eye bolt welded in top and bottom plate for operating line or winch drive line, 3/4-inch diameter steel tie rods for loads up to 1800 lbs. or 7/8-inch dia. rods for greater loads, two nuts per rod end, one threaded rope eye at top and bottom of onstage rod, 1/4-inch thick x 3' tie plate for arbors up to 4-feet-0-inches, 3/8-inch thick x 3-feet tie plate for longer arbors, UHMW polyethylene assemblies with 10 GA backing plates. Each arbor provided with 14 GA - 12 GA x 21 spreader plates (one with thumb screw locking collars attached to plate). Provide one plate for each 2 feet of arbor length. Bottom plate stenciled "DEAD LOAD" 1-inch high white on upper surface legible looking upstage; Clancy #15 series or Tru-Roll #5100 series or H&H #99* series. Arbor sizes as shown on the drawings.

J. Counterweights: Smoothed cut steel plate, 6-inch x 13-3/4-inch (nom.) weighing approximately 260 lbs. per foot of stack. Remove all burrs and rust and finish to match pipe battens. Provide 15% 1-1/2-inch thick, 80% 1-inch thick and 5% 3/8-inch thick weights, 10,000 lbs. in addition to the weights necessary for dead loads on the arbors including all permanent loads on the electrics battens. Calculate deadloads to include weight of curtain tracks, projection screen (if any), curtains, soft goods and any other loads described on batten schedule.
1. Existing weight is intended to be re-used. Existing weight is 10,000 lbs.
2. Calculate additional weight required beyond existing to meet the requirements above.
3. Minimum of 10,000 lbs. of new 6" wide weights in thicknesses as noted above.
4. For each Add/Alternate lineset installed add an additional 750 lbs. of counterweight.

K. Locking Rail for T-Guide line sets: Detail sections for field assembly into strong continuous unit securely fastened to structure. Assemble locks to rail with four bolts each. Mount white acrylic plastic designation plates at each ropeclock with oval-head countersunk screws. Engrave line set number on each plate (e.g., #1, #2, etc.). In addition, engrave names of the following line sets: Front Curtain, Electrics #1, #2, #3; Clancy #538 series or Tru-Roll or H&H #578.
1. Note: Existing locking rail and tension block cause the operating line to get pinched.
   New locking rail and tension floor block shall not allow such pinching to happen.

L. Identification of counterweight maximum loads: Provide two 18-inch x 24-inch (nom.) phenolic or tri-laminate signs with black background and white engraving of the following:
1. Wording: (Confirm wording)
2. MAXIMUM LIVE LOAD ON SCENERY BATTENS xxxx LBS. EACH
   MAXIMUM LIVE LOAD ON #1 ELECTRIC WITH WINCH xxxx LBS.
   MAXIMUM LIVE LOAD ON #2 & #3 ELECTRICS xxxx LBS.
   2" THICK COUNTERWEIGHTS (YELLOW) = 40 LBS
   1-1/2" THICK COUNTERWEIGHTS (RED) = 30 LBS.
   3/4" THICK COUNTERWEIGHTS (BLACK) = 20 LBS.
   3/8" THICK COUNTERWEIGHTS (WHITE) = 13 LBS.
3. Lettering: Sans serif style, 3/4-inch high minimum.
4. Permanently mount signs to wall with one sign visible from loading gallery catwalk and other sign near index lights dimmer and visible from locking rail.
5. Locate signs to not conflicting with other signs or controls.

M. Rope Locks: Steel cam and lever type for operating line, with steel locking ring, 9-inch handle covered with vinyl cushion and hex-head cam pressure adjustment screw. Lock drilled to accept standard key-operated padlock to prevent operation. Clancy 010-533R or Tru-Roll #5000 or H&H #576.

N. Pipe Battens: Fabricated from 1-1/2-inch nominal Schedule 40 steel pipe (ASTM A65 Grade B or A501) with reinforced splices as shown on the drawings. No splice more than 42-inch from pickup point. Finish with semi-gloss black enamel or lacquer.
O. Truss battens: Fabricated from 1-1/2-inch nominal Schedule 40 steel pipe (ASTM A65 Grade B or A501) with reinforced splices as shown on the drawings. No splice more than 42-inch from pickup point. Finish with semi-gloss black enamel or lacquer. Spacing and interconnecting members as shown on the drawings.

P. Wire Rope for Rigging Loads: 7 x 19 aircraft cable, galvanized, preformed steel, 1/4-inch dia. except as shown or specified. Min. breaking strength for 1/4-inch; 7000 lbs.; for 5/16-inch, 9800 lbs.; for 3/8-inch, 14,400 lbs.; MacWhyte or Roebling.

Q. Chain: System 3 proofcoil chain, Grade 30 chain or better rated for intended rigging loads. Chain to meet Federal Spec RCC-271-E. For ¼" proof coil chain the working load limit shall be 1250 lbs.

R. Shackles. Shackles shall meet Federal Spec RR-C-271D Type IVA. For 5/16" shackle the working load limit shall be 1500 lbs.

S. Turnbuckles: Galvanized, drop-forged, jaw and jaw type of size shown, but not less than 3/8-inch nominal diameter; Crosby or Wilcox-Crittenden. Turnbuckles to meet ASTM specification 1145-92-Type 1 -Grade 1.

T. Batten Clamps: Sized for battens and rated to carry anticipated loads. JR Clancy model 026-22x1.5 or equal.

U. Rope Clips: Galvanized, drop forged clip and U-bolt type; Crosby or Wilcox-Crittenden.

V. Swaged fittings: Copper compression sleeve installed per manufacturer's requirements. Use thimbles where appropriate.

W. Counterweight operating line: 3/4-inch dia. 3-strand wrap of polyester filament/staple blend over polypropylene core. Tensile strength of 10,500 lbs.; New England Rope Co. "MultiLine II" or Sampson "Pro-Master".
   1. Existing line may be re-used.

X. Drilled Anchors: In concrete or filled concrete masonry: Expansion bolt in drilled hole same size as bolt in item to be attached. Minimum diameter 3/8-inch unless noted; embedment min. 2-inch and not less than manufacturer's printed recommendation; Kwik-Bolt or ITW Trubolt.

Y. Adhesive Anchors: Steel threaded rod of size shown on the drawings, with two-part epoxy adhesive; ITW Ramset/Red Head "Epcon" system.

Z. Heat-shrink Tubing: (For seizing ends of wire rope and anchoring running end to standing line at terminations) Semi-rigid polyolefin type; Alpha Wire Co. "FIT-295" or equal.

AA. Cable Cradle: (For feeder cable pick-up) Fabricated steel supports for multi-conductor cable feeding stage electrics battens. Provide two cradles for each electrics batten, one with pulley for two-part rigging.

2.4. OUTRIGGER LIGHTS
A. Existing outrigger lights will remain.

2.5. MOTOR WINCH FOR ELECTRIC LINESET
A. General: Electric motor drive for pulling light batten arbor in either direction, via roller chain and wire rope loop connected to arbor top and bottom. Reversing C-face motor and gearbox combination, engineered for 1,500 lbs. chain pull at 15 ft./min. Assembled on structural base with control enclosure, designed to clear arbors and tension blocks of adjacent linesets.

B. Guards for moving parts - Meet O.S.H.A standards.

C. Chain Drive: All components ASA standard. Chain - No. 60 single roller with average tensile strength 8500 lbs.

D. Motor: 208 v. 3-phase, U-frame, 30 min. duty cycle, horsepower as required for speed and load.
E. Gearbox: Heavy industrial double worm gear self-locking unit rated for at least 200% of torque and overhung load imposed by running load; MORSE 50GCDB or equal.

