



WSU SCIENCE HALL
FREIGHT ELEVATOR REPLACEMENT
FWSU PROJECT # 005-337790

MEP SHEET INDEX				
NO.	DESCRIPTION	- 00-00-00	ISSUE 2 01-20-21	ISSUE 1 08-16-20
E-100	BASEMENT OVERALL PLAN	-	X	X
E-101	ENLARGED ELECTRICAL PLANS AND FIXTURE SCHEDULE	-	X	X

APPLICABLE CODES AND REGULATION S:	BUILDING CODE:	MICHIGAN REHABILITATION CODE FOR EXISTING BUILDINGS 2015 (MRCEB)
	ACCESSIBILITY CODE:	ICC ANSIA A117.1 ACCESSIBLE AND USABLE BUILDINGS AND FACILITIES, 2009
	STRUCTURAL CODE:	MICHIGAN BUILDING CODE (MBC), 2015
	ENERGY CODE:	MICHIGAN ENERGY CODE PER MICHIGAN BUILDING CODE (MBC) CHAPTER 11 REFERENCE
	MECHANICAL CODE:	MICHIGAN MECHANICAL CODE, 2015
	PLUMBING CODE:	MICHIGAN PLUMBING CODE, 2015
	ELECTRICAL CODE:	NEPA 70 - NATIONAL ELECTRICAL CODE, 2017 AND 2017 CONSTRUCTION CODE - PART 6 ELECTRICAL CODE RULES

CODE COMPLIANCE NOTES

1. A CONVENIENCE STAIR AND DOOR ARE ADDED FOR LOWER LEVEL ACCESS TO THE EXISTING DOCK AREA, BUT ARE NOT REQUIRED FOR EXITING. THIS ROUTE WILL NOT BE IDENTIFIED AS AN EXIT AND IS ONLY FOR BUILDING STAFF USE.
2. THE SCOPE OF THE PROJECT AND THE LIFT EQUIPMENT SPECIFICS HAVE BEEN SUBMITTED TO THE CITY OF DETROIT FOR REVIEW. PER ELEVATOR 2020 EMAIL, THEY HAVE CONFIRMED THAT THE PROJECT WOULD NOT FALL UNDER THEIR JURISDICTION, BUT THEY WOULD REQUIRE A PERMIT TO BE PULLED FOR THE DECOMMISSIONING AND REMOVAL OF ALL EXISTING ELEVATOR EQUIPMENT AND WOULD REQUIRE AN ELEVATOR INSPECTION.
3. THE EXISTING LIFT HOISTWAY PENETRATES THE ROOF ABOVE AND IS NOT DEFINED AS A SHAFT. PER THE MICHIGAN BUILDING CODE, SECTION 707.03, "AS SUCH, A PERIMETER RATING NOR RATED OPENING PROTECTION IS REQUIRED."

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Detroit, Michigan 48202-3000

002 • Bid	•	•01/20
001 • Bid	•	•09/18
000 • Review	•	•08/10

No.	Description	Date
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Registration Seal

WSU SCIENCE HALL
LIFT REPLACEMENT
DETROIT, MI

In Charge	B. ELDERKIN
Designed	BAE
Drawn By	BAE
Checked	BAE
Approved	-
Sheet Title	Date 01-20

SHEET INDEX AND
PROJECT DATA

Job No. 03409-00 Sheet No. G-00



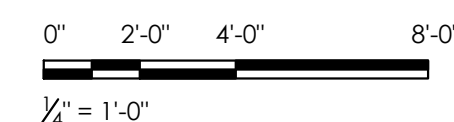
1. DASHED LINES INDICATE DEMOLITION/RELOCATION ITEMS. SOLID LINES INDICATE EXISTING ITEMS TO REMAIN.
2. REMOVE ALL EXISTING MECHANICAL AND ELECTRICAL COMPONENTS THAT ARE NO LONGER USED OR ADDITION WITHIN THE EXISTING HOSTWAY AND IMMEDIATE AREA OF WORK.
3. REFER TO MECH AND ELEC SCHEDULE/DRAWINGS FOR ADDITIONAL DEMOLITION INFORMATION.
4. PORTABLE EQUIPMENT (CARTS, BINS, RACKS, CYLINDERS, ETC.) AND FURNITURE RELOCATIONS ARE BY OTHER
5. ADDITIONAL ITEMS MAY REQUIRE REMOVAL THAT ARE NOT SPECIFICALLY IDENTIFIED IN THESE DRAWINGS.
6. PROJECT SCOPE MAY INCLUDE ITEMS (PUMPS, CONDENS, ELEC BOXES, ETC.) THAT REQUIRE TEMPORARY REMOVAL AND REINSTALLATION OR TEMPORARY/PERMANENT RELOCATION DURING THE COURSE OF THE PROJECT.
7. REFER TO SPECIFICATION SECTION 01 7000 FOR ADDITIONAL INFORMATION

- ▲1 REMOVE EXISTING WIRE MESH GATE AND ENCLOSURE AND CONC HOUSEKEEPING PAD
- ▲2 REMOVE EXISTING HYDRAULIC LIFT EQUIPMENT IN ITS ENTIRETY (PIPPING ELEC EQUIPMENT, ETC.) - ELEC CONDUIT/WIRING BACK TO SOURCE
- ▲3 REMOVE EXIST HYDRAULIC LIFT PISTON/CYLINDER AND COLLAR AND EXISTING PLATFORM
- ▲4 RELOCATE EXIST DRYER
- ▲5 REMOVE EXIST DIFFUSER UNIT AND FAN UNIT AND ALL ASSOCIATED SUPPORTS, DUCTWORK, ELEC CONNECTIONS, ETC.
- ▲6 REMOVE EXIST DUCTWORK AND ASSOCIATED SUPPORTS
- ▲7 REMOVE ALL EXIST ITEMS WITHIN EXIST HOSTWAY THAT ARE NO LONGER NECESSARY FOR NOR SUPPORT THE OPERATION OF THE NEW LIFT (CONDUITS, ELEC BOXES, ETC.)
- ▲8 REMOVE PORTION OF EXIST CONC BLOCK FOUNDATION WALL AS REQUIRED TO INSTALL NEW DOOR
- ▲9 AREA OF EXCAVATION FOR PROPOSED STAIR
- ▲10 REMOVE EXIST BAR GRATE STAIR, LANDING, AND HANDRAIL
- ▲11 REMOVE EXIST METAL LOUVER AND DRYER VENT
- ▲12 REMOVE EXIST PIPE BOLLARD
- ▲13 RELOCATE EXIST WIRE MESH GATE
- ▲14 CUT AND REMOVE/CORE PORTION OF EXISTING FOUNDATION WALL AS REQUIRED TO INSTALL DRYER VENT

1. PRODUCTS NOT SPECIFIED OTHERWISE ARE TO MATCH EXISTING FACILITY STANDARDS, UNO
2. PATCH AND REPAIR EXIST SPRAY APPLIED FIREPROOFING AT STRUCTURAL STEEL WHERE IMPACTED DURING CONSTRUCTION. MAINTAIN REQ FIRE RESISTIVE RATINGS TO SAME LEVEL AS EXISTING.
3. PATCH AND REPAIR WALLS, COLUMN ENCLOSURES AND FLOORS TO ENSURE EVEN SURFACE TO RECEIVE FINISH MATERIAL.
4. PAINT ALL EXISTING AND NEW HAND AND GUARDRAIL AT DOCK AND STAIR

- ① PREPARE EXISTING HOISTWAY PIT TO RECEIVE PROPOSED LIFT ASSEMBLY TO MEET LIFT MANUFACTURERS REQUIREMENTS (ELECTRICITY TO REMAIN - REMOVE EXIST PIPING TO COORD WITH LIFT ASSEMBLY)
- CLEAN, RAMP, AND PAINT EXIST HOISTWAY INTERIOR PERIMETER
- ② (3) 3"x 7" INSULATED STEEL DOORS WITH 10" SQUARE THERMO GLASS VISION PANELS, CAP, REPAIR, AND PAINT EXISTING FRAME. DOORS AT TOP AND BOTTOM OF HOISTWAY TO INCLUDE A MAGNETIC INTERLOCK SO ONLY 1 (1) MAY BE OPENED AT A TIME. WHEN EITHER DOOR IS OPEN THE LIFT WITHIN THE BOTTOM OF THAT PITCH OF DOORS
- ③ CLEAN, PATCH, AND REPAIR EXISTING OPENINGS IN HOISTWAY PERIMETER WHERE NOT NEEDED FOR PROPOSED LIFT OPERATION
- ④ 3"x 7" x 10" INSUL STEEL DOOR W/ 16 GA STEEL FRAME (4" HEAD) - PREP AS REQD FOR HARDWARE/ACCESSORY/ACCESS CONTROL HARDWARE BUT HANGING HARDWARE IS LARGER OR SMALLER - MORTISE ELECTRIC STORM DOOR LOCKSET (SCHLAGE OR EQUIV) - PUSH SIDE CLOSER (LCN OR EQUIV) - DOOR POSITION STOP - ALUM THRESHOLD (NPSR OR EQUIV) - PERIMETER WEATHERSTRIPPING (PEMCO OR EQUIV)
- ⑤ 1-1/4" STEEL HANDRAIL, PAINTED
- ⑥ 4" GALV DUTY WITH DRYER VENT CAP, REPAIR AND PAINT (BASIS OF DESIGN - SEE SFB 4PH)
- ⑦ 3" DIA PVC-U DOWEL PIPING AT 1" PER FOOT TO EXISTING STORM STRUCTURE. 6" SQUARE FLOOR DRAIN IN STAIRWELL LANDING GUARDRAIL TO MATCH EXISTING DIAMETER, CUT AND REMOVE EXIST GUARDRAIL AS REQD TO TIE IN THE NEW, MATCHING EXIST HEIGHTS AND PROFILES, WEED/GROUND SMOOTH, AND REPAINT ENTIRE ASSEMBLY
- ⑧ ONCE EXPOSED BY EXCAVATION, REMOVE ALL COATINGS OR UNAPPLIED MATERIALS FROM EXISTING FOUNDATION WALL, DOWN TO EXISTING CONCRETE/CMU

1. REMOVE EXISTING, WALL MOUNTED COILING DOOR ASSEMBLY AND ALL ASSOCIATED TRACKS, CONTROLS, SWITCHES, ETC.
2. PROVIDE ALLOWANCE TO REWORK AND REPAIR EXISTING EXTERIOR WALL, WHERE COILING DOOR ASSEMBLY WAS REMOVED.
INCLUDING, BUT NOT LIMITED TO: VENEER REPAIR/REPLACEMENT, MORTAR JOINT REPAIR, REPAIR OF HOLES AT REMOVED FASTENERS, REPAIR OR TOUCH UP OF EXISTING STEEL FRAME, ETC.



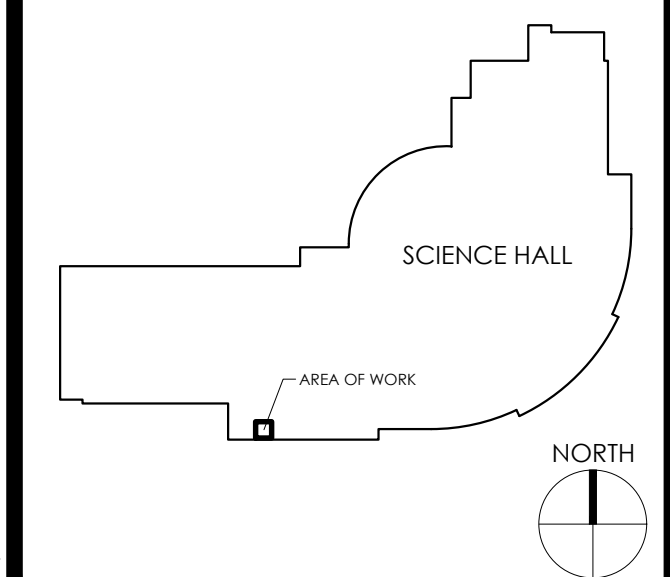
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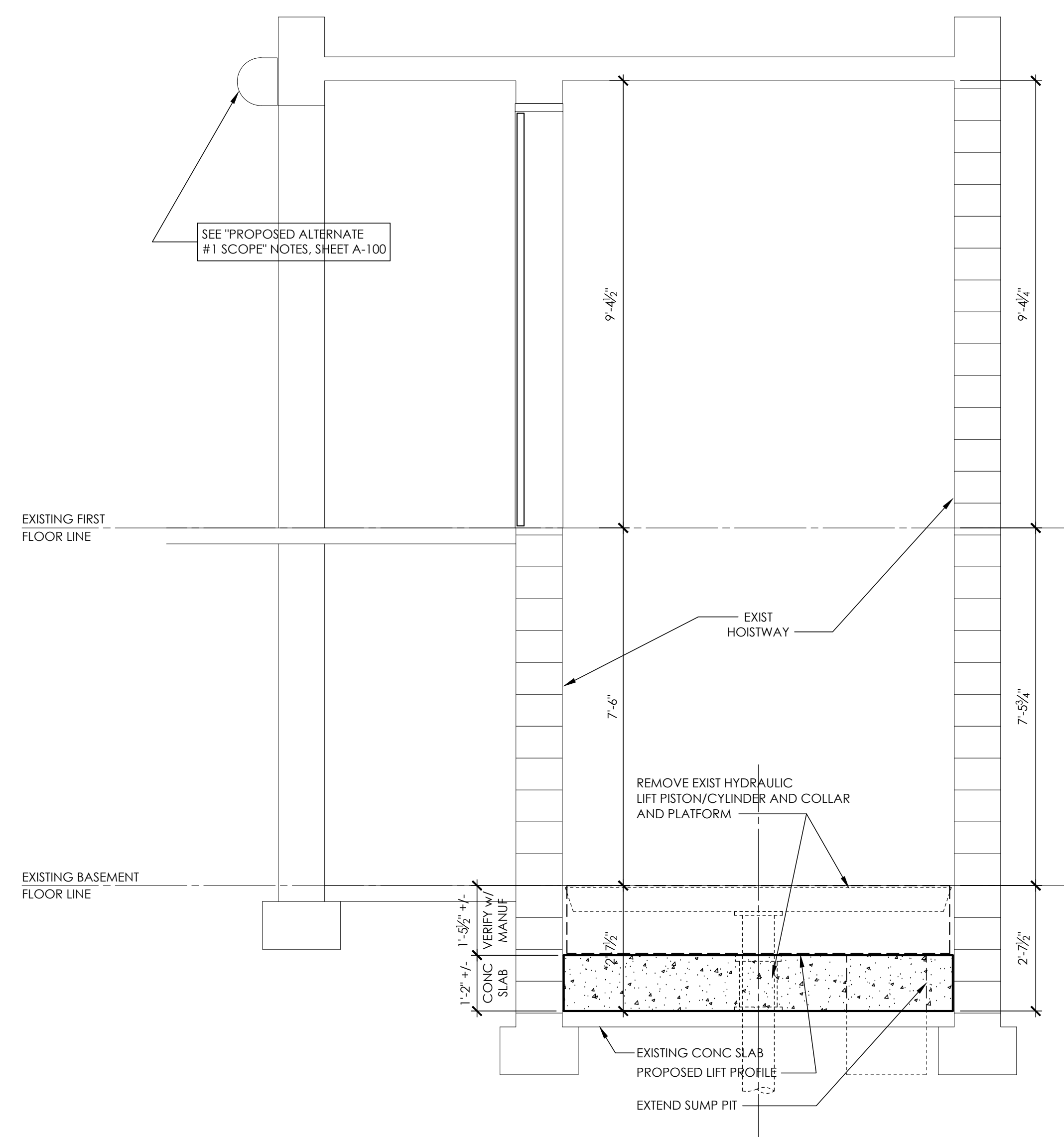