F. Wiring and Controls: Furnish reversing motor starter, safety disconnect contactor, motor overload devices, remote control box and cable, control box receptacles, remote limit switches, and all accessories necessary for complete installation when connected to power and control wiring in building system. Power connection to unit will be a local disconnect furnished under Division 16.

G. Control Box: NEMA 1 pendant box with momentary 1" dia. guarded, green UP and yellow DOWN pushbutton switches, and 1-1/4" dia. red mushroom-head maintained contact STOP switch; 20 foot multicore conductor #14 type "SO" cable, and multi-pin plug having mechanical lock with receptacle ('Twistlock' type acceptable). UP and DOWN switches operate reversing starter in push-to-run, release-to-stop modes; pushing STOP switch opens emergency safety contactor which disconnects power to motor and prevents use of UP and DOWN button switches. OUT position of STOP switch closes emergency safety contactor and permits use of directional motor start button switches. SQUARE-D type 'G' heavy duty control station with type #KR-1 and #KR-25 series switches.

H. Control Receptacle Box: Code-gauge steel enclosure with black (or grey) exterior finish and black (or grey) tri-laminate name plate (1" H x 4" W) engraved "1st ELECTRICS WINCH".

I. Multi-conductor receptacle mating with plug on control box. Furnish for installation under Division 16.

J. Limit Switches: Roller-type track-mounted limit switches in NEMA 1 enclosures actuated by arbor at top and bottom of travel. Install for connection under Division 16.

2.6. MULTI-CONDUCTOR CABLE
A. Rigging Contractor shall furnish and install multi-conductor cable as shown in the drawings. Electrical contractor will terminate connections.

2.7. FIRE CURTAIN AND SMOKEPOCKETS
A. See specification 11 61 34 for requirements.

3. EXECUTION

3.1. GENERAL
A. Before beginning installation, verify that shop drawings reflect actual field conditions. Report any deviations between field conditions and shop drawings to the Architect in writing.

3.2. INSTALLATION OF STAGE RIGGING HARDWARE
A. Tee Guide Hardware: Anchor steel channel members to structure. Attach tee guides to channels 5 ft. O.C. plumb and parallel, with variations not exceeding plus or minus 1/8". Align tee guide joints flush and smooth. Replace tee guides and counterweight arbors if necessary to provide quiet, smooth operation the full length of tee guide. Use spreaders both sides of each tee.

B. Blocks: Locate and anchor blocks to provide proper alignment of wire ropes and prevent chafing of wire rope against other lines, sides of grooves, or other fixed objects. Furnish and install mule blocks or rollers as required to prevent wire rope contacting other objects such as sprinkler pipes, structural members, the gridiron, other wire rope, etc. whether such blocks or rollers are shown on the drawings or not. Hold fleet angle under 2° from sheave plane.

C. Wire Rope: Attach rope to battens and arbors as shown; use 3 clips or one swaged fitting at each cable end. Place "U" bolts on dead end of cable. Seize cut ends of rope with heavy heat-shrinkable plastic tube or soft iron wire. Hold cut end of rope against standing line with
heat-shrink tubing. Cover any rope ends which may catch curtains or scenery. Adjust as necessary to insure quiet operation.

D. Turnbuckles: After adjustment, install safety-wire or lock-nut to prevent accidental change. In lieu of turnbuckles for adjustment, proof-coil chain may be installed if proposed chain and details of attachment are approved by the Architect prior to installation.

E. Counterweight Arbors: Balance arbors with installed loads including curtains, electrical, etc. Distribute remaining counterweights along loading gallery weight rack. Locate counterweights for dead load on arbor under stenciled spreader plate. Paint on-stage ends of dead load counterweights and arbor rod up to height of weights with yellow enamel or lacquer.

F. Pipe Battens: Level battens with 50 lbs. per line added, except actual load for electrics battens, traverse curtains, and cycloramas.

G. Lineset Identification:
   1. At loading catwalk level stencil the number of each lineset in contrasting color paint letters 1/2-inch high on the top stop and in line with the arbor.
   2. At on-stage edge of top and bottom arbor plates, stencil lineset number in contrasting color to be legible from loading catwalk when arbor is raised to upper stop.
   3. Mark the center of pipe battens with 1 inch wide red painted band, using masking tape for sharp edges.
   4. Stencil downstage side of each center loft block with lineset number in 1" high yellow or white paint.

H. Chain: Attach chain to battens and beam clamps as shown in the drawings using rated and approved hardware.

3.3. RIGGING OF FEEDER CABLES FOR ELECTRICS

A. Coordinate terminal box locations and final trim length of feeder cable(s) with other trades.

B. Rig feeder cable as shown on the drawings. Determine best heights for cable pickups to achieve low trim as shown and highest possible high trim with feeder cable loop(s) never below top pipe.

3.4. MOTOR WINCH FOR STAGE ELECTRICS

A. Install winch, motor starter, emergency contactor, limit switches, and controls for electrical connection under this section. Provide required fasteners, auxiliary steel, hardware, and wire and raceway extensions as necessary for a complete installation.

B. Rig winch/arbor for loop drive so that the winch either lifts the arbor (when arbor is heavier than load) or pulls arbor down (when arbor is lighter than load). After test operation, shorten chain if required, so that without slack in chain, turnbuckle retains 5 inches of adjustment before fully closed.

C. Install roller type limit switches in protective boxes for connection under this specification. Locate switches at tee-guide track to prevent excessive batten travel.

D. Load arbor with counterweights for dead load at batten plus 800 lbs.

END OF SECTION
FIRE CURTAIN RIGGING REPLACEMENT

1. GENERAL

1.1. SUMMARY

A. Upgrade of existing fire curtain from manual overbalance system to a new motorized lineshaft fire curtain in the Contra Costa College Knox main theatre. The overall project includes the installation of electrical components including new motor and rate of rise detectors that will be capable of triggering the fire curtain. The existing fire curtain fabric, smoke pockets and tracks are intended to be reused.

B. Project schedule: All onsite work for each phase must be completed between the start date and completion date indicated.

PHASE 1: Replacement of existing trim chains with new batten clamps and turnbuckles only for all 21 linesets.
Phase 1 has been completed.

PHASE 2: All Other work, including fire curtain replacement
Start Date: TBD
Project Completion Date: TBD

C. Coordinate electrical work with Electrical Contractor. Electrical work will be provided by Electrical Contractor under a separate agreement.

1.2. DETAILED SCOPE OF WORK

A. General: Provide all labor, materials, tools, equipment, transportation, temporary construction and special or occasional services required to make complete working installation, as shown on the drawings or described under this section. The work includes fabrication, installation, adjusting, and demonstrating specified performance of the rigged fire curtain, perimeter fabric seals.

B. Motor-operated lineshaft fire curtain, including re-use of existing tracks and in the existing smoke pockets, seals, new wire rope, new release system and any required changes to the existing rigging.

C. New fixed curtain of fire-resistant fabric. New release line for the fire curtain, including a device for release triggered by signals from new detectors in the stagehouse.

D. Supporting brackets, clips, drilled anchors, and miscellaneous iron supports where required for installation of the work.

E. Removal or Relocation of existing equipment where required.
   1. Removal of existing fire curtain arbor and guide track.
   2. Remove and dispose or recycle equipment being replaced.