WSU SCIENCE HALL
LIFT REPLACEMENT
DETROIT, MI

In Charge	B ELDERKIN
Designed	BAE
Drawn By	BAE
Checked	BAE

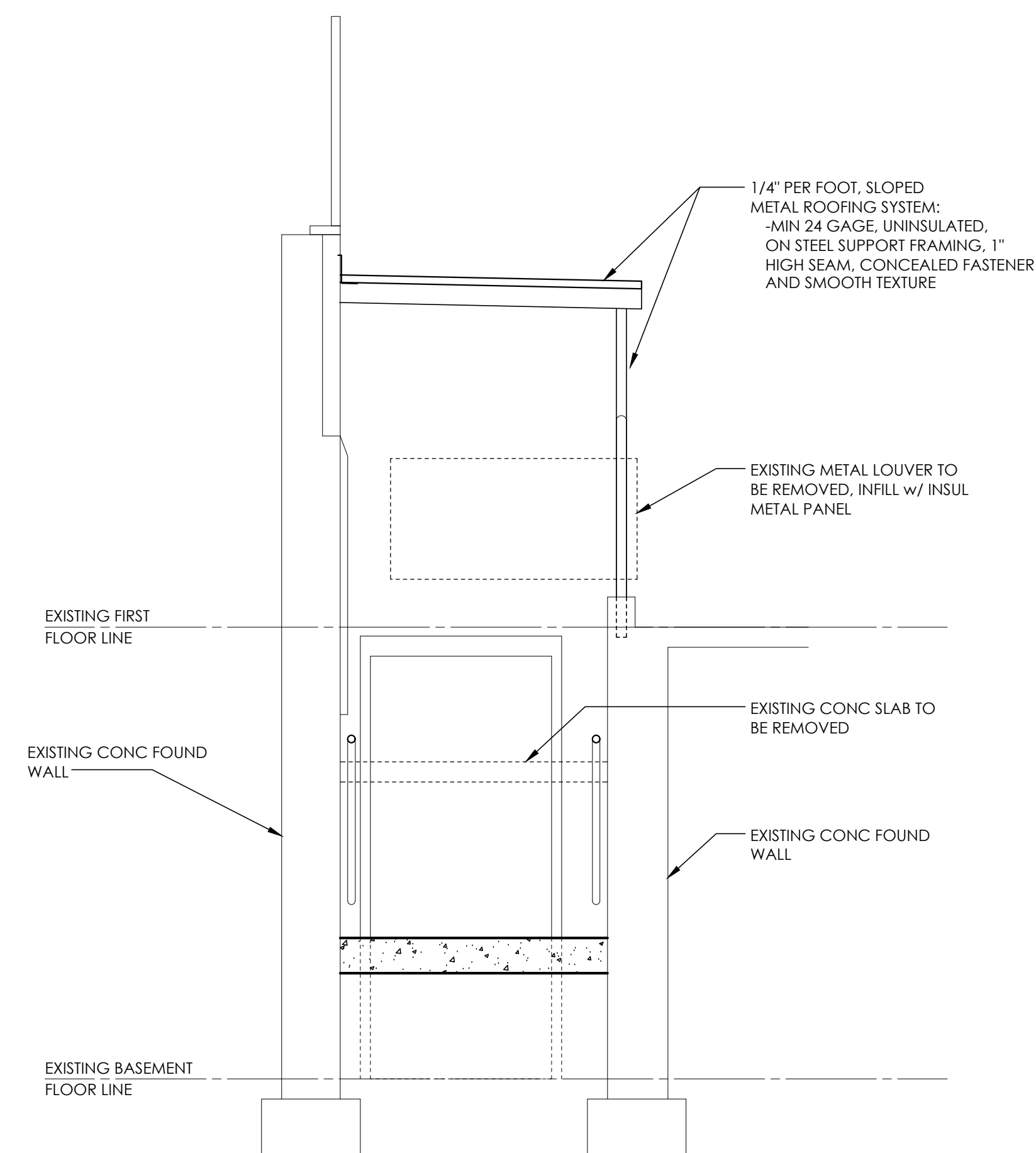
CONSTRUCTION AND DEMOLITION FLOOR PLANS

Job No.	Sheet No.
03409-00	A-100



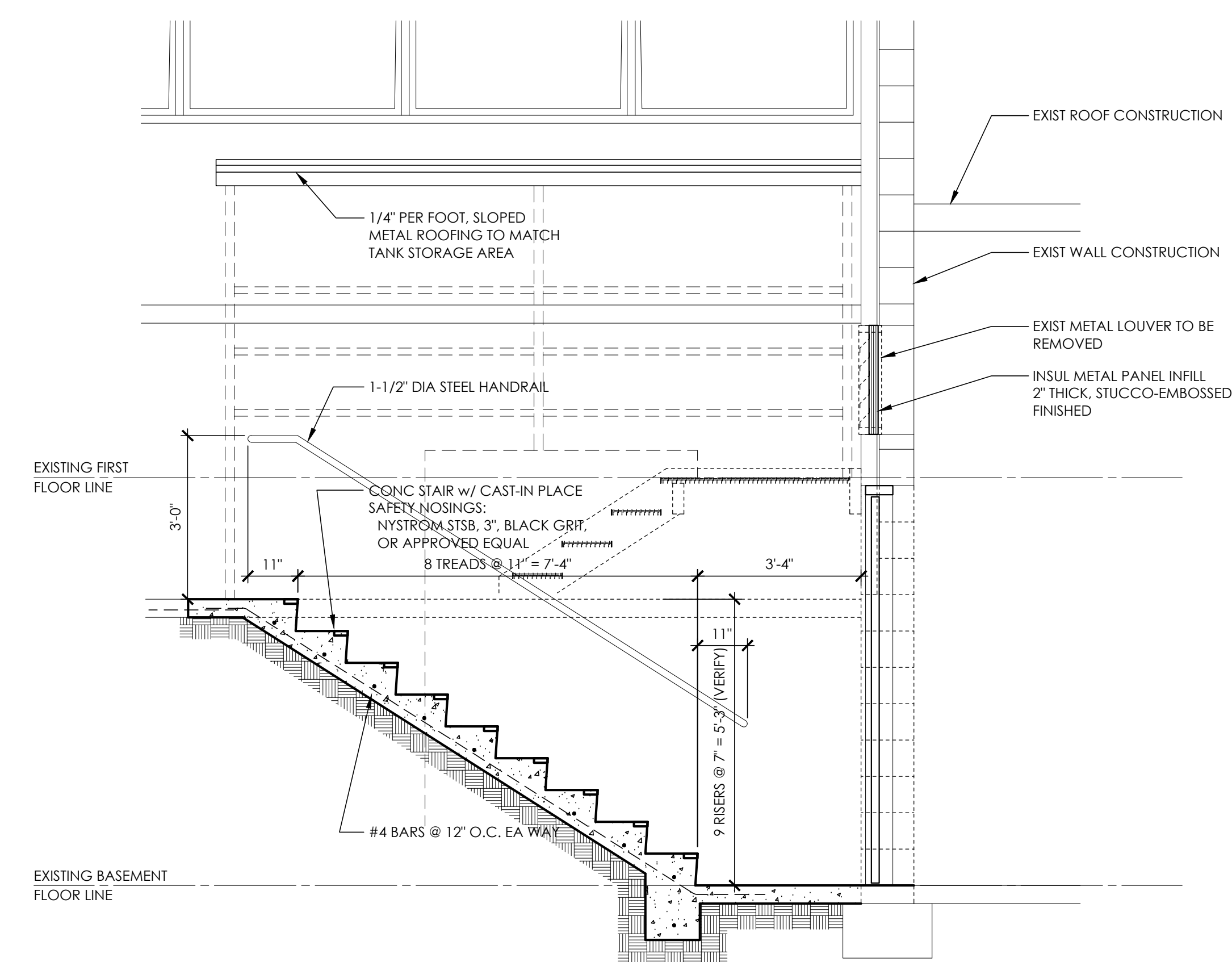
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A-100

STAIR DETAIL
1/2" = 1'-0"



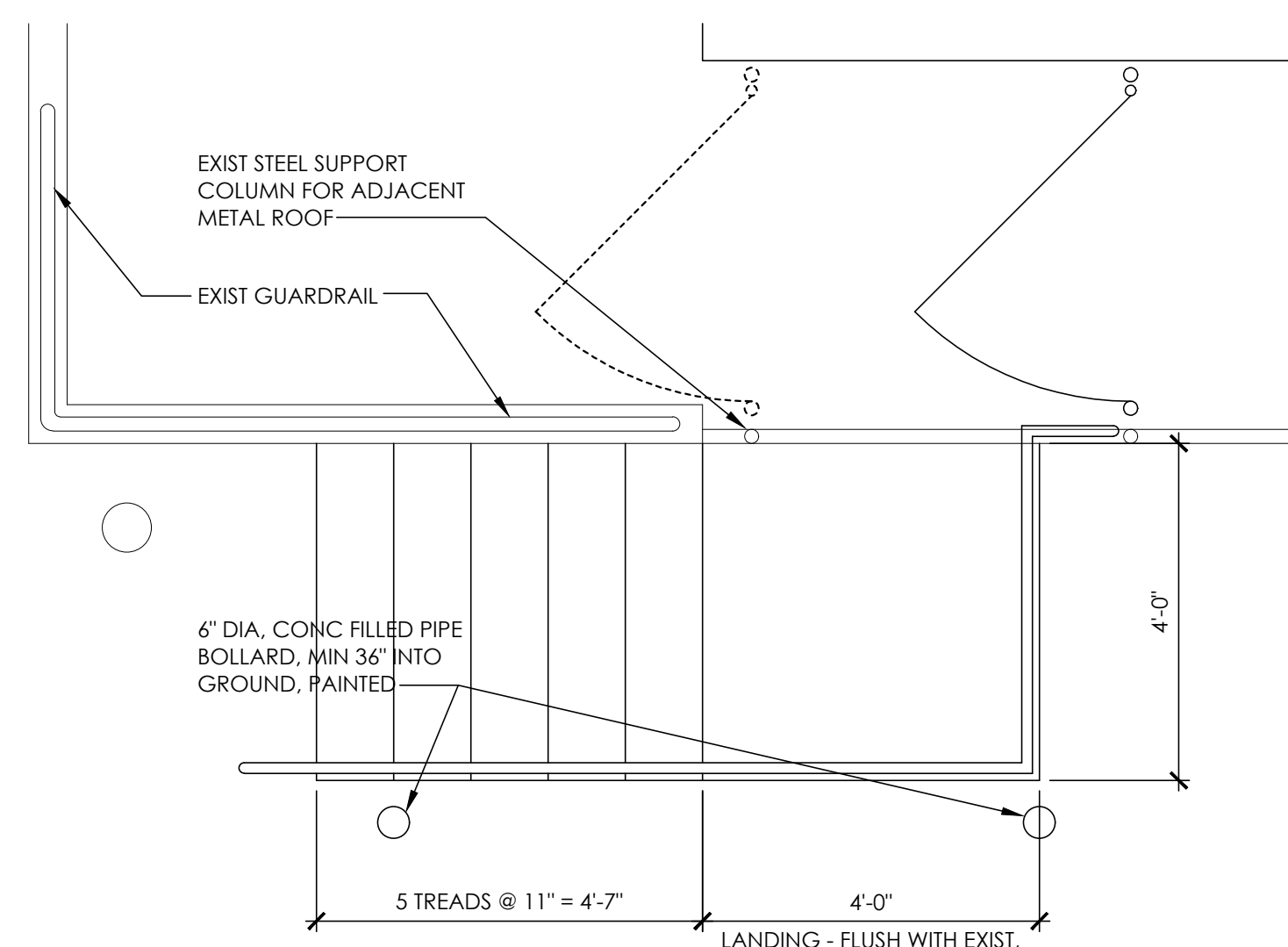
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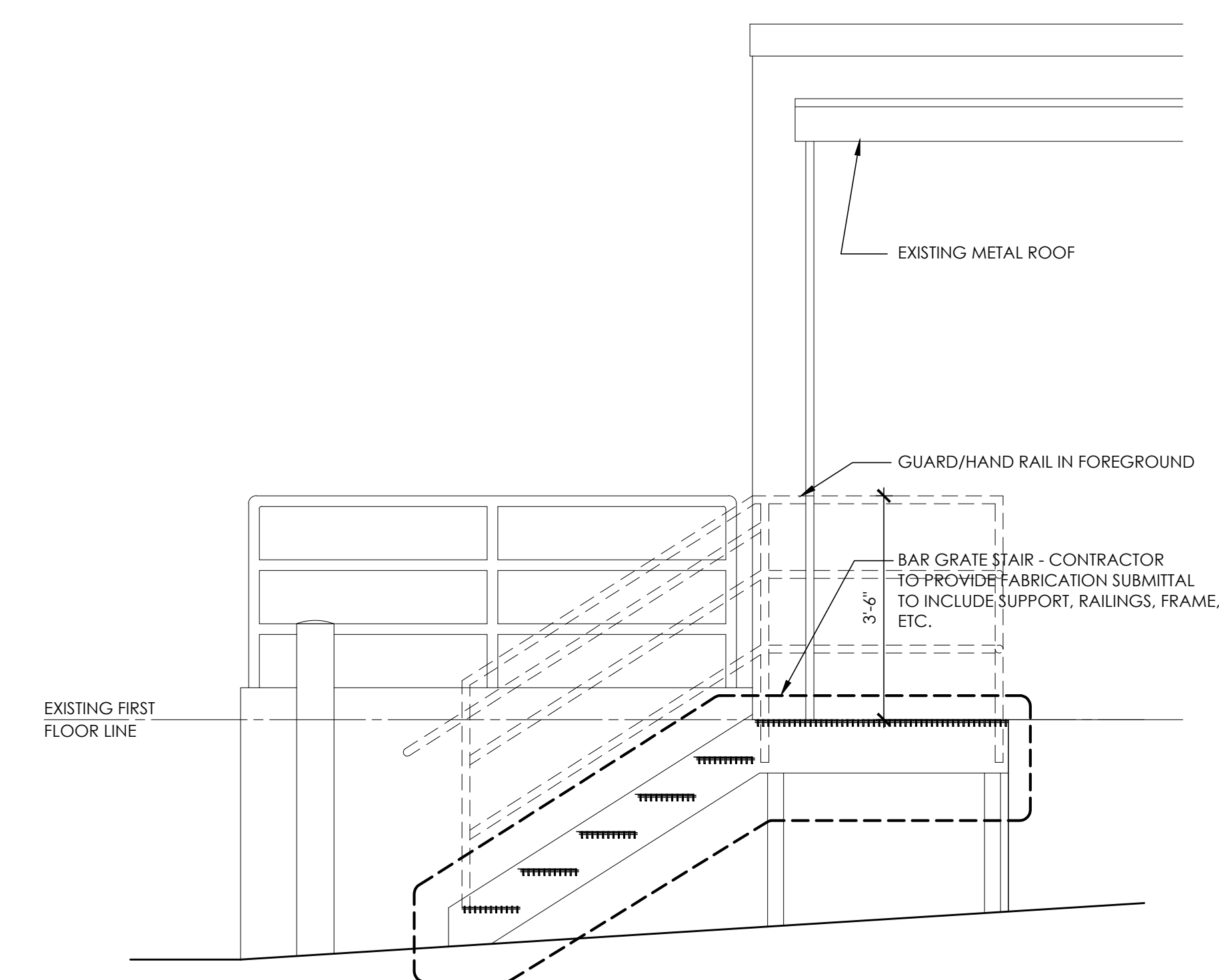
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A-100

STAIR DETAIL
1/2" = 1'-0"



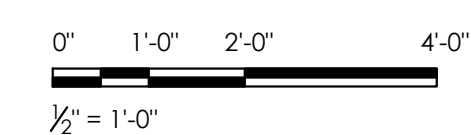
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A-100

STAIR DETAIL
1/2" = 1'-0"



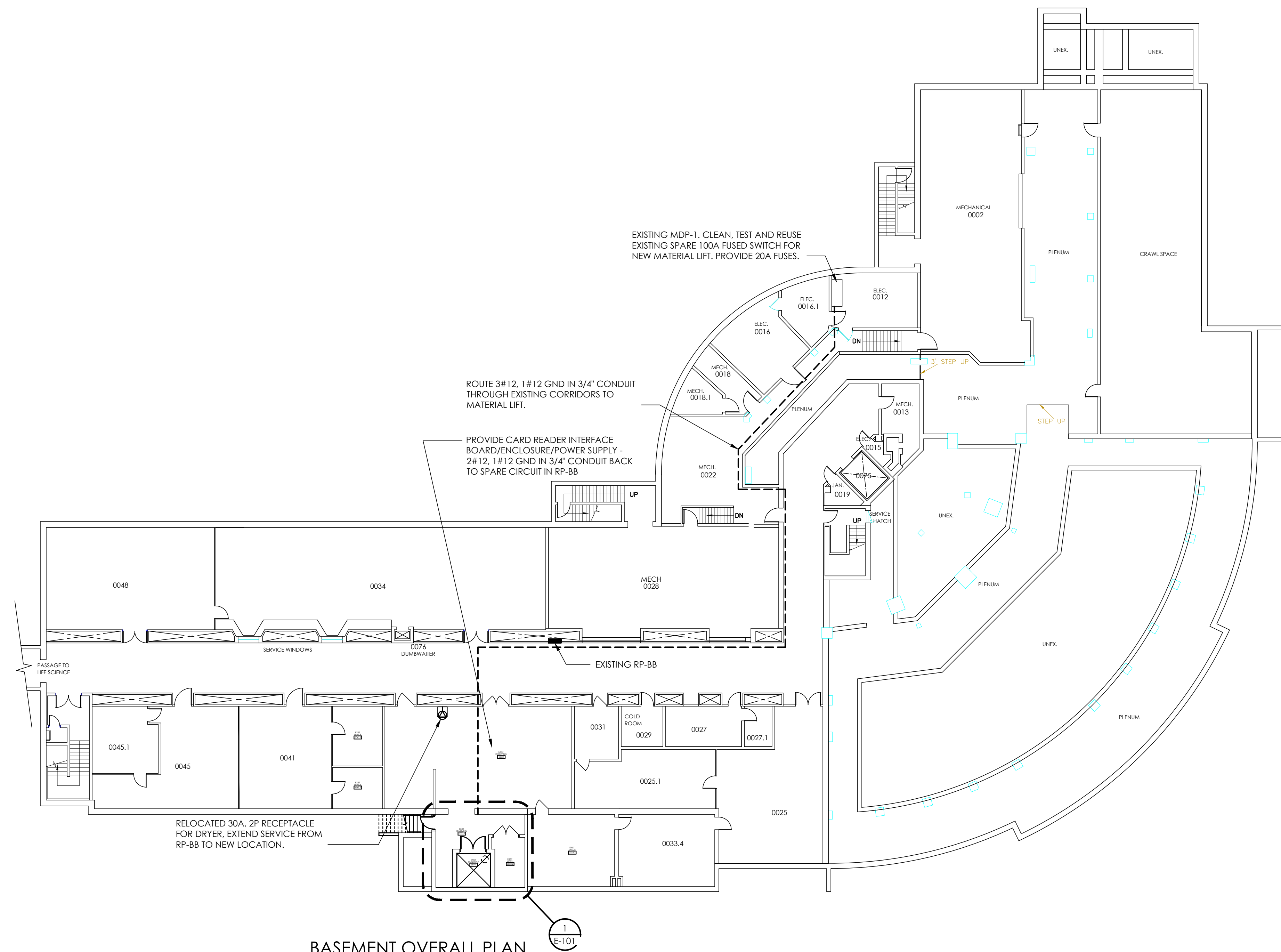
4
A-100

STAIR DETAIL
1/2" = 1'-0"