F. Submittals, Maintenance and Service Manuals.

G. Testing and demonstration of the completed installation.

H. Electrical rough-in and connection of equipment to building electrical system.

I. Furnishing, installation and electrical connection of fire detection sensors to fire curtain release system (Sure Guard 2 device).
   1. This may be provided by sub-contractor or another contractor.

J. Comply with all current and applicable codes and standards except where specific variances have been granted.
   1. Comply with NFPA 80.
K. Drawings to be approved and stamped by a California State licensed Professional Engineer (P.E.)

1.3. RELATED WORK BY OTHERS
A. Furnishing and installation of fire detectors, conduit, raceway, wire and connections of devices are provided under separate Electrical Contractor Work Agreement.

1.4. DEFINITIONS
A. Provide: Furnish and install item(s) in building unless noted otherwise.
B. Furnish: Deliver item(s) to site.
C. Install: Install item(s) in the building regardless of who supplies item(s).
   1. If no Architect is engaged for the project then the term "Architect" as used in this document represents and refers to the project manager.

1.5. SUBMITTALS
A. Submit shop drawings and related documents for review in ample time for completion of the Work of the Contract. Prior to fabrication or delivery of equipment or materials to the site, receive submittals back from Architect stamped "Reviewed - resubmission not required".
B. Include with each submittal a cover letter with a list of the items and data under submission. Contractor agrees that submittals processed by the Architect are not change orders and that the purposes of the submissions are to demonstrate the Contractor's understanding of the design by describing in detail equipment and installation methods.
C. Submit copies of materials list, specifications, catalog cuts, data sheets, and drawings to scale of how items are to be fabricated and how they are to be connected. Drawings based solely on the construction documents which do not show fabrication information will be rejected summarily.
D. Submission type and quantity:
   1. Lists and data sheets: Submit electronically in PDF format or not less than four hard copy sets.
   2. Drawings: Each set of drawings shall include a full scale PDF drawings if submitted electronic format or one full-size reproducible and four sets of black line drawings for each submittal. Show scale details, sizes, dimensions, performance characteristics, wiring diagrams, controls, and all other pertinent details.
      a. Drawings shall show all major components in plan and section views and detail views as necessary to illustrate the complete system installation.
   3. Manufactured Items: Submit four copies of manufacturer's catalog cuts of data sheets for each submission showing illustrations of the item to be furnished.
   4. Submit at least the following items:
      a. Complete list of purchased manufactured items, with manufacturer's name and model number, including anchors, rope clips, fasteners, etc. Provide evidence of quality and load capacity for any item involved in the support of loads.
      b. Details of stage fire curtain rigging and emergency operation.
      c. Details of electric motor winches including dimensions, mounting, motor and gearbox catalog and nameplate data, calculations for line speed and load capacity, and electrical diagrams for power and control equipment.
E. Deviations from requirements of Contract Documents: Bring any deviations to the Architect's attention in writing at the time the drawings are submitted for review.
F. Resubmittal: Do not resubmit drawings which have been stamped "Resubmittal not required."

1.6. SUBSTITUTIONS

A. See Districts Supplementary General Conditions
B. Submit proposed substitutions, if any, meeting the requirements below and of the District's Supplementary General Conditions.
C. Manufacturers, trade names, and model numbers are given for the purposes of identification, and are not intended to be exclusive of other items of equal suitability. However, the design is based on components of individual characteristics, in combinations proven in use.
D. Requests for substitutions will be considered if the request to substitute is reflected in a list of materials, catalog cuts, performance data, electrical characteristics submitted to the Architect within the specified time.
E. The following criteria will govern the consideration of requests for substitutions:
   1. The item considered must be on the whole equal to or better than the item specified and have a satisfactory field history at installed locations for at least 6 months of operation after date of acceptance of the installation.
   2. The item must be equally suited to the design as a whole. If modification of the design is necessary to accommodate the item, it may be rejected on this ground alone.
   3. If the item specified is a factory production standard, the Architect may reject proposed substitutions which must be specially modified in order to be equal.
   4. If in the opinion of the Architect either the acceptance or the necessary evaluation of a proposed substitution may delay completion of the Work beyond the Contract Time, he may summarily reject it if sufficient technical data are not received within the specified time.
   5. Materials specified by manufacturer or trade name are based on the manufacturer's ability and experience. In some cases, continued service beyond the warranty period and spare parts are a factor in the choice of a particular supplier. Proposed substitutions must be manufactured by a firm of equal reputation, qualifications and stability to the specified manufacturer.

1.7. QUALITY ASSURANCE

A. Regulatory Requirements
   1. Conform to all current State rules and all local codes and ordinances.
   2. Where these Specifications call for a higher standard than the above-mentioned rules, the Specifications shall govern.
   3. Nothing in these Drawings or Specifications is to be construed to permit work not conforming to Codes.
   4. Contractor's Qualifications: The Contractor for the work of this Section shall:
      a. Have been continuously in the business of fabricating and installing stage rigging for at least five years.
      b. Maintain a shop adequately equipped and staffed for the fabrication and setup of the work of this Section.
      c. Have successfully completed during the past five years five rigging projects of scope and complexity at least equal to this project.
      d. Have in permanent employ or association engineers and other technical staff capable of the layout, detailing and engineering of the work of this section.
      e. Have all licenses and local qualifications required to perform the work of this section in the project location.
      f. Provide proof of qualification as part of bid submission which includes a list of similar projects completed, including names and current phone numbers of references.
      g. Factory authorized service representative within 300 miles of project.
B. The following companies shall be a standard of qualification for installers:
2. Musson Theatrical, 890 Walsh Avenue, Santa Clara, CA 95050, 1-800-843-2837
3. LA Propoint, 10870 La Tuna Canyon, Sun Valley, CA 91352, 818-767-6800, 818-767-3900 (fax),
4. Legend Theatrical, 103 Whispering Pines Dr. #E, Scotts Valley, CA 95066, 888-485-2485
5. Protech Theatrical Services, Inc., 3431 N. Bruce St., North Las Vegas, NV 89030, 702/639-0290
7. Secoa Corporation, 8650 109th Ave North, Champlin, MN 55316-3789, (763) 506-8800

1.8. BUILDING DRAWINGS AND SITE CONDITIONS

A. Layout: General layout shown on the drawings shall be followed except where other work or
existing conditions may conflict.

B. Accuracy:
1. Drawings for the work under this section are diagrammatic
2. Plans and specifications are complementary, what appears in one shall be binding in
both.
3. Contractor shall verify lines, levels, and dimensions shown on the drawings and shall be
responsible for the accuracy of the setting out of work and for its strict conformance with
the existing conditions at the site.

C. Location: If changes in the indicated locations or arrangements for the work under this
section become necessary due to field conditions or relocation of equipment, make such
changes without extra cost to the Owner, provided no extra material is required.

D. Cutting and patching: If cutting and patching become necessary due to irregular or
improperly located or omitted openings, perform such work without extra cost to the Owner.
Do not cut or drill any structural member without prior written approval by the Architect.

1.9. SERVICE AND MAINTENANCE MANUALS:

A. Before completion of the installation, furnish Service and Maintenance instructions, data
sheets for the exact equipment installed, manufacturer's parts lists and part numbers or
other identification established by the original manufacturer, schematic diagrams of motor
units, controls, and other diagrams not included as part of the manufacturer's data sheets.

B. Include Record Drawings in the Service Manuals. Group sections in a logical manner and
separate each group with indexed divider sheets corresponding to a table of contents. Fold
large drawings to 8-1/2-inches x 11-inches for binding.

C. Place all information in heavy-duty 3-ring binders having the name of the project, Owner,
Consultant, Contractor, Rigging Contractor, and date of completion on the spine.

C. Deliver two preliminary copies of the information to the Architect for approval prior to
completion of the manuals. If additions or revisions are required, make them and resubmit a
preliminary manual. After approval in writing by the Architect, deliver four copies to the
Architect.

1.10. WARRANTY

A. See District's Short Form Agreement for Warranty requirements. In addition to meeting the
District's Agreement requirements the following requirements below shall also be met.

B. Guarantee equipment against defective material and workmanship for one year from date of
completed installation (including completion of punch-list work) except where longer periods
are specified.
C. During the guarantee period, furnish emergency service without additional cost. The emergency service includes on-site adjustment, repair, and replacement of parts necessary to return the equipment to satisfactory operating status.

D. Provide the emergency service within 24 hours of notification (unless agreed to in advance by the Owner).

E. When any component fails at any time during the guarantee period, the guarantee period for replaced components and all other components which are inactive because of the failure shall be extended for a period as long as the inactivity or for two months, whichever is longer.

1.11. SYSTEM STARTUP

A. After installation is complete, test the system for conformance to the requirements of the Contract Documents. At the satisfactory completion of the testing program, and after delivery of the preliminary Service Manual to the Architect, notify the Architect in writing that the systems meet the Contract requirements and are complete and ready for final inspection and tests by the Architect.

B. During the inspection, operate all items to demonstrate specified performance, including but not limited to the following operations:
   1. Operate fire curtain in normal and emergency modes and confirm rate of fall.
   2. Perform tests to meet NFPA 80 testing procedures.
   3. Perform any additional testing required by Authorities Having Jurisdiction.

C. Correct deficient work cited on a punch list (if any) prepared during inspection and tests of the complete installation. When the conditions cited on the punch list are corrected, notify the Architect in writing that the work is completed and ready for a second inspection.

D. If the second inspection shows the need for corrective work of such an extent that additional visits to the site by the Architect are required to verify completion of the work, such visits shall be at the expense of the Contractor. The Owner shall pay fees and expenses for such visits and deduct them from any payments due the Contractor. Per diem fee shall be at the Architect’s standard rate plus incurred expenses.

E. Conditions which, if not corrected during the inspection, may require such additional visits shall include, but not be limited to:
   1. Failure of fire curtain to operate as specified.
   2. Any condition that prevents inspection and operation of items in their final locations.

1.12. OWNER’S INSTRUCTIONS

A. Allow a minimum of four hours for demonstration of the systems including operation, safety procedures, review of routine service and adjustments. Demonstration shall be at a time mutually agreed to by Owner and Contractor.

2. - PRODUCTS

2.1. NOMENCLATURE

A. When manufacturer’s trade names or model numbers are given in conjunction with other information about details, performance or installation, the intent is to specify an item in general similar in character and quality to the standard item identified by manufacturer’s designation, but modified to conform in all respects to these documents.

2.2. MANUFACTURERS/STANDARDS

A. Products from the following sources shall serve as a standard of quality.

B. For Rigging Hardware:
   2. H&H specialties
3. Secoa Corp., Champlin, MN.

C. For Guide Tracks and Carriers:
   1. H&H Specialties
   2. Richards-Wilcox Corp. Aurora, IL

D. For Fabric for Fire Curtain and Seals:
   1. Fabric to meet NFPA 80 requirements.
   2. Re-use of existing fabric is intended. If fabric is not usable the following will be substituted (as an alternate):
      b. Thermotex Thermo-Spec TM
      c. Palmer #2146
      d. Or equal

2.3. RIGGING HARDWARE

A. Provide all plates, channels, angles, bolts, nuts, washers, brackets, straps, clews, auxiliary steel and other items attached to and supporting rigging and equipment and required for satisfactory completion of the work, whether shown or not.

B. Remove burrs, rough or sharp corners and edges, rust, scale, oil and other material deleterious to finish. Prime and enamel or lacquer all exposed steel surfaces except galvanized parts, wire rope and bearing surfaces.

C. Reuse existing smoke pockets, guide tracks and roller guides. Recondition tracks and roller guides to good working order.

D. Wire Rope for Rigging Loads: 7 x 19 aircraft cable, galvanized, preformed steel, 1/4-inch dia. except as shown or specified. Min. breaking strength for 1/4-inch; 7000 lbs.; for 5/16-inch, 9800 lbs.; for 3/8-inch, 14,400 lbs.; MacWhyte or Roebling.

E. Turnbuckles: Galvanized, drop-forged, eye and jaw type of size shown, but not less than 3/8-inch nominal diameter; Crosby or Wilcox-Crittenden.

F. Rope Clips: Galvanized, drop forged clip and U-bolt type; Crosby or Wilcox-Crittenden.

G. Drilled Anchors: In concrete or filled concrete masonry: Expansion bolt in drilled hole same size as bolt in item to be attached. Minimum diameter 3/8-inch unless noted; embedment min. 2-inch and not less than manufacturer's printed recommendation; Kwik-Bolt or ITW Trubolt.

H. Adhesive Anchors: Steel threaded rod of size shown on the drawings, with two-part epoxy adhesive; ITW Ramset/Red Head "Epcon" system or equal by Hilti.

I. Heat-shrink Tubing: (For seizing ends of wire rope and anchoring running end to standing line at terminations) Semi-rigid polyolefin type; Alpha Wire Co. "FIT-295" or equal.

2.4. LINE SHAFT STRAIGHT LIFT FIRE CURTAIN

A. It is intended to re-use the existing fire curtain fabric and associated guides, metal edges and battens. It is intended to use the existing smoke pockets. References in this section referring to the fire curtain fabric, guides, battens and smoke pockets are for reference or should a substitution be necessary.

B. General Description:
   1. Furnish and install a motorized straight lift type, automatically closing fire safety curtain for the proscenium opening indicated on the drawings. Curtain shall lap masonry not less than 18" at each side of the proscenium opening and 24" at the top of the proscenium opening.
   2. The curtain shall be arranged to comply with the "California Building Code (2013),
   3. American National Standard E1.22-2009 and NFPA 80, and meeting NFPA 251 and 255, and other applicable codes and, in general, intercept fire and smoke and prevent
glow from severe fire on the stage from showing on the auditorium side for at least thirty (30) minutes in order to permit safe egress of all people from the auditorium.

4. The curtain shall close by gravity, with the speed of descent controlled by a hydraulic speed regulator. Emergency closing must occur in the time specified in NFPA 80, approximately less than thirty seconds when the fire line is released or fusible links separate.
   a. Rate-of-Travel Limit: Checking device as required for descent in 30 sec. max and 5 sec. min. for last 8 feet of travel.

C. Special Conditions: It is the intention of this specification to provide a fully functioning fire safety curtain system. Actual equipment and components must reflect building conditions and approved construction drawings. All dimensions must be field verified by the Rigging Contractor.