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- NOTES:
1. FOR ELECTRICAL DEMOLITION WORK SEE SHEET A-100.
 2. CONFIRM FINAL LOCATION OF DRYER OUTLET WITH OWNER BEFORE INSTALLATION
 3. CONFIRM ROUTING OF CIRCUIT FOR MATERIAL LIFT WITH OWNER BEFORE INSTALLATION
 4. SECURITY CAMERAS TO REPORT BACK TO WSU PUBLIC SAFETY OFFICE AND SCIENCE HALL ROOM 0034 (EXACT LOCATION WITHIN ROOM TBD)



BASEMENT OVERALL PLAN
1/16" = 1'-0"

[illegible]

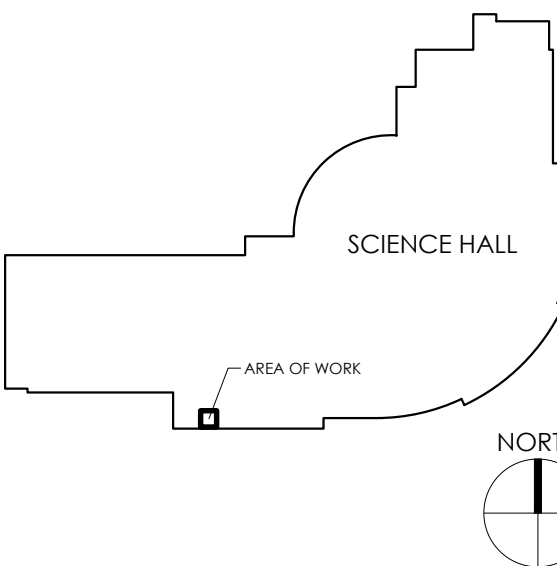
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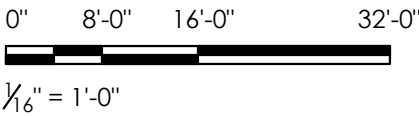


WSU SCIENCE HALL
LIFT REPLACEMENT
DETROIT, MI

In Charge	P. GARLAND		
Designed	PG		
Drawn By	M.R.C.		
Checked	BAE		
Approved -		Date	DATE
Sheet Title			

BASEMENT OVERALL PLAN

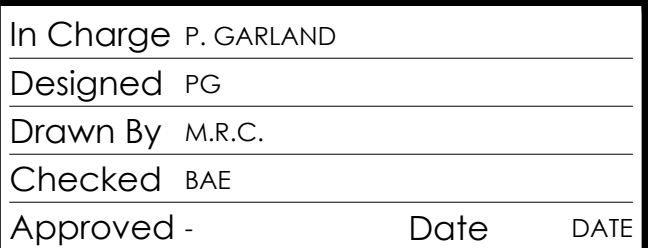
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03409-00	E-10



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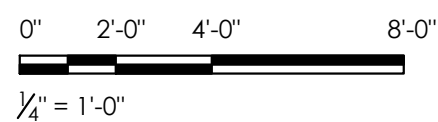


Job No. 03409-00 Sheet No. E-101



- NOTES:
1. FOR ELECTRICAL DEMOLITION WORK SEE SHEET A-100.
 2. PROVIDE 3/4" 1#12 AND 3/4" CONCRETE FROM DISCONNECT TO REINFORCING LIFT CONTROL PANEL.
 3. PROVIDE EXISTING LIGHTS AND RECEPTACLES AS INDICATED, REPLACING EXISTING FOR LIGHTS WITH 2#12, 1#12 GND. RACEWAY MAY BE REUSED.
 4. INSTANTANEOUS PURCHASED CAMERAS AND DECODE/MONITOR. PROVIDE NETWORK CABLE FROM CAMERAS TO MDF LOCATED ON THE FIRST FLOOR IN ROOM 1216
 5. INSTANTANEOUS PURCHASED CARD READER AND DOOR CONTROLS. PROVIDE CONTROL WIRING, NETWORK CABLE TO MDF LOCATED ON THE FIRST FLOOR IN ROOM 1216 AND 120V SERVICE FROM EXISTING RP-BB.
 6. VERY ELEGANT DOOR WITH 120V SERVICE FROM EXISTING RP-BB.
 7. VERY ELEGANT BOX AND CONTROL CABLE OF CARD READER AND CAMERA PER WITH WSU SECURITY. TO ENSURE COMPATIBILITY
 8. SECURITY CAMERAS TO BE INSTALLED BY THE PUBLIC SAFETY OFFICE AND SCIENCE HALL ROOM 0304 (EXACT LOCATION WITHIN ROOM TBD)
 9. ALL WORK TO COMPLY WITH LATEST EDITION OF STANDARDS FOR COMMUNICATIONS INFRASTRUCTURE AVAILABLE FROM WSU AT http://tech.wyome.edu/images/standards_for_communications.pdf

FIXTURE SCHEDULE (BOLD INDICATES BASIS OF DESIGN)								
TYPE	SIZE AND MOUNTING	VOLTAGE, (INPUT WATTAGE), AND EFFICIENCY	LAMPS, LUMENS, AND CRI	BALLAST	LENS, REFLECTOR, HOUSING, ETC.	MANUFACTURER	REMARKS	
INTERIOR LIGHT EMITTING DIODE (LED) FIXTURES - CONTRACTOR FURNISHED AND CONTRACTOR INSTALLED								
L1	4-1/2 INCH DIAMETER SURFACE MOUNTED WALL BRACKET VAPORPROOF	120V-1PH-2W (20 W) MINIMUM FIXTURE EFFICIENCY 90%	4000K WHITE, LIGHT EMITTING DIODES (LED) - 500 LUMENS (NOMINAL) 70+ CRI	277 VAC - 24 VDC ELECTRONIC/ SOLID STATE DRIVER, WITH >90 PF, <12% THD, LINE SIDE FUSE, AND RATED LIFE OF 50,000 HOURS AT 70% OUTPUT DESIGN LIFE	DIE-CAST ALUMINUM VAPOR-TIGHT HOUSING WITH DIE-CAST ALUMINUM GUARD, NATURAL UNPAINTED OR INDUSTRIAL GREY FINISH, HIGH TEMPERATURE SILICONE GASKETS, AND FROSTED HEAT RESISTANT GLASS DIFFUSER	LITHONIA "OLVT" SERIES, RAB LIGHTING "YXBRLED" SERIES, BASELINE "W" SERIES, HUBBELL "MFC" SERIES, OR PRE-APPROVED EQUAL	USED IN ELEVATOR PIT. MOUNTED 4'-0" ABOVE PIT FLOOR. SUITABLE FOR WET LOCATIONS WITH WET LOCATION LABEL. - REFER TO FIXTURE NOTES FOR ADDITIONAL REQUIREMENTS. TESTED TO IESNA LM-79 AND LM-80 STANDARDS.	
L2	16-1/4 INCHES WIDE X 15-3/4 INCHES HIGH 8 INCHES DEEP BUG RATING 1-3-4	120V-1PH-2W (72 W) MINIMUM FIXTURE EFFICIENCY 90%	4000K WHITE/CRI LIGHT EMITTING DIODES (LED) - 6983 LUMENS (NOMINAL) 70+ CRI	480-24 VDC-10000 mA ELECTRONIC/ SOLID STATE DRIVER, WITH 0-10V DIMMING, <30 PF, <20% THD, LINE SIDE GFM FUSE, AND RATED LIFE OF 100,000 HOURS AT L56 AND 25 DEG C DESIGN LIFE	DIE-CAST ALUMINUM HOUSING WITH INTEGRAL HEAT SINK, MARINE GRADE AND COPPER FREE ALUMINUM USED THROUGHOUT. DARK BRONZE THERMOSET POLYESTER POWDER COAT FINISH. PRECISION-MOLDED ACRYLIC LENSES PROVIDING IES TYPE 3 MEDIUM DISTRIBUTION. MODULAR DESIGN WITH REPLACEABLE LIGHT ENGINES. TOOLLESS ENTRY, SURGE PROTECTION DEVICE. COMPLETELY SEALED AGAINST MOISTURE AND ENVIRONMENTAL CONTAMINANTS. PROVIDE WITH INTEGRAL MOTION/AMBIENT SENSOR.	LITHONIA "TWH" SERIES, OR PRE-APPROVED EQUAL	REFER TO FIXTURE NOTES FOR ADDITIONAL REQUIREMENTS. TESTED TO IESNA LM-79 AND LM-80 STANDARDS. DESIGN LIGHTS CONSORTIUM (DLC) CERTIFIED. DIMMING RANGE 1% TO 100%.	





SPECIFICATION MANUAL

**WAYNE STATE UNIVERSITY
Detroit, Michigan
Lift Replacement**

Job No. 03409-00.000

Issue 002 – Bid

January 20, 2021

**ALBERT KAHN ASSOCIATES, INC.
THE FISHER BUILDING
3011 W. GRAND BOULEVARD, SUITE 1800
DETROIT, MICHIGAN 48202-3000**

SECTION 00 0110

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END OF SECTION

SECTION 00 7300 - SUPPLEMENTARY CONDITIONS

PART 1 GENERAL

1.01 OWNER'S OPTIONS

- A. Reference in the Specifications to any article, device, product, material, fixture, form, or type of construction by name, make, or catalog number shall be interpreted as establishing a standard of quality and shall not be construed as limiting competition.
- B. However, unless the agreement contains a statement or statements designating acceptance of an alternate for (1) below, and/or a price adjustment for (2) below, the following provisions stated below shall apply,
 - 1. Where the Specification mentions only one such name, make, type, or style, the Contractor shall employ such subcontractor, fabricator, or process and shall furnish such make, type, or style so specified, regardless of any reference to the phrase "or other approved," or other words to that effect, which may appear in the Specification.
 - 2. Where the Specification mentions more than one name of subcontractor, fabricator, or process, or more than one make, type, or style of article, material, or equipment item, the final selection of the subcontractor, fabricator, or process to be employed, or of the make, type, or style to be furnished, shall rest with the Owner.

1.02 INTENT OF SPECIFICATIONS AND DRAWINGS

- A. The Specification and Drawings are intended to describe the work and to furnish sufficient information to indicate what is necessary for the construction of the work, complete in all details.
- B. The Specifications and Drawings are intended to be complementary, and what is called for by either shall be as binding upon Contractor as if called for by both.
- C. The work shall be complete in every detail, however, should any work or any material be required which is not denoted in the specification or on the drawings either directly or indirectly, but which is nevertheless necessary for proper carrying out of intent thereof, including variations as may be necessary to conform to conditions of actual construction, Contractor agrees the same to be implied and required and shall perform all work and furnish all such material as fully as if they were particularly delineated or described without additional cost to Owner.
- D. Contractor shall not take advantage of any manifestly unintentional error, omission, or inconsistency, should such exist.
- E. Should any such error, omission, or inconsistency appear in the Specifications or in Drawings, Contractor, before proceeding with work, shall bring Architect's attention to same for proper determination, and in no case shall Contractor proceed with the work in uncertainty.
- F. In case of such error, omission or inconsistency, unless there is sufficient evidence reasonably to establish otherwise, the provisions of the agreement will take precedence over the specification and provisions of the specification will take precedence over the drawings, in case of inconsistencies between scales and figures, the figured dimensions on drawings will govern, and large-scale details will take precedence over small-scale details; in each instance, only to the extent necessary to resolve such error, omission or inconsistency.
- G. Large-scale or full-size details, when furnished by Architect to Contractor after award of contract, will be developed from the scale drawings.
- H. Should such details differ from the intent of scale drawings or not be reasonably inferable therefrom and such difference result in additional expense to Contractor, Contractor shall, immediately upon receipt of such details, call Architect's attention to the same, in writing, for proper determination.
- I. No adjustment in contract price in respect thereof will be made to Contractor unless Contractor receives a written order with respect thereto from Architect before starting the work covered by said detail.

- J. With respect to any parts of work for which only a portion is completely drawn or detailed or which are indicated on drawings for any particular area or location, all like work shall conform to the portions so drawn or detailed and shall be deemed to continue throughout like areas or locations and shall include only such variations therefrom approved by Architect as required to conform to conditions of actual construction, unless distinctly shown or noted otherwise.
- K. While work described in the specification may be divided into sections, headings, and subheadings, Contractor shall furnish all labor and materials necessary to provide a complete piece of work as contemplated by the Specifications and Drawings.
- L. Any item called for under any one Specification subdivision must be supplied even though it is not called for again under the subdivision for the particular work.
- M. Regardless of such subdivision by sections, headings, and subheadings as they appear in the Specifications, Contractor shall be responsible for classification and allocation of the performance of work and of furnishing of all labor and material.

1.03 ARCHITECT-ENGINEER'S STATUS

- A. The Contractor will assist the Owner in the general administration of the Contract, acting in any and all of the various capacities assigned to the Architect in the Contract. The Architect and the Architect's representatives shall have access to the work at all times. The Architect shall have the right to reject or condemn all materials furnished and/or installed and/or work performed which, in the Architect's judgment, do not meet the requirements of the Contract.
- B. The administration, inspection, assistance, and actions by the Architect or the Owner's representative, as hereinbefore provided, shall not be construed as undertaking supervisory control of the construction work or of means and methods employed by the Contractor and shall not relieve the Owner or the Contractor from any of their responsibilities or obligations under the Contract, nor shall the Owner or the Contractor request or require the Architect or the Owner's representative to undertake such supervisory control or to administer, to supervise, to inspect, to assist, or to act in any manner so as to relieve the Owner or the Contractor from such responsibilities or obligations.
- C. The fact that the Architect or the Owner's representative has not made early discovery of faulty work or of work performed at variance with the Contract requirements or of work omitted or that the Owner's representative has permitted faulty work to be done or has permitted work to be done which is at variance with the Contract requirements or has permitted omissions in the work shall not bar the Architect or Owner's representative from subsequently rejecting or condemning such faulty work or work done which is at variance with the Contract requirements nor the Owner from insisting that the Contractor correct such work and complete work omitted. Regardless of when such discovery, rejection and/or condemnation may be made and regardless of when the Contractor may be ordered to correct and/or complete such work, the Contractor shall have no claim against the Owner for an increase in the Contract price, nor shall the Contractor subcontractors or any persons directly or indirectly engaged or employed by any of them have any claim against the Architect or Owner for payment or allowance of any kind on account of increased cost, damage, or loss which may be incurred by reason thereof or for correcting faulty work or work which is at variance with the Contract requirements and/or in completing work omitted.
- D. The Contractor shall secure, protect, defend, hold harmless, and indemnify the Owner and the Architect and any of their respective agents, servants, and employees from all claims and liability whatsoever resulting from bodily injury, sickness, or disease (including death resulting at any time therefrom) of any person or persons arising out of the Contract and for damage, loss, destruction of any property, or expense which may arise on account of or as the result of faulty work, or work performed which is at variance with the Contract requirements or work omitted, regardless of whether such damage, loss or expense has occurred prior to, during or subsequent to the discovery, rejection and/or condemnation of faulty work, or of work which is at variance with the Contract requirements or of work omitted.

- E. Whenever in these General Conditions the Contractor has agreed or undertaken to hold harmless the Architect from liability and/or loss, damage, and expense, or it is provided that the Contractor shall have no claim against the Architect, it is intended that the Architect shall have the rights of a third party beneficiary and shall be entitled to the benefit of said undertakings, agreements and provisions, notwithstanding that the Architect is not a signatory to the Contract between the Owner and the Contractor and has not furnished a consideration to the Contractor.

1.04 CONTRACTOR'S SUPERVISION - CLAIMS

- A. The prime Contractor shall keep at the work site, during progress of the work, a competent superintendent and any necessary assistants, all satisfactory to the Architect. The superintendent shall represent the prime Contractor on the site of the work and all directions given to that person shall be as binding as if given to the prime Contractor. On request, all such directions shall be confirmed in writing to the prime Contractor.
- B. If the prime Contractor shall contend that such directions will result in an increase in the cost of the work, damage, or loss, and that the prime Contractor is entitled to payment by the Owner by reason thereof, the prime Contractor shall, within 48 hours of the receipt of such directions, except in an emergency endangering life and property, notify the Architect and Owner, in writing, of any contentions, the amount of such claim with respect thereto, and all details in connection therewith, and shall not proceed upon such directions or with the work affected thereby until receiving, in writing, acknowledgment of the claim by, and instructions from, the Architect or Owner. The prime Contractor shall comply with such instructions, and unless said claim is finally disposed of by said acknowledgment and instructions, said compliance shall be without prejudice to the rights of the Contractor and Owner. In the event of an emergency endangering life or property, the Contractor shall proceed with that work necessary to protect life and property and shall keep accurate and complete records of the costs of such work, which records shall be presented to the Architect as soon as the emergency ceases to exist.
- C. If the prime Contractor shall contend that payment is due from the Owner for increase in the cost of the work, damage or loss, because of any action or omission of others during the performance of the work, the Contractor shall not delay the work on account thereof and shall, within 7 days after the first observance of such occurrence, notify the Architect and Owner, in writing, of any contentions, the amount of the claim with respect thereto, and all details in connection therewith.

1.05 CONTRACTOR'S RESPONSIBILITY

- A. The prime Contractor and its subcontractor's shall be responsible for the work and every part thereof, for the methods, means, and equipment used in performing the Contract, and for all materials, tools, apparatus, and property of every description used in connection therewith.
- B. Except as otherwise provided the prime Contractor assumes all risks, hazards, and conditions in connection with the performance of the Contract including, but without being limited thereto, weather, delays in delivery of material or equipment, embargoes, strikes and/or labor disturbances directed against the prime Contractor or subcontractors.