D. Fire Safety Curtain: The fire curtain fabric is intended to be re-used. This information is for reference:
   1. The curtain shall be fabricated from tightly woven fire curtain material non-wire inserted, non-asbestos, non-carcinogenic silica based cloth, 12 x 7 weave of .070” thickness weighing at least 40 ounces per square yard. The curtain shall be listed and approved by the State of California Fire Marshal, the NYC Material and Equipment Acceptance Division, and shall bear a certification label from a nationally recognized listing agency. Label shall be permanently attached to the fire safety curtain and indicate the curtain fabric’s fire resistance rating. The label shall be within 5 ft. of the bottom of the fire safety curtain and in an area so that it can be easily read when the fire safety curtain is in the fully closed position. All strips of fabric shall be in continuous lengths running the full height of the curtain. There shall be no horizontal seams. Each seam shall be sewn with two lines of stitching using fiberglass thread. Top and bottom pockets shall be 6”. The bottom pocket shall be equipped with a 3” yield pad filled with fire curtain material.
      a. Acceptable Fire Curtain Materials:
         1. ZetexPlus by JR Clancy
         2. Therмотex Thermo-Spec TM
         3. Palmer #2146
         4. Or equal

E. Smoke Seal: Provide a new smoke seal consisting of a triple layer of folded fabric fastened above the proscenium with a mounting clamp so it rubs the curtain and seals the top of the opening. The fabric shall be Fire Curtain cloth with a minimum weight of 27 oz. per square yard.

F. Line Shaft Fire Curtain Hoist:
   1. The hoist shall consist of a gearmotor assembly, a drum for each lift line, and interconnecting shafts. The gearmotor assembly shall include a brake release and a hydraulic speed regulator, allowing the curtain to close at a controlled rate of speed when the brake is released by the activation of the fire line. The hoist shall have a minimum 1,400 pound lifting capacity at a rate of 25 feet per minute.
      a. Gearmotor:
         b. The motor, primary brake and gearbox shall be an integrated unit, with the first stage pinion gear and the primary brake both mounted directly on the motor’s armature shaft. No couplings will be permitted between the motor, primary brake and gear reducer.
         c. Motors shall be totally enclosed fan cooled (TEFC). The motor shall have a minimum AGMA service factor of 1.0 for constant operation.
         d. The gear reducer shall be a helical bevel reducer. The gear case shall be cast iron for protection against shock damage. The output shaft(s) shall have double lip oil seals to prevent leaks. The gearing service factor shall be a minimum of 1.0 with a mechanical strength service factor of 1.25.
d. Brakes shall be normally spring applied, direct acting, electrically released, and equipped with a manual release. The brake shall be an AC / DC electro-magnetic unit with a minimum retarding torque equal to 200% of motor full load torque.

3. Drums
a. Each helical drum shall be supported by a sturdy steel base, holding the elements of the drum assembly in proper alignment. Both ends of each drum shall be supported by a self-aligning flange bearing.
b. Alternate drums shall be threaded in opposite directions, to keep the batten from “walking” as its elevation changes.
c. Drums shall be interconnected by shafts with universal joints at each end. Shafts without universal joints are not acceptable.

4. Rotary Limit Switches:
a. Rotary limit switch assemblies shall have two or four independently adjustable switch/cam sets as required. Cams shall be driven by a geared assembly.
b. Switches shall have snap acting contacts.
c. Rotary limit switches shall be driven directly or by roller chains. If roller chains are used, sprockets shall be pinned to prevent slipping and sized for maximum usable rotation of switch cams. The input shaft and drive chain shall be fully guarded.
d. Switches shall be mounted to the hoist base to allow for easy adjustment of the switch settings.

5. Fixed Speed Starter:
a. The traction drive hoist shall be controlled by a UL 580E listed, full voltage, self protected, reversing starter. Enclosure shall be NEMA 12 with hinged, latching cover. The interior of the starter cabinet shall be “touch safe” per IEC 204-1 “Protection against direct contact” rules.
b. The NEMA/IEC, magnetically operated, mechanically and electrically interlocked; reversing starter shall be sized to match the hoist motor horsepower and shall be rated for plugging and jogging. Units shall incorporate UL580E Type Z, non-welding, positive break contactors.
c. Overcurrent protection shall be provided by an IEC Class 10 overload. Short circuit protection shall be provided by a circuit breaker.
d. Starters shall be wired so that operation of the normal end of travel limit switches shall only allow movement away from the limit switch. Operation of an overtravel limit switch shall open the line contactor, and will not allow further movement in either direction. A spring return toggle switch shall be housed inside the starter cabinet to allow override of the overtravel limits for resetting purposes.

6. Control Stations: One control station shall be provided in wall mounted NEMA 12 enclosures. Each shall contain hold to operate (dead man) UP and DOWN pushbuttons, and a mushroom head emergency stop pushbutton. There shall be a key operated on/off switch. Provide 4 keys.

G. Battens: Battens shall be made of 2” I.D., schedule 40 black iron pipe. Fabrication shall be as for standard sets.

H. Fire line System: The manual fire line release system shall consist of a 1/8” diameter wire rope, with six JR Clancy 016-7519 fusible linksor equal, side mounting pulleys JR Clancy 013-176 or equal as required, and two JR Clancy 016-14L fire line release devices or equal, each mounted in JR Clancy 016-14EX enclosures or equal. Devices shall be mounted 4 to 5 feet above the stage floor on each side of the proscenium immediately adjacent to the fire line or as shown on the drawings. All other components such as round weight arbors, arbor guards, floor pulleys, etc. required to form a fully functional fire line release system shall be provided.

1. Lift Cables: The curtain lift cables shall be 1/4” diameter 7 x 19 galvanized utility cable as specified. Cables shall be terminated with corresponding cable thimbles and two forged cable clips or a Nicopress fitting at each end. The curtain end of each cable
shall be attached to the batten using a 3/8" x 6" turnbuckle and pipe clamp. Use J.R. Clancy 020-250, 1/4" diameter cables and fittings.

I. Safety Chains: Supply safety chain as shown on the drawings. 1/4" minimum, proof coil chains (grade 30) shall be located between lift cables except at the ends where chains shall be 12" or less from the end of the batten. Chains shall be attached to the top of the curtain with pipe clamps around the top of the batten and chain shackles. The other end shall be appropriately attached to the building structure.

J. Smoke Pockets: See 2.04A for intended re-use of existing smoke pockets.
   1. For reference if new smoke pockets are required:
      Furnish and install one pair of smoke pockets to extend from the stage floor to a point above the top of the raised curtain or to the height specified in the drawings. Pockets shall consist of a 6" deep "Z" channel formed from 1/4" steel plate and a 1/4" x 18" steel plate which shall be bolted to the channels on 2'-0" centers. Channels shall be anchored to the walls on 4'-0" centers. J.R. Clancy 016-1060 Smoke Pockets.

K. Guide track and carriers. See 2.04A. Existing guide tracks and carriers are intended to be used. Recondition existing track and carriers to good working order.
   1. This paragraph below is for reference.
      a. Carriers: Ball-bearing 4-wheel carriers;
         1. H&H #440BS Carrier
         2. Richards-Wilcox #2035-01976 (2 wheel with side guide rollers).
         3. Or equal
      b. Track:
         1. H&H #410S
         2. Richards-Wilcox #2035-00471
         3. Or equal

2.5. ELECTRIC RELEASE DEVICE
A. The fire curtain shall be equipped with an electro-mechanical fire line release mechanism operated by a J.R. Clancy Sure-Guard® II which is activated by normally open or normally closed devices including rate of rise heat detectors, smoke detectors, emergency switches, etc. (furnished and installed by others) or by release of tension in the fire line. A switch shall be mounted in the release mechanism enclosure for testing system operation. Activation of release mechanism shall release tension in the fire line, which, in turn, allows the arbor to rise and the fire curtain to close in the normal manner. The release unit shall incorporate three pulleys to permit its attachment to the fireline at any point and to help prevent accidental release.

B. The release shall contain an integral battery and charger to provide emergency power during power interruptions. The release shall operate from a 120 VAC power source.