1.06 INDEMNIFICATION

- A. The Contractor shall secure, protect, defend, hold harmless, and indemnify the Owner and the Architect and any of their respective agents, servants, and employees from all claims and liability whatsoever resulting from bodily injury, sickness, or disease (including death resulting at any time therefrom) of any person or persons arising out of the Contract and for damage, loss, destruction of any property, or expense which may arise on account of or as the result of faulty work, or work performed which is at variance with the Contract requirements or work omitted, regardless of whether such damage, loss or expense has occurred prior to, during or subsequent to the discovery, rejection and/or condemnation of faulty work, or of work which is at variance with Contract requirements or of work omitted.
- B. Whenever in these General Conditions, the Contractor has agreed or undertaken to hold harmless the Architect from liability and/or loss, damage and expense, or it is provided that the Contractor shall have no claim against the Contractor, it is intended that the Architect shall

have the rights of a third party beneficiary and shall be entitled to the benefit of said undertakings, agreements, provisions, notwithstanding that the Architect is not a signatory to the Contract between the Owner and the Contractor and has not furnished a consideration to the Contractor.

- C. Where the Contract, including amendments thereto, provides for decisions, determinations, orders, certifications, directions, or other actions by the Architect and or the Architect's representative, the same shall be final and binding upon the Contractor and the Owner.

1.07 LIENS

- A. The Contractor shall comply with the applicable lien laws of the state in which the Work is being performed. As a condition of any payments whatsoever by the Owner on account of the Contract, or on account of any orders for additions or revisions thereto, the Contractor shall, upon request of the Owner, procure from each and every subcontractor and supplier of material or labor, a waiver of lien or a release of any claim to a lien which they or any of them may have under the lien laws of the state in which the Work is being done, and shall furnish the same to the Owner together with each and every other document, sworn statement or assurance which, in the opinion of the Owner, is necessary or appropriate to establish that the property is free from liens on account of anything which is done by the Contractor, or those acting under the Contractor or subcontractors, in the performance of the Work under the Contract and any and all orders for additions and revisions thereto. Any payments made by the Owner without requiring strict compliance with the terms of this paragraph shall not be construed as a waiver by the Owner of the right to insist upon strict compliance with the terms of this paragraph as a condition of later payments.
- B. Same has been asserted, of any lien or claim arising out of or in connection with the performance or default in performance of the contract, and if the Owner or representatives of the Owner or any property of either or any property installed on the premises, might be or become liable for the discharge or satisfaction of such lien or claim, then the Owner shall have the right to retain out of any payment then due or thereafter to become due, in addition to the amounts otherwise retained under the Contract, an amount sufficient to discharge such lien or satisfy such claim and to reimburse the Owner and/or the representatives of the Owner for all costs and expenses in connection therewith, including cost of bonds and reasonable attorneys' fees, and shall notify the Contractor of such retention. The Owner, with sole discretion, shall have the right to apply any amounts retained to discharge or satisfy such lien or claim and pay all costs and expenses in connection therewith unless, within 20 days after said notice,
 - 1. The Contractor has said lien or claim discharged or satisfied, or
 - 2. Some other procedure, proposed by the Contractor and satisfactory to the Owner, is adopted to effect, within a reasonable period of time, the discharge or satisfaction of said lien or claim.
- C. If the amounts retained are insufficient for the aforesaid purpose, or if any such lien or claim remains undischarged or unsatisfied after all payments have been made to the Contractor, then the Contractor shall reimburse the Owner for all sums in excess of the retained amounts, if any, or for the amounts that the Owner paid to discharge such lien or satisfy such claims, including the costs and expenses and reasonable attorneys' fees in connection therewith.
- D. The Contractor shall include a provision satisfying the requirements hereinbefore specified as part of any and all subcontracts entered into for the Work or any portion thereof.

1.08 MEASUREMENT AND FITTING OF PARTS

- A. The Contractor shall take all necessary field measurements and otherwise verify all dimensions shown on the Drawings, including the Contractor's, subcontractors' and manufacturers' Shop Drawings. Should any error or inconsistency exist, the Contractor shall not proceed with the Work affected thereby until reporting same to the Architect and shall have received from the Architect clarification or correction.
- B. The Contractor shall, without extra charge, make adjustable parts fit to fixed parts. The Contractor shall coordinate all portions of the Work under the Contract prior to fabrication

and/or installation and shall do all required cutting and altering of and fitting to, any portion of the Work to make its several parts fit together and to make possible installation of adjoining portions of the Work and to fit Work already in place.

- C. The Contractor shall not cut or alter the Work of any other Contractor without permission of said other Contractor and concurrence therein by the Owner's Field Representative.

1.09 TEMPORARY STAIRS, RUNWAYS, AND LADDERS

- A. The General Contractor shall provide and maintain temporary stairs, main ladders, and runways for access to all areas for the use of all authorized project personnel.
- B. The Contractor shall provide additional runways and ladders as may be required for the execution of own Work.
- C. All such apparatus, equipment and construction shall meet all requirements for safety and all provisions of laws and ordinances applicable thereto.
- D. Permanent stairs shall be erected as soon as possible, and the General Contractor shall provide same with temporary protective treads, hand rails, and shaft protection.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

SECTION 01 3000 - ADMINISTRATIVE REQUIREMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. General administrative requirements.
- B. Electronic document submittal service.
- C. Preconstruction meeting.
- D. Site mobilization meeting.
- E. Progress meetings.
- F. Submittals for review, information, and project closeout.
- G. Number of copies of submittals.
- H. Requests for Interpretation (RFI) procedures.
- I. Submittal procedures.

1.02 RELATED REQUIREMENTS

- A. Section 00 7300 - Supplementary Conditions: Duties of the Construction Manager.
- B. Section 01 6000 - Product Requirements: General product requirements.
- C. Section 01 7000 - Execution Requirements - Alteration Projects: Additional coordination requirements.
- D. Section 01 7800 - Closeout Submittals: Project record documents; operation and maintenance data; warranties and bonds.

1.03 GENERAL ADMINISTRATIVE REQUIREMENTS

- A. Comply with requirements of Section 01 7000 - Execution Requirements - Alteration Projects for coordination of execution of administrative tasks with timing of construction activities.
- B. Make the following types of submittals to Architect:
 - 1. Requests for Interpretation (RFI).
 - 2. Requests for substitution.
 - 3. Shop drawings, product data, and samples.
 - 4. Test and inspection reports.
 - 5. Design data.
 - 6. Manufacturer's instructions and field reports.
 - 7. Applications for payment and change order requests.
 - 8. Progress schedules.
 - 9. Coordination drawings.
 - 10. Correction Punch List and Final Correction Punch List for Substantial Completion.
 - 11. Closeout submittals.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 ELECTRONIC DOCUMENT SUBMITTAL SERVICE

- A. All documents transmitted for purposes of administration of the contract are to be in electronic (PDF, MS Word, or MS Excel) format, as appropriate to the document, and transmitted via an Internet-based submittal service that receives, logs and stores documents, provides electronic stamping and signatures, and notifies addressees via email.
 - 1. Besides submittals for review, information, and closeout, this procedure applies to Requests for Interpretation (RFIs), progress documentation, contract modification documents (e.g. supplementary instructions, change proposals, change orders), applications for payment, field reports and meeting minutes, Contractor's correction punchlist, and any other document any participant wishes to make part of the project record.

2. Contractor and Architect are required to use this service.
 3. It is Contractor's responsibility to submit documents in allowable format.
 4. Subcontractors, suppliers, and Architect's consultants will be permitted to use the service at no extra charge.
 5. Users of the service need an email address, internet access, and PDF review software that includes ability to mark up and apply electronic stamps (such as Adobe Acrobat, www.adobe.com, or Bluebeam PDF Revu, www.bluebeam.com), unless such software capability is provided by the service provider.
 6. Paper document transmittals will not be reviewed; emailed electronic documents will not be reviewed.
 7. All other specified submittal and document transmission procedures apply, except that electronic document requirements do not apply to samples or color selection charts.
- B. Submittal Service: The selected service is:
1. Newforma ConstructEx: www.newforma.com/products/constructex/#sle.
- C. Training: One, one-hour, web-based training session will be arranged for all participants, with representatives of Architect and Contractor participating; further training is the responsibility of the user of the service.
- D. Project Closeout: Architect will determine when to terminate the service for the project and is responsible for obtaining archive copies of files for Owner.

3.02 PRECONSTRUCTION MEETING

- A. Owner will schedule a meeting after Notice of Award.
- B. Attendance Required:
1. Owner.
 2. Architect.
 3. Contractor.
- C. Agenda:
1. Execution of Owner-Contractor Agreement.
 2. Submission of executed bonds and insurance certificates.
 3. Distribution of Contract Documents.
 4. Submission of list of subcontractors, list of products, schedule of values, and progress schedule.
 5. Designation of personnel representing the parties to Contract, Owner and Architect.
 6. Procedures and processing of field decisions, submittals, substitutions, applications for payments, proposal request, Change Orders, and Contract closeout procedures.
 7. Scheduling.
- D. Record minutes and distribute copies within two days after meeting to participants, with two copies to Architect, Owner, participants, and those affected by decisions made.

3.03 SITE MOBILIZATION MEETING

- A. Schedule meeting at the Project site prior to Contractor occupancy.
- B. Attendance Required:
1. Contractor.
 2. Owner.
 3. Architect.
 4. Contractor's superintendent.
 5. Major subcontractors.
- C. Agenda:
1. Use of premises by Owner and Contractor.
 2. Owner's requirements.
 3. Construction facilities and controls provided by Owner.
 4. Temporary utilities provided by Owner.

5. Survey and building layout.
 6. Security and housekeeping procedures.
 7. Schedules.
 8. Application for payment procedures.
 9. Procedures for testing.
 10. Procedures for maintaining record documents.
 11. Requirements for start-up of equipment.
 12. Inspection and acceptance of equipment put into service during construction period.
- D. Record minutes and distribute copies within two days after meeting to participants, with two copies to Architect, Owner, participants, and those affected by decisions made.

3.04 PROGRESS MEETINGS

- A. Attendance Required:
1. Contractor.
 2. Owner.
 3. Architect.
 4. Contractor's superintendent.
 5. Major subcontractors.
- B. Agenda:
1. Review minutes of previous meetings.
 2. Review of work progress.
 3. Field observations, problems, and decisions.
 4. Identification of problems that impede, or will impede, planned progress.
 5. Review of submittals schedule and status of submittals.
 6. Maintenance of progress schedule.
 7. Corrective measures to regain projected schedules.
 8. Planned progress during succeeding work period.
 9. Maintenance of quality and work standards.
 10. Effect of proposed changes on progress schedule and coordination.
 11. Other business relating to work.
- C. Record minutes and distribute copies within two days after meeting to participants, with two copies to Architect, Owner, participants, and those affected by decisions made.

3.05 REQUESTS FOR INTERPRETATION (RFI)

- A. Definition: A request seeking one of the following:
1. An interpretation, amplification, or clarification of some requirement of Contract Documents arising from inability to determine from them the exact material, process, or system to be installed; or when the elements of construction are required to occupy the same space (interference); or when an item of work is described differently at more than one place in Contract Documents.
 2. A resolution to an issue which has arisen due to field conditions and affects design intent.
- B. Whenever possible, request clarifications at the next appropriate project progress meeting, with response entered into meeting minutes, rendering unnecessary the issuance of a formal RFI.
- C. Preparation: Prepare an RFI immediately upon discovery of a need for interpretation of Contract Documents. Failure to submit a RFI in a timely manner is not a legitimate cause for claiming additional costs or delays in execution of the work.
1. Prepare a separate RFI for each specific item.
 2. Prepare using software provided by the Electronic Document Submittal Service.
 3. Combine RFI and its attachments into a single electronic file. PDF format is preferred.
- D. Reason for the RFI: Prior to initiation of an RFI, carefully study all Contract Documents to confirm that information sufficient for their interpretation is definitely not included.
1. Include in each request Contractor's signature attesting to good faith effort to determine from Contract Documents information requiring interpretation.

2. Unacceptable Uses for RFIs: Do not use RFIs to request the following:
 - a. Approval of submittals (use procedures specified elsewhere in this section).
 - b. Approval of substitutions (see Section - 01 6000 - Product Requirements)
 - c. Changes that entail change in Contract Time and Contract Sum (comply with provisions of the Conditions of the Contract).
 3. Improper RFIs: Requests not prepared in compliance with requirements of this section, and/or missing key information required to render an actionable response. They will be returned without a response, with an explanatory notation.
 4. Frivolous RFIs: Requests regarding information that is clearly indicated on, or reasonably inferable from, Contract Documents, with no additional input required to clarify the question. They will be returned without a response, with an explanatory notation.
- E. Content: Include identifiers necessary for tracking the status of each RFI, and information necessary to provide an actionable response.
1. Official Project name and number, and any additional required identifiers established in Contract Documents.
 2. Owner's, Architect's, and Contractor's names.
 3. Discrete and consecutive RFI number, and descriptive subject/title.
 4. Issue date, and requested reply date.
 5. Reference to particular Contract Document(s) requiring additional information/interpretation. Identify pertinent drawing and detail number and/or specification section number, title, and paragraph(s).
 6. Annotations: Field dimensions and/or description of conditions which have engendered the request.
 7. Contractor's suggested resolution: A written and/or a graphic solution, to scale, is required in cases where clarification of coordination issues is involved, for example; routing, clearances, and/or specific locations of work shown diagrammatically in Contract Documents. If applicable, state the likely impact of the suggested resolution on Contract Time or the Contract Sum.
- F. Attachments: Include sketches, coordination drawings, descriptions, photos, submittals, and other information necessary to substantiate the reason for the request.
- G. RFI Log: Prepare and maintain a tabular log of RFIs for the duration of the project.
1. Indicate current status of every RFI. Update log promptly and on a regular basis.
 2. Note dates of when each request is made, and when a response is received.
 3. Highlight items requiring priority or expedited response.
 4. Highlight items for which a timely response has not been received to date.
- H. Review Time: Architect will respond and return RFIs to Contractor within seven calendar days of receipt. For the purpose of establishing the start of the mandated response period, RFIs received after 12:00 noon will be considered as having been received on the following regular working day.
1. Response period may be shortened or lengthened for specific items, subject to mutual agreement, and recorded in a timely manner in progress meeting minutes.
- I. Responses: Content of answered RFIs will not constitute in any manner a directive or authorization to perform extra work or delay the project. If in Contractor's belief it is likely to lead to a change to Contract Sum or Contract Time, promptly issue a notice to this effect, and follow up with an appropriate Change Order request to Owner.
1. Response may include a request for additional information, in which case the original RFI will be deemed as having been answered, and an amended one is to be issued forthwith. Identify the amended RFI with an R suffix to the original number.
 2. Do not extend applicability of a response to specific item to encompass other similar conditions, unless specifically so noted in the response.
 3. Upon receipt of a response, promptly review and distribute it to all affected parties, and update the RFI Log.

4. Notify Architect within seven calendar days if an additional or corrected response is required by submitting an amended version of the original RFI, identified as specified above.

3.06 SUBMITTALS FOR REVIEW

- A. When the following are specified in individual sections, submit them for review:
 1. Product data.
 2. Shop drawings.
 3. Samples for selection.
 4. Samples for verification.
- B. Submit to Architect for review for the limited purpose of checking for compliance with information given and the design concept expressed in Contract Documents.
- C. Samples will be reviewed for aesthetic, color, or finish selection.
- D. After review, provide copies and distribute in accordance with SUBMITTAL PROCEDURES article below and for record documents purposes described in Section 01 7800 - Closeout Submittals.

3.07 SUBMITTALS FOR INFORMATION

- A. When the following are specified in individual sections, submit them for information:
 1. Design data.
 2. Certificates.
 3. Test reports.
 4. Inspection reports.
 5. Manufacturer's instructions.
 6. Manufacturer's field reports.
 7. Other types indicated.
- B. Submit for Architect's knowledge as contract administrator or for Owner.

3.08 SUBMITTALS FOR PROJECT CLOSEOUT

- A. Submit Correction Punch List for Substantial Completion.
- B. Submit Final Correction Punch List for Substantial Completion.
- C. When the following are specified in individual sections, submit them at project closeout in compliance with requirements of Section 01 7800 - Closeout Submittals:
 1. Project record documents.
 2. Operation and maintenance data.
 3. Warranties.
 4. Bonds.
 5. Other types as indicated.
- D. Submit for Owner's benefit during and after project completion.

3.09 NUMBER OF COPIES OF SUBMITTALS

- A. Electronic Documents: Submit one electronic copy in PDF format; an electronically-marked up file will be returned. Create PDFs at native size and right-side up; illegible files will be rejected.
- B. Samples: Submit the number specified in individual specification sections; one of which will be retained by Architect.
 1. After review, produce duplicates.
 2. Retained samples will not be returned to Contractor unless specifically so stated.

3.10 SUBMITTAL PROCEDURES

- A. General Requirements:
 1. Use a separate transmittal for each item.
 2. Transmit using approved form.
 - a. Use form generated by Electronic Document Submittal Service software.

3. Sequentially identify each item. For revised submittals use original number and a sequential numerical suffix.
 4. Identify: Project; Contractor; subcontractor or supplier; pertinent drawing and detail number; and specification section number and article/paragraph, as appropriate on each copy.
 5. Apply Contractor's stamp, signed or initialed certifying that review, approval, verification of products required, field dimensions, adjacent construction work, and coordination of information is in accordance with the requirements of the work and Contract Documents.
 6. Schedule submittals to expedite the Project, and coordinate submission of related items.
 7. Identify variations from Contract Documents and product or system limitations that may be detrimental to successful performance of the completed work.
 8. Provide space for Contractor and Architect review stamps.
 9. When revised for resubmission, identify all changes made since previous submission.
 10. Distribute reviewed submittals. Instruct parties to promptly report inability to comply with requirements.
 11. Incomplete submittals will not be reviewed, unless they are partial submittals for distinct portion(s) of the work, and have received prior approval for their use.
 12. Submittals not requested will be recognized, and will be returned "Not Reviewed",
- B. Product Data Procedures:
1. Submit only information required by individual specification sections.
 2. Collect required information into a single submittal.
 3. Do not submit (Material) Safety Data Sheets for materials or products.
- C. Shop Drawing Procedures:
1. Prepare accurate, drawn-to-scale, original shop drawing documentation by interpreting Contract Documents and coordinating related work.
 2. Do not reproduce Contract Documents to create shop drawings.
 3. Generic, non-project-specific information submitted as shop drawings do not meet the requirements for shop drawings.
- D. Samples Procedures:
1. Transmit related items together as single package.
 2. Identify each item to allow review for applicability in relation to shop drawings showing installation locations.

3.11 SUBMITTAL REVIEW

- A. Submittals for Review: Architect will review each submittal, and approve, or take other appropriate action.
- B. Submittals for Information: Architect will acknowledge receipt, but will take no other action.
- C. Architect's actions will be reflected by marking each returned submittal using virtual stamp on electronic submittals.

END OF SECTION

SECTION 01 3010 - CONTRACTOR TRANSMITTAL

TO: Albert Kahn Associates, Inc.
The Fisher Building
3011 W. Grand Blvd., Suite 1800
Detroit, Michigan 48202-3000

Attn: G. Janowski

Re: Job No. 03409-00.000
Wayne State University
Detroit, Michigan
Lift Replacement

Date: _____

Submittal Number: _____

Resubmittal Number: _____

Submitter: _____

Transmitter: _____
(Firm submitting to Architect-Engineer)

Description.

Type	Section Number	Contract Name	Drawing Numbers	Manufacturer/ Supplier	Review Code
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____

Comments _____
(For additional submittal descriptions, use reverse side).

Pre-transmittal Examination.

We have examined items in this Submittal and to best of our knowledge, find them in compliance with Contract Documents.

Transmitter: _____ Date: _____

Return of Submittal to Transmitter.

Reviewer Remarks:

_____ copies of submittals are returned herewith.

Information submitted has been reviewed for compliance with Contract Documents. Review and resulting notations do not assume completeness of submittal or suggest supplemental information not requested is waived. Review does not relieve Contractor from satisfactory completion of work in compliance with Contract Documents.

Albert Kahn Associates, Inc.

Reviewer: _____ Date: _____

Review Codes.

Submittals for Review.

R - Reviewed: Work may proceed.

REN – Reviewed Exceptions Noted: Correct and resubmit, work may proceed.

NA - Not Acceptable: Correct and resubmit before proceeding with work.

SNC - Submittal Not Corrected: Previous notations not corrected, returned without review.

SNR - Submittal Not Requested: Returned without review.

Submittals for Information.

I - Information will be recorded, further processing not required.

NA - Not Acceptable: Review comments, correct, and resubmit before proceeding with work.

Copies. _____

[illegible]

03409-00 - ISSUE 002

CONTRACTOR TRANSMITTAL

Controlled document is electronic file on Kahn server. Verify latest version. (c)

SECTION 01 3011 - SUBSTITUTION REQUEST

To: ALBERT KAHN ASSOCIATES, INC.

Date: _____

Albert Kahn Building

3011 W. Grand Blvd., Suite 1800

Detroit, Michigan 48202-3000

Substitution Number: _____

Re: Job No. 03409-00.000

Wayne State University

Detroit, Michigan

Lift Replacement

Specified Product Description.

Section Number	Drawing Numbers	Manufacturer/ Supplier	Make/ Model
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
Comments _____			

Proposed Product Description.

Section Number	Drawing Numbers	Manufacturer/ Supplier	Make/ Model	Review Code
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
Comments _____				

Presubstitution Examination.

We have examined the Product specification requirements and the requirements outlined in Section 01 3000 Administration Requirements, Part 3 Substitution Procedures. We have attached a comparative table of specified product and substitution comparing all aspects of the products, and to best of our knowledge, find them in compliance with Contract Documents.

Transmitter: _____ Date: _____.

Review Codes.

Substitution for Review.

R - Reviewed: Acceptable Product; Work may proceed.

REN – Reviewed Exceptions Noted: Correct and resubmit, work may proceed.

NA - Not Acceptable: Correct and resubmit before proceeding with work.

END OF SECTION

SECTION 01 3013

CAD FILE EXCHANGE REQUEST

Job Name: Job No.: Revision No.: Date: **THE FOLLOWING FILES ARE TO BE SENT TO:**Company Name: Contact Name: Address: Date Required by: Phone: Email: CC:

FILE DESCRIPTION (SHEET NO. & TITLE)	FILE DESCRIPTION (SHEET NO. & TITLE)

DESIRED CAD FILE FORMAT:

Kahn will deliver CAD files in their original format based on the authoring tool used to develop them. If there is a special need of conversions or translations, please describe below:

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- ☐ CD delivered by hand to:
- ☐ Email attachment to:
- ☐ Upload to FTP Site:
- ☐ Other:

Comments:

These CAD files are a work in progress by Kahn for use in the preparation of construction documents (consisting of drawings, specifications, and General and Special Conditions). These files are NOT CONSTRUCTION DOCUMENTS and may not be suitable for purposes other than those intended by Kahn.

Company (identified above signature line below) acknowledges that as a work in progress the files may be updated throughout the design process and are not purported to be complete or accurate for Company's use. Also, electronic data transferred in any manner or translated from the system and format used by Kahn to another system or format is subject to errors that may affect the reliability of the data and the data may be altered, whether inadvertently or otherwise. Accordingly, Kahn makes no warranty, express or implied, as to the accuracy of the information transferred.

Company, by signing this form, releases and agrees to indemnify Kahn from any liability or claim for damages resulting from the use of the model by Company.

Company

Signature

Print Name of Authorized Representative of Company

Title

Date Signed

END OF SECTION

 03409-00 Issue 002

CAD FILE EXCHANGE REQUEST

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SECTION 01 6000 - PRODUCT REQUIREMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. General product requirements.
- B. Re-use of existing products.
- C. Transportation, handling, storage and protection.
- D. Product option requirements.
- E. Maintenance materials, including extra materials, spare parts, tools, and software.

1.02 SUBMITTALS

- A. Refer to Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data Submittals: Submit manufacturer's standard published data. Mark each copy to identify applicable products, models, options, and other data. Supplement manufacturers' standard data to provide information specific to this Project.
- C. Shop Drawing Submittals: Prepared specifically for this Project; indicate utility and electrical characteristics, utility connection requirements, and location of utility outlets for service for functional equipment and appliances.
- D. Sample Submittals: Illustrate functional and aesthetic characteristics of the product, with integral parts and attachment devices. Coordinate sample submittals for interfacing work.
 - 1. For selection from standard finishes, submit samples of the full range of the manufacturer's standard colors, textures, and patterns.
- E. Indicate utility and electrical characteristics, utility connection requirements, and location of utility outlets for service for functional equipment and appliances.

PART 2 PRODUCTS

2.01 EXISTING PRODUCTS

- A. Do not use materials and equipment removed from existing premises unless specifically required or permitted by the Contract Documents.
- B. Unforeseen historic items encountered remain the property of the Owner; notify Owner promptly upon discovery; protect, remove, handle, and store as directed by Owner.
- C. Existing materials and equipment indicated to be removed, but not to be re-used, relocated, reinstalled, delivered to the Owner, or otherwise indicated as to remain the property of the Owner, become the property of the Contractor; remove from site.

2.02 NEW PRODUCTS

- A. Provide new products unless specifically required or permitted by the Contract Documents.

2.03 PRODUCT OPTIONS

- A. Products Specified by Reference Standards or by Description Only: Use any product meeting those standards or description.
- B. Products Specified by Naming One or More Manufacturers: Use a product of one of the manufacturers named and meeting specifications, no options or substitutions allowed.
- C. Products Specified by Naming One or More Manufacturers with a Provision for Substitutions: Submit a request for substitution for any manufacturer not named.

2.04 MAINTENANCE MATERIALS

- A. Furnish extra materials, spare parts, tools, and software of types and in quantities specified in individual specification sections.
- B. Deliver to Project site; obtain receipt prior to final payment.

PART 3 EXECUTION

3.01 TRANSPORTATION AND HANDLING

- A. Package products for shipment in manner to prevent damage; for equipment, package to avoid loss of factory calibration.
- B. If special precautions are required, attach instructions prominently and legibly on outside of packaging.
- C. Coordinate schedule of product delivery to designated prepared areas in order to minimize site storage time and potential damage to stored materials.
- D. Transport and handle products in accordance with manufacturer's instructions.
- E. Transport materials in covered trucks to prevent contamination of product and littering of surrounding areas.
- F. Promptly inspect shipments to ensure that products comply with requirements, quantities are correct, and products are undamaged.
- G. Provide equipment and personnel to handle products by methods to prevent soiling, disfigurement, or damage, and to minimize handling.
- H. Arrange for the return of packing materials, such as wood pallets, where economically feasible.

3.02 STORAGE AND PROTECTION

- A. Designate receiving/storage areas for incoming products so that they are delivered according to installation schedule and placed convenient to work area in order to minimize waste due to excessive materials handling and misapplication.
- B. Store and protect products in accordance with manufacturers' instructions.
- C. Store with seals and labels intact and legible.
- D. Store sensitive products in weather tight, climate controlled, enclosures in an environment favorable to product.
- E. For exterior storage of fabricated products, place on sloped supports above ground.
- F. Protect products from damage or deterioration due to construction operations, weather, precipitation, humidity, temperature, sunlight and ultraviolet light, dirt, dust, and other contaminants.
- G. Comply with manufacturer's warranty conditions, if any.
- H. Cover products subject to deterioration with impervious sheet covering. Provide ventilation to prevent condensation and degradation of products.
- I. Prevent contact with material that may cause corrosion, discoloration, or staining.
- J. Provide equipment and personnel to store products by methods to prevent soiling, disfigurement, or damage.
- K. Arrange storage of products to permit access for inspection. Periodically inspect to verify products are undamaged and are maintained in acceptable condition.
 - 1. Touch-up and repair finish where marred or damaged, leaving surface in good condition at Project completion.

END OF SECTION

SECTION 01 7000 - EXECUTION REQUIREMENTS - ALTERATION PROJECTS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Examination, preparation, and general installation procedures.
- B. Requirements for alterations work, including selective demolition, _____.
- C. Pre-installation meetings.
- D. Cutting and patching.
- E. Surveying for laying out the work.
- F. Cleaning and protection.
- G. Starting of systems and equipment.
- H. Demonstration and instruction of Owner personnel.
- I. Closeout procedures, including Contractor's Correction Punch List, except payment procedures.
- J. General requirements for maintenance service.

1.02 RELATED REQUIREMENTS

- A. Section 01 3000 - Administrative Requirements: Submittals procedures, Electronic document submittal service.
- B. Section 01 7800 - Closeout Submittals: Project record documents, operation and maintenance data, warranties, and bonds.

1.03 REFERENCE STANDARDS

- A. ACI 301 - Specifications for Structural Concrete for Buildings; 2010 with errata 2012.
- B. ASTM C33/C33M - Standard Specification for Concrete Aggregates; 2011a.
- C. NFPA 241 - Standard for Safeguarding Construction, Alteration, and Demolition Operations; 2013.
- D. SMACNA (ASMM) - Architectural Sheet Metal Manual; 2012.
- E. UL (FRD) - Fire Resistance Directory; current edition.

1.04 SYSTEM DESCRIPTION

- A. In general, work of this Section involves demolition of architectural, mechanical, and electrical components within building, and as described in this Section.
- B. Cut and patch existing floors, walls, ceilings, roofs, and incidental structures for mechanical and electrical work.
- C. In finished areas, conceal mechanical and electrical, piping, ductwork, and conduit above suspended ceilings or within furring, unless specifically noted otherwise.
- D. Exclude temporary partitions and enclosures from this Section.
- E. Coordinate work of this section with other demolition activities.
- F. Field survey existing building to become familiar and determine scope of demolition work.
- G. Accompanying drawings of existing building represent conditions at date of drawing, and current conditions cannot be guaranteed. Include costs to make adjustments as current conditions are revealed during execution of work.
- H. Coordinate, monitor, and determine location, size, sequence, and scheduling of demolition and cutting of floors, walls, ceilings, furred spaces, roofs, and mechanical and electrical systems required to complete selective demolition.
- I. Remove debris created by this work and legally dispose of off Owner's property.
- J. Demolition procedures.

1. Submit written outline of proposed procedures to accomplish demolition, describing in detail:
 - a. Methods and equipment to be used for each operation.
 - b. Sequence of operations.
 - c. Access routes.
 - d. Waste disposal.
 2. Procedures shall ensure:
 - a. Coordination with Owner and governmental authorities.
 - b. Safety to life and property from fire during execution of work, in accordance with NFPA 241.
 - c. Protection of property which is to remain undisturbed.
 - d. Coordination with other work in progress.
 - e. Timely termination of utility services.
- K. Hazardous materials.
1. Asbestos, PCB compounds, and other hazardous materials may be present on site.
 2. Owner has employed a Hazardous Material Consultant to conduct an assessment survey and develop an abatement program.
 3. Submit written certification that hazardous materials have been legally disposed of after completion of work.

1.05 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Demolition Plan: Submit demolition plan as specified by OSHA and local authorities.
 1. Indicate extent of demolition, removal sequence, bracing and shoring, and location and construction of barricades and fences. Include design drawings and calculations for bracing and shoring.
 2. Identify demolition firm and submit qualifications.
 3. Include a summary of safety procedures.
 4. Include utility and service disconnection procedures.
- C. Cutting and Patching: Submit written request in advance of cutting or alteration that affects:
 1. Structural integrity of any element of Project.
 2. Integrity of weather exposed or moisture resistant element.
 3. Efficiency, maintenance, or safety of any operational element.
 4. Visual qualities of sight exposed elements.
 5. Work of Owner or separate Contractor.
- D. Project Record Documents: Accurately record actual locations of capped and active utilities.

1.06 QUALITY ASSURANCE

- A. Pre-demolition conference.
 1. Convene with representatives of Owner, Contractor, Architect, and Demolition Contractors.
 2. Review Contract requirements, procedures, coordination, and determine a complete understanding of requirements and responsibilities.
 3. Be prepared to discuss plans to execute work, scheduling, equipment, assignments, and waste disposal.
- B. Qualifications.
 1. For demolition work, employ a firm specializing in type of work required.
 - a. Minimum of 3 years of documented experience.
 2. For field engineering, employ a professional engineer of discipline required for specific service on Project, licensed in the State in which the Project is located.
 3. For design of temporary shoring and bracing, employ a Professional Engineer experienced in design of this type of work and licensed in the State in which the Project is located.

1.07 PROJECT CONDITIONS

- A. Use of explosives is not permitted.
- B. Ventilate enclosed areas to assist cure of materials, to dissipate humidity, and to prevent accumulation of dust, fumes, vapors, or gases.
- C. Dust Control: Execute work by methods to minimize raising dust from construction operations. Provide positive means to prevent air-borne dust from dispersing into atmosphere and over adjacent property.
 - 1. Provide dust-proof enclosures to prevent entry of dust generated outdoors.
 - 2. Provide dust-proof barriers between construction areas and areas continuing to be occupied by Owner.
- D. Noise Control: Provide methods, means, and facilities to minimize noise produced by construction operations.
 - 1. At All Times: Excessively noisy tools and operations will not be tolerated inside building at any time of day; excessively noisy includes jackhammers.
 - 2. Outdoors: Limit conduct of especially noisy exterior work to hours of 8 am to 5 pm
 - 3. Indoors: Limit conduct of especially noisy interior work to hours of 6 pm to 7 am.
- E. Pest and Rodent Control: Provide methods, means, and facilities to prevent pests and insects from damaging work.
 - 1. Pest Control Service: Weekly treatments.
- F. Rodent Control: Provide methods, means, and facilities to prevent rodents from accessing or invading premises.

PART 2 PRODUCTS

2.01 PATCHING MATERIALS

- A. New Materials: As specified in product sections; match existing products and work for patching and extending work.
- B. Type and Quality of Existing Products: Determine by inspecting and testing products where necessary, referring to existing work as a standard.
- C. Product Substitution: For any proposed change in materials, submit request for substitution described in Section 01 6000 - Product Requirements.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that existing site conditions and substrate surfaces are acceptable for subsequent work. Start of work means acceptance of existing conditions.
- B. Verify that existing substrate is capable of structural support or attachment of new work being applied or attached.
- C. Examine and verify specific conditions described in individual specification sections.
- D. Take field measurements before confirming product orders or beginning fabrication, to minimize waste due to over-ordering or misfabrication.
- E. Existence and location of underground and other utilities, and construction indicated as existing are not guaranteed. Before beginning work, investigate and verify existence and location of underground utilities, mechanical systems, and electrical systems and other construction affecting work.
- F. Verify that utility services are available, of correct characteristics, and in correct locations.
- G. Prior to Cutting: Examine existing conditions prior to commencing work, including elements subject to damage or movement during cutting and patching. After uncovering existing work, assess conditions affecting performance of work. Beginning of cutting or patching means acceptance of existing conditions.

3.02 PREPARATION

- A. Clean substrate surfaces prior to applying next material or substance.
- B. Seal cracks or openings of substrate prior to applying next material or substance.
- C. Apply manufacturer required or recommended substrate primer, sealer, or conditioner prior to applying any new material or substance in contact or bond.

3.03 GENERAL INSTALLATION REQUIREMENTS

- A. In addition to compliance with regulatory requirements, conduct construction operations in compliance with NFPA 241, including applicable recommendations in Appendix A.
- B. Install products as specified in individual sections, in accordance with manufacturer's instructions and recommendations, and so as to avoid waste due to necessity for replacement.
- C. Make vertical elements plumb and horizontal elements level, unless otherwise indicated.
- D. Install equipment and fittings plumb and level, neatly aligned with adjacent vertical and horizontal lines, unless otherwise indicated.
- E. Make consistent texture on surfaces, with seamless transitions, unless otherwise indicated.
- F. Make neat transitions between different surfaces, maintaining texture and appearance.
- G. Repair or replace damaged property outside of work area without additional cost to Owner.