C. The electrical fire line release shall be UL Listed.

D. The fire line release system shall be the J.R. Clancy 016-970 Sure-Guard® II or equal.

2.6. FIRE CURTAIN SIGNAGE
   1. Emergency Manual Release Sign: Provide 8" high x 12" wide red tri-laminate phenolic sign engraved with white-showing characters in Helvetica or similar non-serif font. Two signs required. Engravings shall be appropriate for the device supplied and similar to:

   "EMERGENCY FIRE CURTAIN RELEASE" (3/4" high)

   "PULL RING FROM PEG TO LOWER FIRE CURTAIN" (1/2" high).

   2. Mount above manual release stations
   3. Re-set instructions sign. Mount near controls. This can be 8 1/2" by 11" typed paper mounted in protective frame.

2.7. RATE OF RISE DETECTORS
A. Provide rate of rise detectors and all associated electrical work and installation work in connection with the Electric Release Device (SureGuard 2) for a fully functioning system that will release the fire curtain when the rate of rise detectors register appropriate conditions.
   1. Electrical work by Electrical Contractor.

3. EXECUTION

3.1. GENERAL

A. Before beginning installation, verify that shop drawings reflect actual field conditions. Report any deviations between field conditions and shop drawings to the Architect in writing.

3.2. INSTALLATION OF STAGE RIGGING HARDWARE

A. Wire Rope: Attach rope to battens and arbors as shown; use 3 clips or one swaged fitting at each cable end. Place "U" bolts on dead end of cable. Seize cut ends of rope with heavy heat-shrinkable plastic tube or soft iron wire. Hold cut end of rope against standing line with heat-shrink tubing. Cover any rope ends which may catch curtains or scenery. Adjust as necessary to insure quiet operation.

B. Turnbuckles: After adjustment, install safety-wire or lock-nut to prevent accidental change. In lieu of turnbuckles for adjustment, proof-coil chain may be installed if proposed chain and details of attachment are approved by the Architect prior to installation.

3.3. INSTALLATION OF FIRE CURTAIN

A. Attach guide tracks to smoke pockets. Set curtain and guide carriers in smoke pockets, adjust plumb and parallel with the curtain.

B. Provide all electrical work required for installation of
   1. lineshaft motor disconnect switch
   2. lineshaft motor electrical connection
   3. Rate of rise detectors
   4. Electrical release device (SureGuard 2)
   5. Other electrical work as required.

C. Rig curtain to motorized lineshaft drums.

D. Install new release line, electrically-operated release device, ring-and-peg terminations and signs as shown.

E. Adjust check device so that the curtain descends and seals at the floor in thirty seconds with the last 8 feet taking not less than 5 seconds. Trim and level as required for tight seal at floor.

F. Operate the curtain in emergency and non-emergency modes at least ten times each. Just prior to Architect's inspection of completed installation, readjust lateral curtain tension, release line tension and rate of descent.

G. After completion of all other punch list work, make one final adjustment of bottom batten level, lateral tension and rate of descent.

3.4. ACCEPTANCE TESTING

A. Contractor shall test all components to verify compliance with all paragraphs of NFPA 80, 20.8 and will confirm in writing that this testing has been completed prior to scheduling of testing by the Authority Having Jurisdiction.

END OF SECTION
SECTION 26 09 61 –
THEATRICAL SYSTEMS INSTALLATION

1. GENERAL

1.1. SUMMARY
A. This section describes distribution equipment, the work of setting in place, and electrical connections necessary for installation and operation of Theatrical systems in the Knox Performing Arts Center Theatre at Contra Costa College.

1.2. SECTION INCLUDES
A. Installation of all section 11 electrical equipment including materials, labor, and connection for control of Stage Lighting in the theater(s) and related load distribution systems, all complete and operative, including, but not limited to the following principal items:
   1. Stage Lighting Systems
   2. Rigging Winches
B. Installation of all raceway system related to all theatrical systems in Concert Hall and choir room, including conduit wireways, auxiliary gutters, junction boxes, pull boxes, raceway grounding, supports, anchors, and miscellaneous hardware as required and if not existing or specified under another section.
   1. Control and signal receptacle boxes.
   2. Ethernet distribution.
   3. Load outlet boxes.
   5. Electrics batten assemblies.
   7. Load and signal conductors.
   8. Connection of load conductors.
   9. Supports, anchors, braces, and necessary hardware.
C. Test and adjust installed equipment for specified performance.

1.3. RELATED SECTIONS
A. General Requirements Division 1
B. Rigging 11 61 33
C. Fire Curtain 11 61 34

1.4. DEFINITIONS
A. Contractor: Refers to the electrical contractor responsible for the work of this Division.
B. Provide: Install, and connect item(s) in the building as enumerated under this Section.
C. Install: Install and connect (if appropriate) item(s) in the building regardless of who supplies the item(s).
D. Architect: The Architect of record. If there is no Architect then this refers to the Owner.
E. Owner: An official representative of Contra Costa College
F. Consultant: Consultant responsible for design of stage lighting system as described in this section: Landry & Bogan, 733 West Evelyn Ave., Mountain View, CA 94041 (650) 969-5195, fax (650) 969-4965. Contact: Kent Conrad

1.5. GENERAL REQUIREMENTS
A. Electrical equipment and materials shall bear a UL label.

1.6. QUALITY ASSURANCE
A. Regulatory Requirements
1. Conform to all current State rules and all local codes and ordinances, including but not necessarily limited to the following:
   a. ANSI (American National Standards Institute).
   b. IEEE (Inst. of Electrical & Electronic Engineers).
   c. IPCEA (Insulated Power Cable Engineers Association.)
   d. NEC (National Electrical Code), locally adopted edition.
   e. NEMA (Nat'l Electrical Manufacturers Assoc.).
   f. NFPA (National Fire Protection Association).
   g. UL (Underwriters' Laboratories).

B. Where these Specifications call for a higher standard than the above-mentioned rules, the Specifications shall govern. Should there be any direct conflict between the above-mentioned rules and these Specifications, the rules shall govern.

C. Nothing in these Plans or Specifications is to be construed to permit work not conforming to Codes.

1.7. CLOSEOUT SUBMITTALS (AS-BUILTS)
A. Provide project record drawings and specifications as required by other sections of the specifications as outlined in the Operating and Service Manuals. Such drawings shall fully represent installed conditions including true panelboard connections, correct conduit and wire sizing as well as routing of new runs, revised fixture scheduling listing the manufacturer and products actually installed and revised panel schedules.

B. All changes to drawings shall be made by qualified draftspersons to match existing line work and lettering as closely as possible.

1.8. BUILDING DRAWINGS AND SITE CONDITIONS
A. Layout: General layout shown on the drawings shall be followed except where other work may conflict with the drawings.

B. Accuracy:
   1. Plans and specifications are complementary, what appears in one shall be binding in both.
   2. Drawings for the work under this Division are diagrammatic.
   3. Contractor shall verify dimensions shown on the drawings and shall be responsible for the accuracy of the setting out of work and for its strict conformance with the existing conditions at the site.

C. Location: If changes in the indicated locations or arrangements for the work under this section become necessary due to field conditions or relocation of equipment, make such changes without extra cost to the Owner, provided no extra material is required.

D. Cutting and patching: If cutting and patching become necessary due to irregular or improperly located or omitted openings, perform such work without extra cost to the Owner. Do not cut or drill any structural member without prior written approval by the Architect.