3.04 ALTERATIONS

- A. Drawings showing existing construction and utilities are based on casual field observation and existing record documents only.
 - 1. Verify that construction and utility arrangements are as indicated.
 - 2. Report discrepancies to Architect before disturbing existing installation.
 - 3. Beginning of alterations work constitutes acceptance of existing conditions.
- B. Keep areas in which alterations are being conducted separated from other areas that are still occupied.
- C. Maintain weatherproof exterior building enclosure except for interruptions required for replacement or modifications; take care to prevent water and humidity damage.
 - 1. Where openings in exterior enclosure exist, provide construction to make exterior enclosure weatherproof.
 - 2. Insulate existing ducts or pipes that are exposed to outdoor ambient temperatures by alterations work.
- D. Remove existing work as indicated and as required to accomplish new work.
 - 1. Remove rotted wood, corroded metals, and deteriorated masonry and concrete; replace with new construction specified.
 - 2. Remove items indicated on drawings.
 - 3. Relocate items indicated on drawings.
 - 4. Where new surface finishes are to be applied to existing work, perform removals, patch, and prepare existing surfaces as required to receive new finish; remove existing finish if necessary for successful application of new finish.
 - 5. Where new surface finishes are not specified or indicated, patch holes and damaged surfaces to match adjacent finished surfaces as closely as possible.
 - 6. Ownership of removed items.
 - a. Before Contractor is allowed access into area of each demolition stage, certain materials will be removed by Owner, including hardware, fixtures, and portable equipment.
 - b. Certain items are designated to be carefully removed for reuse in other work at this site, remove and store as directed by Owner.

- c. Certain items are designated to be carefully removed and turned over to Owner. Before removal or demolition obtain a list of materials and items to remain Owner's property and instructions for disposition.
 - d. Title to materials, equipment, and components not otherwise designated in Contract Documents, within work area, is vested in Demolition Contractor.
- E. Services (Including but not limited to HVAC, Plumbing, Fire Protection, Electrical, and Telecommunications): Remove, relocate, and extend existing systems to accommodate new construction.
 - 1. Maintain existing active systems that are to remain in operation; maintain access to equipment and operational components; if necessary, modify installation to allow access or provide access panel.
 - 2. Where existing systems or equipment are not active and Contract Documents require reactivation, put back into operational condition; repair supply, distribution, and equipment as required.
 - 3. Where existing active systems serve occupied facilities but are to be replaced with new services, maintain existing systems in service until new systems are complete and ready for service.
 - a. Disable existing systems only to make switchovers and connections; minimize duration of outages.
 - b. See Section 01 1000 for other limitations on outages and required notifications.
 - c. Provide temporary connections as required to maintain existing systems in service.
 - 4. Verify that abandoned services serve only abandoned facilities.
 - 5. Remove abandoned pipe, ducts, conduits, and equipment, including those above accessible ceilings; remove back to source of supply where possible, otherwise cap stub and tag with identification; patch holes left by removal using materials specified for new construction.
- F. Protect existing work to remain.
 - 1. Prevent movement of structure; provide shoring and bracing if necessary.
 - 2. Perform cutting to accomplish removals neatly and as specified for cutting new work.
 - 3. Repair adjacent construction and finishes damaged during removal work.
- G. Adapt existing work to fit new work: Make as neat and smooth transition as possible.
 - 1. When existing finished surfaces are cut so that a smooth transition with new work is not possible, terminate existing surface along a straight line at a natural line of division and make recommendation to Architect.
 - 2. Where removal of partitions or walls results in adjacent spaces becoming one, rework floors, walls, and ceilings to a smooth plane without breaks, steps, or bulkheads.
 - 3. Where a change of plane of 1/4 inch (6 mm) or more occurs in existing work, submit recommendation for providing a smooth transition for Architect review and request instructions.
 - 4. Trim existing wood doors as necessary to clear new floor finish. Refinish trim as required.
- H. Patching: Where existing surface is not indicated to be refinished, patch to match surface finish that existed prior to cutting. Where surface is indicated to be refinished, patch so that substrate is ready for new finish.
- I. Preparation for structural steel.
 - 1. Cut and remove roofing, roof deck, walls, metal siding, concrete, masonry, floors, and similar construction.
 - 2. Include openings in existing construction required to permit installation and connection of steel framing.
 - 3. Keep openings to minimum size and maintain in weathertight condition.
 - 4. Exclude installation and connection of structural steel to existing construction from this Section.
- J. Means of protection.

1. Construct temporary shoring, lights, barriers, partitions, casing of openings, chutes, closures, or other devices required for proper execution of demolition work.
 2. Install shoring, bracing, or support to prevent movement, settlement, or collapse of construction to be demolished and adjacent construction to remain.
 3. Install adequate temporary waterproof protection should it become necessary to remove parts of existing building shell to allow access to building.
 4. Leave protection in place except when openings are being used, until new construction has provided a watertight seal.
 5. Protect and support conduits, pipes, and ductwork to remain and subject to damage by demolition activities.
 6. Install airtight covers at return air grilles or ducts in work areas to prevent dirt and dust from entering ventilation systems to remain.
 7. Protect floor coverings and other interior finishes to remain from marring and other damage.
 8. Maintain and leave protection in place until protected surface is no longer subject to damage by construction activities.
- K. Refinish existing surfaces as indicated:
1. Where rooms or spaces are indicated to be refinished, refinish all visible existing surfaces to remain to specified condition for each material, with a neat transition to adjacent finishes.
 2. If mechanical or electrical work is exposed accidentally during work, re-cover and refinish to match.
- L. Clean existing systems and equipment.
- M. Remove demolition debris and abandoned items from alterations areas and dispose of off-site; do not burn or bury.
- N. Do not begin new construction in alterations areas before demolition is complete.
- O. Comply with all other applicable requirements of this section.

3.05 CUTTING AND PATCHING

- A. Whenever possible, execute work by methods that avoid cutting or patching.
- B. See Alterations article above for additional requirements.
- C. Perform whatever cutting and patching is necessary to:
1. Complete the work.
 2. Fit products together to integrate with other work.
 3. Provide openings for penetration of mechanical, electrical, and other services.
 4. Match work that has been cut to adjacent work.
 5. Repair areas adjacent to cuts to required condition.
 6. Repair new work damaged by subsequent work.
 7. Remove samples of installed work for testing when requested.
 8. Remove and replace defective and non-complying work.
- D. Execute work by methods that avoid damage to other work and that will provide appropriate surfaces to receive patching and finishing. In existing work, minimize damage and restore to original condition.
- E. Use methods as described in written outline of proposed procedures to keep dust to a minimum, such as wetting of concrete and earth during removal.
- F. Employ skilled and experienced installer to perform cutting for weather exposed and moisture resistant elements, and sight exposed surfaces.
- G. Cut rigid materials using masonry saw or core drill. Pneumatic tools not allowed without prior approval.
- H. Restore work with new products in accordance with requirements of Contract Documents.

- I. Fit work air tight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.
- J. Patching:
 - 1. Finish patched surfaces to match finish that existed prior to patching. On continuous surfaces, refinish to nearest intersection or natural break. For an assembly, refinish entire unit.
 - 2. Match color, texture, and appearance.
 - 3. Repair patched surfaces that are damaged, lifted, discolored, or showing other imperfections due to patching work. If defects are due to condition of substrate, repair substrate prior to repairing finish.
- K. Fireproofing repair.
 - 1. Patch and repair fireproofing on structural steel where damaged and removed during attachment of work.
 - 2. Repair to maintain integrity of claimed existing fire resistance rating.
 - 3. Materials.
 - a. Match proprietary products listed in UL, Directory under Cementitious Mixtures (CALV) or Fiber sprayed (CCAZ).
 - b. Type to match existing fireproofing.
 - c. Produced, labeled, and certified by one of manufacturers listed for specific UL Design.
 - 4. Mix and apply in accordance with manufacturers written procedures.
 - 5. Apply to full required thickness, but not less than thickness of existing adjacent materials.
- L. Repair ceilings.
 - 1. Remove, protect from damage and soiling, and store components of existing ceiling interfering with work above existing ceilings.
 - 2. After completion of construction above ceilings, restore removed ceilings to original condition.
 - 3. Replace components marred or otherwise rendered unusable in course of work.
 - 4. Work carefully and skillfully to minimize damage and to leave items in best possible condition.
- M. Concrete slab repair.
 - 1. Saw cut perimeter of area to be patched to 1 inch depth.
 - 2. Remove concrete to depth not less than 1-1/2 inches.
 - 3. Apply bonding agent.
 - a. Sikadur 32 Hi-mod by Sika Corporation, Lyndhurst, New Jersey 07071
www.sikausa.com.
 - b. Euco 452 LV/MV Epoxy System by Euclid Chemical Company, Cleveland, Ohio 44110
www.euclidchemical.com.
 - 4. Concrete.
 - a. Compressive strength at 28 days: 4000 psi.
 - b. Cement content: Not less than 5.8 sacks per cubic yard.
 - c. Water content: Not more than 5.0 gallons per sack of cement.
 - d. Slump: Not more than 3 inches.
 - e. Fine and coarse aggregate in accordance with ASTM C33, maximum size 3/4 inch.
 - f. Proportioning for mix design in accordance with ACI 301, Chapter 3.

3.06 PROGRESS CLEANING

- A. Maintain areas free of waste materials, debris, and rubbish. Maintain site in a clean and orderly condition.
- B. Remove debris and rubbish from pipe chases, plenums, attics, crawl spaces, and other closed or remote spaces, prior to enclosing space.
- C. Broom and vacuum clean interior areas prior to start of surface finishing, and continue cleaning to eliminate dust.

- D. Collect and remove waste materials, debris, and trash/rubbish from site periodically and dispose off-site; do not burn or bury.

3.07 PROTECTION OF INSTALLED WORK

- A. Protect installed work from damage by construction operations.
- B. Provide special protection where specified in individual specification sections.
- C. Provide temporary and removable protection for installed products. Control activity in immediate work area to prevent damage.
- D. Provide protective coverings at walls, projections, jambs, sills, and soffits of openings.
- E. Protect finished floors, stairs, and other surfaces from traffic, dirt, wear, damage, or movement of heavy objects, by protecting with durable sheet materials.
- F. Prohibit traffic or storage upon waterproofed or roofed surfaces. If traffic or activity is necessary, obtain recommendations for protection from waterproofing or roofing material manufacturer.
- G. Remove protective coverings when no longer needed; reuse or recycle coverings if possible.

3.08 SYSTEM STARTUP

- A. Coordinate schedule for start-up of various equipment and systems.
- B. Notify Architect and Owner seven days prior to start-up of each item.
- C. Verify that each piece of equipment or system has been checked for proper lubrication, drive rotation, belt tension, control sequence, and for conditions that may cause damage.
- D. Verify tests, meter readings, and specified electrical characteristics agree with those required by equipment or system manufacturer.
- E. Verify that wiring and support components for equipment are complete and tested.
- F. Execute start-up under supervision of applicable Contractor personnel and manufacturer's representative in accordance with manufacturers' instructions.
- G. When specified in individual specification Sections, require manufacturer to provide authorized representative to be present at site to inspect, check, and approve equipment or system installation prior to start-up, and to supervise placing equipment or system in operation.
- H. Submit a written report that equipment or system has been properly installed and is functioning correctly.

3.09 DEMONSTRATION AND INSTRUCTION

- A. Demonstrate operation and maintenance of products to Owner's personnel two weeks prior to date of Substantial Completion.
- B. Demonstrate start-up, operation, control, adjustment, trouble-shooting, servicing, maintenance, and shutdown of each item of equipment at scheduled time, at equipment location.
- C. For equipment or systems requiring seasonal operation, perform demonstration for other season within six months.
- D. Provide a qualified person who is knowledgeable about Project to perform demonstration and instruction of Owner's personnel.
- E. Utilize operation and maintenance manuals as basis for instruction. Review contents of manual with Owner's personnel in detail to explain all aspects of operation and maintenance.
- F. Prepare and insert additional data in operations and maintenance manuals when need for additional data becomes apparent during instruction.
- G. Amount of time required for instruction on each item of equipment and system is that specified in individual sections.

3.10 ADJUSTING

- A. Adjust operating products and equipment to ensure smooth and unhindered operation.

3.11 FINAL CLEANING

- A. Use cleaning materials that are nonhazardous.
- B. Clean interior and exterior glass, surfaces exposed to view; remove temporary labels, stains and foreign substances, polish transparent and glossy surfaces, vacuum carpeted and soft surfaces.
- C. Remove labels that are not permanent. Do not paint or otherwise cover fire test labels or nameplates on mechanical and electrical equipment.
- D. Clean equipment and fixtures to a sanitary condition with cleaning materials appropriate to surface and material being cleaned.
- E. Clean filters of operating equipment.
- F. Clean debris from area drains and drainage systems.
- G. Clean site; sweep paved areas, rake clean landscaped surfaces.
- H. Remove waste, surplus materials, trash/rubbish, and construction facilities from site; dispose of in legal manner; do not burn or bury.

3.12 CLOSEOUT PROCEDURES

- A. Make submittals that are required by governing or other authorities.
- B. Accompany Project Coordinator on preliminary inspection to determine items to be listed for completion or correction in the Contractor's Correction Punch List for Contractor's Notice of Substantial Completion.
- C. Notify Architect when work is considered ready for Architect's Substantial Completion inspection.
- D. Submit written certification containing Contractor's Correction Punch List, that Contract Documents have been reviewed, work has been inspected, and that work is complete in accordance with Contract Documents and ready for Architect's Substantial Completion inspection.
- E. Conduct Substantial Completion inspection and create Final Correction Punch List containing Architect's and Contractor's comprehensive list of items identified to be completed or corrected and submit to Architect.
- F. Correct items of work listed in Final Correction Punch List and comply with requirements for access to Owner-occupied areas.
- G. Accompany Project Coordinator on Contractor's preliminary final inspection.
- H. Notify Architect when work is considered finally complete and ready for Architect's Substantial Completion final inspection.
- I. Complete items of work determined by Architect listed in executed Certificate of Substantial Completion.

3.13 MAINTENANCE

- A. Provide service and maintenance of components indicated in specification sections.
- B. Maintenance Period: As indicated in specification sections or, if not indicated, not less than one year from Date of Substantial Completion or length of specified warranty, whichever is longer.
- C. Examine system components at a frequency consistent with reliable operation. Clean, adjust, and lubricate as required.
- D. Include systematic examination, adjustment, and lubrication of components. Repair or replace parts whenever required. Use parts produced by manufacturer of original component.

- E. Maintenance service shall not be assigned or transferred to any agent or subcontractor without prior written consent of Owner.

END OF SECTION

SECTION 01 7800 - CLOSEOUT SUBMITTALS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Project Record Documents.
- B. Operation and Maintenance Data.
- C. Warranties and bonds.

1.02 RELATED REQUIREMENTS

- A. Conditions of Contract: Performance bond and labor and material payment bonds, warranty, and correction of work.
- B. Section 01 3000 - Administrative Requirements: Submittals procedures, shop drawings, product data, and samples.
- C. Section 01 7000 - Execution Requirements - Alteration Projects: Contract closeout procedures.
- D. Individual Product Sections: Specific requirements for operation and maintenance data.
- E. Individual Product Sections: Warranties required for specific products or Work.

1.03 SUBMITTALS

- A. Project Record Documents: Submit documents to Architect with claim for final Application for Payment.
- B. Operation and Maintenance Data:
 - 1. Submit two copies of preliminary draft or proposed formats and outlines of contents before start of Work. Architect will review draft and return one copy with comments.
 - 2. For equipment, or component parts of equipment put into service during construction and operated by Owner, submit completed documents within ten days after acceptance.
 - 3. Submit one copy of completed documents 15 days prior to final inspection. This copy will be reviewed and returned after final inspection, with Architect comments. Revise content of all document sets as required prior to final submission.
 - 4. Submit two sets of revised final documents in final form within 10 days after final inspection.
- C. Warranties and Bonds:
 - 1. For equipment or component parts of equipment put into service during construction with Owner's permission, submit documents within 10 days after acceptance.
 - 2. Make other submittals within 10 days after Date of Substantial Completion, prior to final Application for Payment.
 - 3. For items of Work for which acceptance is delayed beyond Date of Substantial Completion, submit within 10 days after acceptance, listing date of acceptance as beginning of warranty period.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 PROJECT RECORD DOCUMENTS

- A. Maintain on site one set of following record documents; record actual revisions to Work:
 - 1. Drawings.
 - 2. Specifications.
 - 3. Addenda.
 - 4. Change Orders and other modifications to Contract.
 - 5. Reviewed shop drawings, product data, and samples.
 - 6. Manufacturer's instruction for assembly, installation, and adjusting.
- B. Ensure entries are complete and accurate, enabling future reference by Owner.
- C. Store record documents separate from documents used for construction.

- D. Record information concurrent with construction progress.
- E. Specifications: Legibly mark and record at each product section description of actual products installed, including following:
 - 1. Manufacturer's name and product model and number.
 - 2. Product substitutions or alternates utilized.
 - 3. Changes made by Addenda and modifications.
- F. Record Drawings and Shop Drawings: Legibly mark each item to record actual construction including:
 - 1. Measured depths of foundations in relation to finish first floor datum.
 - 2. Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.
 - 3. Measured locations of internal utilities and appurtenances concealed in construction, referenced to visible and accessible features of Work.
 - 4. Field changes of dimension and detail.
 - 5. Details not on original Contract drawings.