1.9. EXISTING CONDITIONS
A. Take care to protect existing work from damage, dirt and paint overspray. Repair and clean any part of the Project damaged or soiled by personnel or operations for whom this contractor is responsible. Replace anything which is not restored to original condition in the opinion of the Architect.

B. Circuit designations and other labels scratched or otherwise damaged during installation must be replaced prior to final inspection.

1.10. WARRANTY
A. See Division 1 Warranty for additional warranty requirements.
B. Guarantee equipment installation against defective material and workmanship for one year from date of completed installation and completion of punch-list work (if any) except where longer periods are specified.

C. During the guarantee period, furnish emergency service without additional cost. The emergency service includes on-site adjustment, repair, and replacement of parts necessary to return the equipment to satisfactory operating status.

D. Provide the emergency service within 24 hours of notification (or a longer period if agreed to in advance by the Owner).

E. When any component fails at any time during the guarantee period, the guarantee period for replaced components and all other components which are inactive because of said failure shall be extended for a period as long as the inactivity or for two months, whichever is longer.

PART 2
2. PRODUCTS
2.1. MANUFACTURERS
   A. For conduit, flexible steel conduit, connectors, couplings, junction boxes, pull boxes, supports, anchors, miscellaneous hardware etc.: Use manufacturers that comply with industry standards.
   B. For wireways and auxiliary gutters: Comply with requirements of industry standards except wireways and gutters shall have hinged covers for full conductor access.
   C. For equipment specified, but without manufacturer listed: Comply with requirements that meet industry standards.
   D. Other equipment manufacturers: As listed under specification paragraphs.
   E. Industry Standards shall be equal to or better than manufacturers used on similar Contra Costa College projects in the past three years.

2.2. CONDUCTORS
   A. In equipment: 600 v. rating unless low voltage wiring isolated from high voltage wiring. Conductors shall be UL listed for use within equipment enclosure and for the intended use.
   B. Low voltage signal and control conductors where 300 v. insulation permitted: Shielded and unshielded multi-conductor signal and control cable, color coded tinned copper conductors, PVC insulated, and PVC outer jacket; Belden, Alpha, or equal.
   C. Power conductors: THHN/THWN as specified elsewhere in Division 26.
   D. Multi-conductor power cable (for Stage and Front-of-House Electrics Battens): Extra-flexible, 12GA, 65/30 stranded copper, rubber-insulated, yarn wrapped, Neoprene jacketed, Type "SO"; Carol Cable, Royal Electric Co., or equal.
   E. All conductors UL listed for application.
   F. Signal and control wiring types and wiring topography are specific to each stage lighting equipment manufacturer. Contractor must obtain specific recommendations from Division 11 manufacturer of stage lighting dimmers & control console.

2.3. WIREWAYS AND AUXILIARY GUTTERS
   A. Quality Assurance: Constructed to UL Standard 870 for Wireways, Auxiliary Gutters and Associated Fittings including lengths, connectors, and fittings.
   B. Construction
      1. Suitable for "lay-in" conductors with hinged covers permanently attached so that removal is not necessary to utilize the lay-in feature.
      2. Slip-in type wireway connectors with self-retaining mounting screws.
3. Screw ends installed towards wireway interior protected by spring nuts or other means to prevent damaging conductor insulation in wireway.

4. Hangers: 2-piece units which hook together to permit preassembly of wireway and hanger bottom plate before hanging on preinstalled upper bracket.

5. Finish: Grey enamel over rust-inhibition primer.

6. Provide Fire Stops where required.


2.4. ETHERNET NETWORK (LAN)

A. General

1. Description: Local area network similar to “Ethernet” type and suitable for connection of various portable control units. All devices on network must be compatible with the Architecture for Control Networks (ACN) protocol.

2. Network trunk: Twisted-pair requirements of IEEE 802.3 wired in star system.

3. Trunk Cables: Category 6, 4-pair 23GA copper, Polyolefin insulated, and PVC jacket. Belden # 7881A or equal.

3. EXECUTION

3.1. EXAMINATION

A. Verification of Conditions: Examine areas and conditions under which material, equipment, and systems are to be erected, installed, and applied. Correct existing conditions detrimental to proper and timely completion of work. Do not proceed until unsatisfactory conditions have been corrected. Start of work will be interpreted as acceptance of existing surfaces and conditions within any particular work area.

3.2. INSTALLATION OF RIGGING AND LIGHTING CONTROL EQUIPMENT (IF APPLICABLE)

A. Provide and install all recessed control back boxes.

B. Install all surface mounted control boxes and raceways (per Division 11). Provide any hardware necessary to install devices as shown on TL sheets.

C. Provide and install all control conduit per drawings.

D. Provide and install all control wiring per manufacturers shop drawings.

E. Termination of control (low voltage) wiring shall be per Division 11. (Ethernet terminations per this section.)

3.3. INSTALLATION AND TESTING OF ETHERNET NETWORK (LAN) (IF APPLICABLE)

A. Install and terminate all Ethernet signal wiring in compliance with industry wiring standards as described in Category 6 as published by IEEE.

B. All installations shall conform to established Ethernet wiring practice and installation shall be performed by contractors qualified to do this type of work.

C. No cable run may be longer than 270'-0" to allow users room to connect remote devices with 30' of ethernet tap.

D. Contractor shall certify network to category 6 specifications utilizing a Fluke DSP LAN test meter or equivalent. Supporting documentation shall be turned over to the consultant upon request.

3.4. REMOVAL AND RE-INSTALLATION OF EXISTING STAGE CONNECTOR STRIPS, STAGE LOAD BOXES, RACEWAYS AND WIRING

A. Uninstall existing stage lighting connector strips and other devices as noted on the drawings.

B. Provide and install all stage load recessed back boxes.

C. Install new wiring as noted in TR drawings and sections 11 61 33 Theatre Rigging and 11 61 34 Fire Curtain.
D. Re-Install all surface and batten mounted stage load boxes and raceways (per Division 11). Provide any hardware necessary to re-install devices as noted on TR sheets.

E. Provide (except as noted in the drawing), install, and terminate all stage load wiring. **Note:** Each stage load circuit requires an individual neutral.

F. Terminate all conduit into gutter, junction box, pull can, receptacle device, or back box. If not shown, terminate raceway into junction box of appropriate size for maximum quantity of conductors possible in conduit based on 40% fill of #10 copper THHN as per NEC.

G. Designate both ends of wire runs with same code matching equipment installation drawings.

H. Wireways and gutters: Support conductors in vertical wireways at 30 ft. intervals using Kellems cable grips or other approved devices. Install fire stops where required for penetrations.

3.5. GRID TERMINAL BOXES

A. Re-use existing grid terminal boxes. Terminate new wire to connector strips as noted in the drawings and documents. Drop cables in new locations as shown. Support cables with Kellems grip at drop points. Secure cable to the grid. Adjust location of drop points of cable in coordination with rigging contractor for correctly operating rigging and cable management system. Provide additional hardware as needed for a complete installation.

3.6. STAGE ELECTRICS BATTENS:

A. Assemble and install batten assemblies on stage rigging pipe battens designated for the assemblies. Coordinate installation with rigging sub-contractor (in another contract).

B. Confirm correct length of multi-conductor with rigging contractor prior to ordering and cutting cable. If replacement of cable or purchase of additional cable is required due to contractor failure to coordinate length with rigging contractor, replacement cable will be provided by contractor at no additional cost to the Owner for materials or labor. Install multi-conductor cables without twist, through Kellems grips at both ends, between grid terminal boxes and cable cradles and terminal boxes on stage electrics battens. Terminate one end only in preparation for rigging under Division 11. After rigging is completed, make final termination at both ends.