3.02 OPERATION AND MAINTENANCE DATA

- A. Source Data: For each product or system, list names, addresses and telephone numbers of Subcontractors and suppliers, including local source of supplies and replacement parts.
- B. Product Data: Mark each sheet to clearly identify specific products and component parts, and data applicable to installation. Delete inapplicable information.
- C. Drawings: Supplement product data to illustrate relations of component parts of equipment and systems, to show control and flow diagrams. Do not use Project Record Documents as maintenance drawings.
- D. Typed Text: As required to supplement product data. Provide logical sequence of instructions for each procedure, incorporating manufacturer's instructions.

3.03 OPERATION AND MAINTENANCE DATA FOR MATERIALS AND FINISHES

- A. For Each Product, Applied Material, and Finish:
 - 1. Product data, with catalog number, size, composition, and color and texture designations.
 - 2. Information for re-ordering custom manufactured products.
- B. Instructions for Care and Maintenance: Manufacturer's recommendations for cleaning agents and methods, precautions against detrimental cleaning agents and methods, and recommended schedule for cleaning and maintenance.
- C. Moisture protection and weather-exposed products: Include product data listing applicable reference standards, chemical composition, and details of installation. Provide recommendations for inspections, maintenance, and repair.
- D. Additional information as specified in individual product specification sections.
- E. Where additional instructions are required, beyond the manufacturer's standard printed instructions, have instructions prepared by personnel experienced in the operation and maintenance of the specific products.
- F. Provide a listing in Table of Contents for design data, with tabbed fly sheet and space for insertion of data.

3.04 OPERATION AND MAINTENANCE DATA FOR EQUIPMENT AND SYSTEMS

- A. For Each Item of Equipment and Each System:
 - 1. Description of unit or system, and component parts.
 - 2. Identify function, normal operating characteristics, and limiting conditions.
 - 3. Include performance curves, with engineering data and tests.
 - 4. Complete nomenclature and model number of replaceable parts.

- B. Where additional instructions are required, beyond the manufacturer's standard printed instructions, have instructions prepared by personnel experienced in the operation and maintenance of the specific products.
- C. Panelboard Circuit Directories: Provide electrical service characteristics, controls, and communications; typed.
- D. Include color coded wiring diagrams as installed.
- E. Operating Procedures: Include start-up, break-in, and routine normal operating instructions and sequences. Include regulation, control, stopping, shut-down, and emergency instructions. Include summer, winter, and any special operating instructions.
- F. Maintenance Requirements: Include routine procedures and guide for preventative maintenance and troubleshooting; disassembly, repair, and reassembly instructions; and alignment, adjusting, balancing, and checking instructions.
- G. Provide servicing and lubrication schedule, and list of lubricants required.
- H. Include manufacturer's printed operation and maintenance instructions.
- I. Include sequence of operation by controls manufacturer.
- J. Provide original manufacturer's parts list, illustrations, assembly drawings, and diagrams required for maintenance.
- K. Provide control diagrams by controls manufacturer as installed.
- L. Provide Contractor's coordination drawings, with color coded piping diagrams as installed.
- M. Provide charts of valve tag numbers, with location and function of each valve, keyed to flow and control diagrams.
- N. Provide list of original manufacturer's spare parts, current prices, and recommended quantities to be maintained in storage.
- O. Include test and balancing reports.
- P. Additional Requirements: As specified in individual product specification sections.

3.05 ASSEMBLY OF OPERATION AND MAINTENANCE MANUALS

- A. Assemble operation and maintenance data into durable manuals for Owner's personnel use, with data arranged in the same sequence as, and identified by, the specification sections.
- B. Where systems involve more than one specification section, provide separate tabbed divider for each system.
- C. Prepare electronic and paper versions of manual as described below.
- D. Prepare instructions and data by personnel experienced in maintenance and operation of described products.
- E. Prepare data in form of an instructional manual.
 - 1. Maintenance instructions for equipment and systems.
 - 2. Maintenance instructions for special finishes, including recommended cleaning methods and materials, and special precautions identifying detrimental agents.
 - 3. Air and water balance reports.
 - 4. Certificates.
- F. Project Directory: Title and address of Project; names, addresses, and telephone numbers of Architect, Consultants, Contractor and subcontractors, with names of responsible parties.
- G. Tables of Contents: List every item separated by a divider, using the same identification as on the divider tab; where multiple volumes are required, include all volumes Tables of Contents in each volume, with the current volume clearly identified.

3.06 WARRANTIES AND BONDS

- A. Obtain warranties and bonds, executed in duplicate by responsible Subcontractors, suppliers, and manufacturers, within 10 days after completion of applicable item of work. Except for items

put into use with Owner's permission, leave date of beginning of time of warranty until Date of Substantial completion is determined.

- B. Verify that documents are in proper form, contain full information, and are notarized.
- C. Co-execute submittals when required.
- D. Retain warranties and bonds until time specified for submittal.

END OF SECTION

SECTION 03 3000 - CAST-IN-PLACE CONCRETE (SHORT FORM)

PART 1 GENERAL

1.01 REFERENCE STANDARDS

- A. ACI 301 - Specifications for Structural Concrete for Buildings; 2010 (Errata 2012).
- B. ACI 318 - Building Code Requirements for Reinforced Concrete and Commentary; 2011.
- C. ACI SP-66 - ACI Detailing Manual; 2004.
- D. ASTM A185/A185M - Standard Specification for Steel Welded Wire Reinforcement, Plain, for Concrete; 2007.
- E. ASTM A615/A615M - Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement; 2012.
- F. ASTM A996/A996M - Standard Specification for Rail-Steel and Axle-Steel Deformed Bars for Concrete Reinforcement; 2009b.
- G. ASTM C33/C33M - Standard Specification for Concrete Aggregates; 2011a.
- H. ASTM C150/C150M - Standard Specification for Portland Cement; 2012.
- I. ASTM C260/C260M - Standard Specification for Air-Entraining Admixtures for Concrete; 2010a.
- J. ASTM C494/C494M - Standard Specification for Chemical Admixtures for Concrete; 2012.
- K. ASTM C1602/C1602M - Standard Specification for Mixing Water Used in the Production of Hydraulic Cement Concrete; 2012.

1.02 SUBMITTALS

- A. See Section 01 3000 – Administrative Requirements, for submittal procedures.
- B. For Review.
 - 1. Shop drawings.
 - a. Steel reinforcement.
 - 2. Design Data.
 - a. Concrete mixture design.
- C. For Information.
 - 1. Product Data.
 - a. Cement.
 - b. Admixtures.
 - 2. Design / Performance Data.
 - a. Materials used in concrete.
 - 3. Test Reports.
 - a. Materials used in concrete.
 - b. Strength test.
 - c. Laboratory reports.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Admixtures.
 - 1. Air-entraining, in accordance with ASTM C260 to produce concrete air content, 6 percent, plus or minus 1-1/2 percent for concrete exposed to freezing and thawing.
 - 2. Water reducing admixtures.
 - a. Admixtures; Low-Range Water Reducing (LRWR), Mid-Range Water Reducing (MRWR), or High-Range Water Reducing (superplasticizer) (HRWR).
 - b. In accordance with ASTM C494, Type A or F.
 - c. Use to increase workability (slump) where required for concrete placement.
 - d. Slump of concrete: Not more than listed for mix prior to addition of admixture, or 6 inches following addition of admixture.
 - e. Other admixtures, including fly ash, require written acceptance by Architect.

- B. Aggregate, Fine and Coarse.
 - 1. Clean and well graded.
 - 2. In accordance with ASTM C33.
 - 3. Coarse aggregate: Size 57, Class 5S.
 - 4. Not containing materials that are deleteriously reactive with alkalis in cement.
- C. Portland Cement: In accordance with ASTM C150, Type I or Type II.
- D. Reinforcement: Deformed bars.
 - 1. Material: Billet steel in accordance with ASTM A615 or rail steel in accordance with ASTM A996.
 - 2. Yield Strength of Reinforcement: Not less than 60,000 psi.
 - 3. Detailing: In accordance with ACI SP-66.
- E. Water: In accordance with ASTM C1602.

2.02 CONCRETE MIXES

- A. In accordance with ACI 301 and ACI 318.
- B. Mix Requirements.
 - 1. For slabs on grade (Type FS).
 - a. Ultimate compressive strength at 28 days: Not less than 4000 psi.
 - b. Cementitious content: Not less than 550 pounds per cubic yard.
 - c. Water/cementitious ratio: Not more than 0.48.
 - d. Slump: Not more than 3 inches.
 - e. Modulus of rupture at 28 days: Not less than 550 pounds per square inch.
 - 2. For footings, piers, grade beams, and walls (Type B).
 - a. Ultimate compressive strength at 28 days: Not less than 3000 psi.
 - b. Cementitious content: Not less than 520 pounds per cubic yard.
 - c. Water/cementitious ratio: Not more than 0.51.
 - d. Slump: Not more than 4 inches.
 - e. Modulus of rupture at 28 days: Not less than 500 pounds per square inch.
 - 3. For concrete not otherwise indicated (Type B).
 - a. Ultimate compressive strength at 28 days: Not less than 3000 psi.
 - b. Cementitious content: Not less than 520 pounds per cubic yard.
 - c. Water/cementitious ratio: Not more than 0.51.
 - d. Slump: Not more than 4 inches.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Soil Preparation.
 - 1. Footings are designed to bear on firm soil with allowable bearing pressure of 2,500 psf.
 - 2. Obtain concurrence of Owner's Field Representative of exposed soil quality before placing concrete for footings.
 - 3. Granular slab fill.
 - a. Dense-grade aggregate.
 - 4. Where soil conditions require change in size, depth, or design of footings other than in Contract, an adjustment shall be made in accordance with extra work performed.
- B. Formwork.
 - 1. Construct of smooth surface form material, true, rigid, leakproof.
 - 2. Brace externally and diagonally and sufficiently strong to support dead weight of forms and liquid weight of concrete without displacement.
- C. Reinforcement.
 - 1. In accordance with ACI SP-66 and ACI 318.
 - 2. Maintain position during concrete placement.
- D. Placement of Concrete.

1. Temperature of Concrete at Placement: Not less than 55 degrees F, and not more than 90 degrees F.
2. Atmospheric Temperature at Placement: Not less than 40 degrees F.
3. Temperature of Concrete for 7 Days of Curing: Not less than 50 degrees F.
4. Protect from injurious wind, sun, and temperature.
5. Water cure for seven days.

END OF SECTION

SECTION 14 4316 - PLATFORM LIFT

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Complete platform scissor lift system.
- B. Platform lift will travel from existing basement floor to existing first floor.
- C. Lift is not to transport people.
- D. Platform lift maintenance.

1.03 REFERENCE STANDARDS

- A. NFPA 70 - National Electrical Code; National Fire Protection Association; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- B. UL (BMD) - Building Materials Directory; Underwriters Laboratories Inc.; current edition.
- C. UL (ECMD) - Electrical Construction Materials Directory; Underwriters Laboratories Inc.; current edition.
- D. ANSI MH29.1, "Safety Standard for Industrial Scissor Lifts"

1.04 ADMINISTRATIVE REQUIREMENTS

- A. Preinstallation Meeting: Convene a meeting one week prior to starting work.
 - 1. Review schedule of installation, installation procedures and conditions, and coordination with related work.
- B. Construction Use of platform lift: Not permitted.

1.05 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. For Information.
 - 1. Product Data: Provide data on following items:
 - a. Signal and operating fixtures, operating panels, indicators, safety features.
 - b. Platform lift design, dimensions, layout, and components.
 - c. Electrical characteristics and connection requirements.
- C. For Review.
 - 1. Shop Drawings: Indicate following information:
 - a. Locations of platform lift equipment: driving machines, controllers, governors and other component.
 - b. Hoistway components: Platform, guide rails, buffers, and other components.
 - c. Rail bracket spacing; maximum loads imposed on guide rails requiring load transfer to building structural framing.
 - d. Individual weight of principal components; load reaction at points of support.
 - e. Clearances and over-travel of platform lift.
 - f. Locations in hoistway of traveling cables and connections for platform lights.
 - g. Location and sizes of access doors, doors, and frames.
 - h. Expected heat dissipation of platform lift equipment in machine lift pit.
 - i. Applicable seismic design data; certified by a licensed Professional Structural Engineer.
 - j. Interface with building security system.
 - k. Electrical characteristics and connection requirements.
 - l. Platform and handrail sequence of operations.
- D. For Closeout.
 - 1. Maintenance Contract.
 - 2. Maintenance Data.

- a. Parts catalog with complete list of equipment replacement parts; identify each entry with equipment description and identifying code.
- b. Technical information for servicing operating equipment.
- c. Legible schematic of wiring diagrams of installed electrical equipment and changes made in the Work. List symbols corresponding to identity or markings on platform lift control and hoistway apparatus.

1.06 QUALITY ASSURANCE

- A. Perform Work in accordance with applicable code and as supplemented in this Section.
- B. Perform welding of steel in accordance with AWS D1.1.
- C. Perform electrical work in accordance with NFPA 70.
- D. Maintain one copy of each quality standard document on site.
- E. Manufacturer Qualifications: Company specializing in manufacturing products specified in this Section with minimum ten years documented experience.
- F. Installer Qualifications: Company specializing in performing work of this Section and approved by lift equipment manufacturer.
- G. Products Requiring Fire Resistance Rating: Listed and classified by UL.
- H. Products Requiring Electrical Connection: Listed and classified by UL as suitable for purpose specified and indicated.

1.07 WARRANTY

- A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.
- B. Provide two year manufacturer warranty for platform lift operating equipment and devices.

PART 2 PRODUCTS

2.01 LIFT MANUFACTURER

- A. Basis of Design: Advance Lifts - Model BFL2-6120: www.advancelifts.com
- B. Air Technical Industries - Double Scissor Lift Table: www.airtechnical.com
- C. Components to be manufactured by same entity, unless otherwise indicated.
- D. Substitutions: See Section 01 6000 - Product Requirements.

2.02 LIFT INSTALLERS:

- A. Certified, experienced installer in the State of Michigan.

2.03 PLATFORM LIFTS

- A. Platform Lift Design Criteria.
 - 1. Platform size: Approximately 8' x 8' (verify)
 - 2. Total travel: Approximately 7 feet 6 inches (verify).
 - 3. Number of stops: 2. Stops are on adjacent sides of the platform.
 - 4. Lift speed: Nominal design of 45 feet per minute.
 - 5. Wheel load: 6,500 pounds per wheel, minimum.
 - 6. Dynamic load capacity: 50 PSF plus dead load.
 - 7. Sustaining load capacity: 150 PSF plus dead load.
 - 8. Level tolerance: 1/8 inch
 - 9. Maximum clearance between finished edge of lift and lift perimeter: 1/2 inch.
 - 10. Maximum deflection: 1/600 under full sustaining evenly distributed load.
 - 11. Not drift when stopped at any elevation with maximum sustaining capacity.
 - 12. Programmed stops:
 - a. Existing basement floor level.
 - b. Existing first floor level.
- B. Construction.

1. Platform.
 - a. Fabricated from heavy duty plate steel with beveled steel toe guards.
 - b. Nonskid safety tread deck plate
2. Scissor Mechanism.
 - a. Fabricated from heavy duty formed steel tubes
3. Cylinders.
 - a. No less than two heavy duty machine grade cylinders with mechanical internal stops and return lines from breather vents to the reservoir
 - b. Cylinder rods shall be chrome plated and polished
 - c. Cylinders shall be equipped with flow controls to prevent free fall in compliance with MH29.1.
4. Hydraulic Power Unit.
 - a. Manufacturer's standard self contained remotely located assembly consisting of a steel reservoir, UL listed motor, high pressure gear pump and valve manifold with pressure compensated flow control, down solenoid, check valve and relief valve.
5. Electrical Controls.
 - a. Constant pressure UP and DOWN pushbuttons with key lockout, mounted on platform railing and at top and bottom door openings and emergency stop button. NEMA 12 UL listed control box with magnetic motor starter with 3 pole adjustable overloads, 24 Volt 4 amp fused secondary control transformer and the entire control box assembly, not just components, shall be labeled as UL listed.
6. Safety Devices.
 - a. Removable guard rails, 42" high with midrail and 4" kick plate along non-opening sides.
 - b. Lift shall not operate past its upper or lower limits.

2.04 PLATFORM LIFT ENTRANCES

- A. Door and Frame by others.
- B. Door control by platform operations.

2.05 MATERIALS

- A. Rolled Steel Sections, Shapes, Rods: ASTM A36/A36M.
- B. Sheet Steel: ASTM A1008/A1008M, Designation CS, with matte finish.
- C. Sheet Steel: Hot-dipped galvanized steel sheet, ASTM A653/A653M, with G90/Z275 coating.
- D. Shop and Touch-Up Primer: SSPC-Paint 15, complying with VOC limitations of authorities having jurisdiction.
- E. Touch-Up Primer for Galvanized Surfaces: SSPC-Paint 20, Type I - Inorganic, complying with VOC limitations of authorities having jurisdiction.
- F. Finish Paint (for Metal Surfaces): Alkyd enamel, semi-gloss, black color, complying with VOC limitations of authorities having jurisdiction.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify existing conditions before starting work.
- B. Verify that hoistway, pit, and machine room are ready for work of this section.
- C. Verify hoistway shaft and openings are of correct size and within tolerance.
- D. Verify location and size of machine foundation and position of machine foundation bolts.
- E. Verify that electrical power is available and of correct characteristics.

3.02 PREPARATION

- A. Arrange for temporary electrical power for installation work and testing of platform lift components.