3.7. IDENTIFICATION OF LIGHTING LOAD RECEPTACLES

A. All performance lighting load receptacles are required to be designated with appropriate circuit numbers.

B. Confirm that such designations exist and that they conform to the designated receptacle locations shown on the drawings.

C. If any designations are incorrect, notify the Owner.

3.8. GENERAL TESTS

A. At completion of installation, but prior to powering the lighting control systems, conduct tests to determine conformity with applicable codes and with these specifications. Tests shall include, but are not limited to, the following:

B. Insulation Resistance: Perform 500-volt DC tests for one minute on all feeder and branch circuit conductors, including the neutral, and make a typed record of all readings to be included in the maintenance instructions. Repair or replace circuits showing less than 4 megohms resistance to ground. Make tests using Biddle Insulation Resistance Megger, or equal.

C. Circuits Conformity: Test all feeder and branch circuits for continuity. Test all neutrals for improper grounds.

3.9. TESTS OF STAGE LIGHTING CONTROL SYSTEMS

A. Control and signal verification (after stage lighting systems are powered): It is the responsibility of the contractor to verify that all systems functions are operating properly.
B. Contractor shall certify network to category 5 specifications utilizing a Fluke DSP LAN test meter or equivalent. Supporting documentation shall be turned over to the consultant upon request.

C. Verify that all signal and control cables are as per manufacturer’s recommendation and are installed as required for proper function.

D. Circuit Verification (after stage lighting systems are powered):
   1. Panelboard(s): Verify compliance of the typed panel directories with actual field wiring by cycling them on and off.
   2. Stage lighting dimmers: Verify that numbered load receptacle is connected to respective dimmer.

E. After all tests show conformance, notify the Architect/Owner in writing that the installation is complete, satisfactory, and ready for final inspection by the Architect/Owner.

3.10. INSTALLATION OF FIRE CURTAIN MOTOR

A. See TR sheets and specification 116173 for additional information pertaining to the acoustical drapes. See manufacturer’s shop drawings for final wiring.

B. Connect power to motor. Power is required at time of installation of acoustical drapes motors.

C. Provide and install limit switch junction boxes (as required) per rigging contractor.

D. Install limit switches per direction of the rigging contractor (as required).

E. Provide and install control and power conduit.

F. Provide and install all wiring per information supplied by rigging contractor including number of wires, spare wires, size, color and marking of wires.

3.11. INSTALLATION OF 1ST ELECTRIC WINCH AND OTHER WINCHES (SEE ALTERNATES IN RIGGING SPECIFICATION 11 61 33)

A. See TR sheets and specification 116133 for additional information pertaining to the 1st Electric Winch.

B. Connect power to disconnect. Power is required at time of installation of winch.

C. Provide and install disconnect per drawings.

D. Provide and install limit switch junction boxes at top and bottom of T-bar wall per manufacturers drawings.

E. Install limit switches per direction of the rigging contractor.

F. Provide and install control and power conduit.

G. Provide and install all wiring per information supplied by rigging contractor including number of wires, spare wires, size, color and marking of wires.

3.12. INSPECTION AND TESTS BY ARCHITECT/OWNER

A. The Architect will make final inspection and tests and prepare a punch list of corrective or incomplete work, if any, caused by the installation work.

B. When the conditions due to installation work which are cited on the punch list (if any) are corrected, notify the Architect in writing that the work is completed and ready for a second inspection.

C. If the second inspection and tests show the need for corrective work of such an extent that additional visits to the site by the Architect are required to verify completion of the work, such visits shall be at the expense of the Contractor.

D. If test reports and demonstrations are satisfactory, and the Architect, upon inspection, finds the systems generally operable for the uses intended, the Architect may elect to consider the work substantially complete and waive liquidated damages. The Contractor shall
proceed immediately to correct conditions (if any) which do not conform to the Contract Documents.

END OF SECTION
ELECTRICAL WORK SUMMARY

PART 1. GENERAL

1.01. SUMMARY
   A. Provide all electrical related work for stage rigging replacement as specified in Section 11 61 33.
   B. Provide all electrical related work for fire curtain rigging replacement as specified in Section 11 61 34.

1.02. STAGE RIGGING
   A. This section describes systems, equipment, and installation of the stage rigging in the
      Contra Costa College Knox Theatre. The work in this section is for replacement or upgrade
      of existing rigging with new rigging parts as indicated in the Appendix A Rigging Schedule
      and Appendix B Rigging report. Essentially all moving parts are being replaced with new
      units. The work includes supply and installation and testing of the equipment for a complete
      rigging system.
   B. Coordinate electrical work with rigging contractor
   C. See drawings and specifications for Fire Curtain Rigging Replacement Section 11 61 33.
   D. Provide all conduit, wire, electrical boxes, disconnect switches and associated hardware for
      a complete working installation of equipment.
   E. Work includes:
      1. Multi-conductor cables to stage lighting "electrics" battens. 5 total.
         a. Disconnection of existing cables.
         b. Connection of new multi-conductor cables at existing grid terminal box and at
            existing connector strips at battens.
         c. Rigging contractor will provide and rig cables.
      2. Motorized winches for stage lighting "electrics" battens. Possible 3 total (depending on
         alternates taken). See "Alternates" in Section 11 61 33:
         a. Installation of new conduit, wiring, disconnect switches and other associated
            items for new motorized winches for stage rigging counterweight assist "electrics"
            linesets.
         b. Provide power and control wiring.
   F. Obtain any permits required.

1.03. FIRE CURTAIN RIGGING REPLACEMENT
   A. Upgrade of existing fire curtain from manual overbalance system to a new a new motorized
      lineshaft fire curtain in the Contra Costa College Knox main theatre. The overall project
      includes the installation of electrical components including new motor and rate of rise
      detectors that will be capable of triggering the fire curtain. The existing fire curtain fabric,
      smoke pockets and tracks are intended to be reused.
   B. Coordinate electrical work with rigging contractor.
   C. See drawings and specifications for Fire Curtain Rigging Replacement Section 11 61 34.
   D. Provide all conduit, wire, electrical boxes, disconnect switches and associated hardware for
      a complete working installation of equipment.
   E. Work includes:
      1. Line shaft motor: New power and control conduit, wire, disconnect switches and other
         associated electrical work items for a complete working installation of new motorized
         line shaft system provided by rigging contractor.
         a. Provide all engineering, conduit, wire and associated items for a complete
            installation
2. SureGuard electrical fire curtain release station: New power and control conduit, wire and associated electrical work items for a complete installation of SureGuard release station. Provide interconnection to rate of rise indicators and to fire alarm system as required.
   a. Provide all engineering, conduit, wire and associated items for a complete installation.

3. Provide new rate of rise detectors in accordance with NFPA 80 at ceiling of stage at proscenium wall.
   a. Provide all engineering, conduit, wire and associated items for a complete installation.

F. Obtain any permits required.

G. Provide any required testing or demonstration necessary for approval by Authority Having Jurisdiction.

1.04. PROJECT SCHEDULE

A. Project schedule: All onsite work for each phase must be completed between the start date and completion date indicated.

PHASE 1: No Electrical work in Phase 1. Replacement of existing trim chains with new batten clamps & turnbuckles only for 21 linesets.
Start Date: January 2, 2015
Project Completion Date: January 16, 2015 — This work has been completed

PHASE 2: All other work
Start Date: TBD
Project Completion Date: TBD