3.03 INSTALLATION

- A. Install system components. Connect equipment to building utilities.
- B. Provide conduit, boxes, wiring, and accessories.
- C. Mount motors, pillow blocks, and gearboxes on vibration and acoustic isolators, on bed plate and concrete pad. Place on structural supports and bearing plates. Securely fasten to building supports. Prevent lateral displacement.
- D. Accommodate equipment in space indicated.
- E. Structural Metal Surfaces: Clean surfaces of rust, oil or grease; wipe clean with solvent; prime two coats.
- F. Platform Control Room Components: Clean and degrease; prime one coat, finish with one coat of enamel.
- G. Adjust equipment for smooth and quiet operation.

3.04 ADJUSTING

- A. Adjust automatic floor leveling feature at each floor to achieve 1/8 inch from flush.

3.05 CLEANING

- A. Remove protective coverings from finished surfaces.
- B. Clean surfaces and components ready for inspection.

3.06 PROTECTION

- A. Do not permit construction traffic on platform after cleaning.
- B. Protect installed products until project completion.
- C. Touch-up, repair, or replace damaged products before Date of Substantial Completion.

3.07 MAINTENANCE

- A. See Section 01 7000 - Execution Requirements, for additional requirements relating to maintenance service.
- B. Provide a separate maintenance contract for specified maintenance service.
- C. Perform maintenance work using competent and qualified personnel under supervision and in direct employ of platform lift manufacturer or original installer.
- D. Provide service and maintenance of platform lift system and components for two years from Date of Substantial Completion.
- E. Examine system components monthly. Clean, adjust, and lubricate equipment.
- F. Include systematic examination, adjustment, and lubrication of platform lift equipment. Repair or replace parts whenever required. Use parts produced by manufacturer of original equipment.
- G. Perform work without removing platform lift during peak usage periods.
- H. Provide emergency call back service at all hours for this maintenance period.
- I. Maintain adequate stock of parts for replacement or emergency purposes locally, near place of Work. Have personnel available to ensure the fulfillment of this maintenance service, without unreasonable loss of time.

END OF SECTION

SECTION 26 0500 - COMMON WORK RESULTS FOR ELECTRICAL

PART 1 GENERAL

1.01 REFERENCE STANDARDS

- A. IEEE Institute of Electrical and Electronic Engineers.
- B. Local and state codes.
- C. National Electrical Contractors Association - National Electrical Installation Standards.
- D. NEMA National Electrical Manufacturers Association.
- E. NFPA 70 - National Electrical Code; 2017.
- F. OSHA Occupational Safety and Health Act, latest edition.
- G. UL (ECMD) - Electrical Construction Materials Directory; current edition.

1.02 SUBMITTALS

- A. For Closeout.
 - 1. Project Record Documents.
 - a. Field Record Drawings.
 - 1) Keep accurate record of installed conditions at jobsite to record significant departures from Architect's drawings or manufacturers' Shop or Fabrication Drawings.
 - 2) Prepare Field Record Drawings.
 - 3) Draw field record information to scale on 24 inch by 36 inch minimum size sheets.
 - 4) Record Drawings shall contain pertinent notes, dimensions indicating lateral relationships, depths and elevations, and other information that actually locates electrical subject.
 - 5) Dimension permanently concealed components from permanent site reference point or building column lines.
 - 6) Limit identification of conduits for fire alarm and security systems in masonry and plaster walls to main feeder conduits 1-1/4 inches and larger.
 - 7) Show actual locations of.
 - (a) Conduits and devices.
 - (1) Embedded in concrete and masonry.
 - (2) Concealed by plaster.
 - (3) Concealed in inaccessible ceilings.
 - 8) Make updated Record Drawings available to Owner and Architect's representative during construction.

PART 2 PRODUCTS

2.01 SYSTEMS

- A. Electrical Service Characteristics.
 - 1. Power system (600 volts and less).
 - a. 480 volts, 3 phase, 3 wire, 60 hertz, neutral solidly grounded at source.
 - 2. Lighting system.
 - a. 208/120 volts, 3 phase, 4 wire, 60 hertz, solidly grounded neutral.
 - 3. Small power system.
 - a. 208/120 volt, 3 phase, 4 wire, 60 hertz, solidly grounded neutral.

PART 3 EXECUTION

3.01 SEQUENCING AND SCHEDULING

- A. Cutover Schedule.
 - 1. Establish and perform definite time schedule of cutover as soon as possible after award of Contract.
 - 2. Prepare schedule in conjunction with Owner's representatives, Architect, and Power Company's representatives.
- B. Plan and proceed with work under following conditions.
 - 1. Owner reserves right to continue normal operations.
 - 2. Accomplish work at Contractor's convenience and without obstructing Owner's operations.
 - 3. Interference with electrical service or shutdown will not be allowed without special permission from Owner, and then only for as short a time as scheduled.
 - 4. Temporary or permanent equipment, cables, and materials shall be in place, completely ready, except for actual cutover or connection.
 - 5. Perform work during regular working hours.

3.02 CONSTRUCTION

- A. Requirements for Electrical Installations.
 - 1. Positioning and final selection of equipment shall take into consideration requirements of NEC, Article 110.26 "Spaces About Electrical Equipment".
 - 2. Coordinate with other trades prior to laying out or installing equipment.
- B. Demolition and Remodeling.
 - 1. Drawings indicate general demolition in designated areas (not every item shown).
 - 2. Refer to architectural drawings for extent of work.
 - 3. Remove necessary items as provided by demolition.
 - 4. Field verify locations and arrangement of existing systems and equipment.
 - 5. Where relocation of existing service is necessary in areas providing uninterruptible services, schedule work for minimal down time during slack period.
 - 6. Maintain existing services scheduled to remain during demolition.
 - 7. Do not disturb existing services without Owner approval.
 - a. Coordinate in writing systems demolition work with Owner 14 days prior to construction schedule.
 - b. Begin work only after Owner agrees to schedule of shutoffs.
 - c. Fabricate and install interconnecting portions of systems prior to shut down for final connection.
 - 8. Perform demolition as directed by General Contractor/Construction Manager.
 - a. Relocate items indicated after thorough cleaning.
 - b. Remove existing wiring back to panel serving abandoned circuits.
 - c. Remove nonembedded conduit serving abandoned circuits.
 - d. Provide temporary support for existing systems' cables supported off ceiling grid systems.
 - e. Remove existing low voltage signal cabling used for voice and data systems in wall(s) being removed, including conduit, boxes and cables back to telecommunication room(s).
 - f. Remove existing electrical devices in wall being removed, including conduits and wires, back to panel or active junction box.
 - g. Reconnect and re-energize existing circuit partially removed to existing electrical devices not affected by demolition.
 - h. Provide new panel directory to reflect revision for panel being affected by demolition.

9. Salvage.
 - a. Existing wires and conduits of correct size may be spliced and extended from appropriate junction box.
 - b. Do not reuse wiring and conduit after removal.
 - c. Equipment and materials removed by demolition and not shown for reuse become Owner's property, if Owner so elects.
 - d. Furnish Owner with list of equipment and materials removed, and dispose at location directed by Owner.
 - e. Equipment and materials not retained by Owner shall become Contractor's property and be removed from site.

3.03 FIELD QUALITY CONTROL

- A. Electrical drawings, including one line diagrams have been prepared for obtaining bids and for engineering electrical installation.
- B. In all instances, after installation and energization of electrical systems and where modifications or additions are required to existing systems, verify by actual field tests that applicable circuits are de-energized prior to working on systems.

END OF SECTION

SECTION 26 0519 - LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES

PART 1 GENERAL

1.01 RELATED REQUIREMENTS

- A. Section 26 0553 - Identification for Electrical Systems: Identification products and requirements.

1.02 REFERENCE STANDARDS

- A. ASTM B3 - Standard Specification for Soft or Annealed Copper Wire; 2013.
- B. ASTM B8 - Standard Specification for Concentric-Lay-Stranded Copper Conductors, Hard, Medium-Hard, or Soft; 2011.
- C. ASTM B33 - Standard Specification for Tin-Coated Soft or Annealed Copper Wire for Electrical Purposes; 2010 (Reapproved 2014).
- D. ASTM B787/B787M - Standard Specification for 19 Wire Combination Unilay-Stranded Copper Conductors for Subsequent Insulation; 2004 (Reapproved 2014).
- E. ASTM D3005 - Standard Specification for Low-Temperature Resistant Vinyl Chloride Plastic Pressure-Sensitive Electrical Insulating Tape; 2010.
- F. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2010.
- G. NEMA WC 70 - Nonshielded Power Cable 2000 V or Less for the Distribution of Electrical Energy; 2009.
- H. NETA ATS - Acceptance Testing Specifications for Electrical Power Equipment and Systems; 2013.
- I. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- J. UL 44 - Thermoset-Insulated Wires and Cables; Current Edition, Including All Revisions.
- K. UL 83 - Thermoplastic-Insulated Wires and Cables; Current Edition, Including All Revisions.
- L. UL 486A-486B - Wire Connectors; Current Edition, Including All Revisions.
- M. UL 486C - Splicing Wire Connectors; Current Edition, Including All Revisions.
- N. UL 510 - Polyvinyl Chloride, Polyethylene, and Rubber Insulating Tape; Current Edition, Including All Revisions.
- O. UL (ECMD) - Electrical Construction Materials Directory; current edition.

1.03 ADMINISTRATIVE REQUIREMENTS

- A. Coordination:
 - 1. Coordinate sizes of raceways, boxes, and equipment enclosures installed under other sections with actual conductors to be installed, including adjustments for conductor sizes increased for voltage drop.
 - 2. Coordinate with electrical equipment installed under other sections to provide terminations suitable for use with conductors to be installed.
 - 3. Notify Architect of any conflicts with or deviations from contract documents. Obtain direction before proceeding with work.

1.04 SUBMITTALS

- A. Submittals: Not Required.

1.05 QUALITY ASSURANCE

- A. Comply with requirements of NFPA 70.
- B. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section with minimum five years documented experience and with service facilities within 100 miles of Project.

- C. Products: Furnish products listed and classified by Underwriters Laboratories Inc. as suitable for purpose specified and indicated.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Receive, inspect, handle, and store conductors and cables in accordance with manufacturer's instructions.

1.07 FIELD CONDITIONS

- A. Do not install or otherwise handle thermoplastic-insulated conductors at temperatures lower than 14 degrees F (-10 degrees C), unless otherwise permitted by manufacturer's instructions. When installation below this temperature is unavoidable, notify Architect and obtain direction before proceeding with work.

PART 2 PRODUCTS

2.01 CONDUCTOR AND CABLE APPLICATIONS

- A. Concealed Dry Interior Locations: Use only building wire in raceway.
- B. Exposed Dry Interior Locations: Use only building wire in raceway.
- C. Above Accessible Ceilings: Use only building wire in raceway.
- D. Wet or Damp Interior Locations: Use only building wire in raceway.
- E. Exterior Locations: Use only building wire in raceway.
- F. Use single conductor unless multiconductor is indicated on drawings.
- G. Use stranded conductors for 8 AWG and larger.
- H. Use stranded conductors for control circuits.
- I. Use conductor not smaller than 12 AWG for power and lighting circuits.
- J. Use conductor not smaller than 16 AWG for control circuits.
- K. Use 10 AWG conductors for 20 ampere, 120 volt branch circuits longer than 75 feet (25 m).
- L. Use 10 AWG conductors for 20 ampere, 277 volt branch circuits longer than 200 feet (60 m).
- M. Conductor sizes are based on copper unless indicated as aluminum or "AL".

2.02 CONDUCTOR AND CABLE MANUFACTURERS

- A. Aetna Insulated Wire Company.
- B. AFC Cable Systems.
- C. American Insulated Wire Corporation.
- D. General Cable
- E. Houston Wire and Cable Company.
- F. The Okonite Company.
- G. Prysmian Power Cables and Systems (Pirelli Cable Corporation) www.us.prysmian.com.
- H. Service Wire Company.
- I. Southwire Company.

2.03 CONDUCTOR AND CABLE GENERAL REQUIREMENTS

- A. Provide products that comply with requirements of NFPA 70.
- B. Unless specifically indicated to be excluded, provide all required conduit, boxes, wiring, connectors, etc. as required for a complete operating system.
- C. Comply with NEMA WC 70.
- D. Thermoplastic-Insulated Conductors and Cables: Listed and labeled as complying with UL 83.

- E. Thermoset-Insulated Conductors and Cables: Listed and labeled as complying with UL 44.
- F. Conductor Material:
 - 1. Copper Conductors: Soft drawn annealed, 98 percent conductivity, uncoated copper conductors complying with ASTM B3, ASTM B8, or ASTM B787/B787M unless otherwise indicated.
 - 2. Tinned Copper Conductors: Comply with ASTM B33.
- G. Conductor Color Coding:
 - 1. Color code conductors as indicated unless otherwise required by authority having jurisdiction. Maintain consistent color coding throughout project.
 - 2. Color Coding Method: Integrally colored insulation.
 - 3. Color Code:
 - a. 480Y/277 V, 3 Phase, 4 Wire System:
 - 1) Phase A: Brown.
 - 2) Phase B: Orange.
 - 3) Phase C: Yellow.
 - 4) Neutral/Grounded: Gray.
 - b. 208Y/120 V, 3 Phase, 4 Wire System:
 - 1) Phase A: Black.
 - 2) Phase B: Red.
 - 3) Phase C: Blue.
 - 4) Neutral/Grounded: White.
 - c. Equipment Ground, All Systems: Green.
 - d. Travelers for 3-Way and 4-Way Switching: Pink.
 - e. For modifications or additions to existing wiring systems, comply with existing color code when existing code complies with NFPA 70 and is approved by the authority having jurisdiction.
 - f. For control circuits, comply with manufacturer's recommended color code.

2.04 SINGLE CONDUCTOR BUILDING WIRE

- A. Description: Single conductor insulated wire.
- B. Conductor: Copper.
- C. Insulation Voltage Rating: 600 volts.
- D. Insulation: NFPA 70, Type THHN/THWN-2 or XHHW-2.

2.05 WIRING CONNECTORS

- A. Description: Wiring connectors appropriate for the application, suitable for use with the conductors to be connected, and listed as complying with UL 486A-486B or UL 486C as applicable.

2.06 ACCESSORIES

- A. Electrical Tape:
 - 1. Vinyl Insulating Electrical Tape: Complying with ASTM D3005 and listed as complying with UL 510; minimum thickness of 7 mil (0.18 mm); resistant to abrasion, corrosion, and sunlight; conformable for application down to 0 degrees F (-18 degrees C) and suitable for continuous temperature environment up to 221 degrees F (105 degrees C).
- B. Wire Pulling Lubricant: Listed; suitable for use with the conductors or cables to be installed and suitable for use at the installation temperature.
- C. Cable Ties: Material and tensile strength rating suitable for application.

2.07 LUBRICATING COMPOUND

- A. Acceptable Manufacturers.
 - 1. American Polywater Corporation.
 - 2. Greenlee Textron.
 - 3. Ideal Industries Incorporated.
 - 4. Thomas and Betts.
 - 5. 3M.
- B. Substitutions: See Section 01 6000 - Product Requirements.

2.08 INSULATING TAPE

- A. Acceptable Products.
 - 1. For general use: 33 Plus by 3M Company.
 - 2. For high temperature use: 27 by 3M Company.
- B. Substitutions: See Section 01 6000 - Product Requirements.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that interior of building has been protected from weather.
- B. Verify that work likely to damage wire and cable has been completed.
- C. Verify that raceways, boxes, and equipment enclosures are installed and are properly sized to accommodate conductors and cables in accordance with NFPA 70.
- D. Verify that raceway installation is complete and supported.
- E. Verify that field measurements are as indicated.
- F. Verify that conditions are satisfactory for installation prior to starting work.

3.02 PREPARATION

- A. Clean raceways thoroughly to remove foreign materials before installing conductors and cables.

3.03 INSTALLATION

- A. Circuiting Requirements:
- B. Install products in accordance with manufacturer's instructions.
- C. Install conductors and cable securely in a neat and workmanlike manner in accordance with NECA 1.
- D. Installation in Raceway:
 - 1. Tape ends of conductors and cables to prevent infiltration of moisture and other contaminants.
 - 2. Pull all conductors and cables together into raceway at same time.
 - 3. Do not damage conductors and cables or exceed manufacturer's recommended maximum pulling tension and sidewall pressure.
 - 4. Use suitable wire pulling lubricant where necessary, except when lubricant is not recommended by the manufacturer.
- E. Install conductors with a minimum of 12 inches (300 mm) of slack at each outlet.
- F. Neatly train and bundle conductors inside boxes, wireways, panelboards and other equipment enclosures.
- G. Group or otherwise identify neutral/grounded conductors with associated ungrounded conductors inside enclosures in accordance with NFPA 70.

- H. Make wiring connections using specified wiring connectors.
 - 1. Make splices, taps, and terminations to carry full ampacity of conductors with no perceptible temperature rise.
 - 2. Make splices and taps only in accessible boxes. Do not pull splices into raceways or make splices in conduit bodies or wiring gutters.
 - 3. Remove appropriate amount of conductor insulation for making connections without cutting, nicking or damaging conductors.
 - 4. Do not remove conductor strands to facilitate insertion into connector.
 - 5. Clean contact surfaces on conductors and connectors to suitably remove corrosion, oxides, and other contaminants. Do not use wire brush on plated connector surfaces.
- I. Insulate splices and taps that are made with uninsulated connectors using methods suitable for the application, with insulation and mechanical strength at least equivalent to unspliced conductors.
- J. Insulate ends of spare conductors using vinyl insulating electrical tape.
- K. Identify conductors and cables in accordance with Section 26 0553. Identify each conductor with its circuit number or other designation indicated.
- L. Unless specifically indicated to be excluded, provide final connections to all equipment and devices, including those furnished by others, as required for a complete operating system.
- M. Install in raceway, except where exposed wiring is indicated or specified.
- N. Use wiring methods indicated.
- O. Install conductors so bending radius is not less than minimum recommended by ICEA or manufacturer.
- P. Install conductors continuous, without splices between devices.
- Q. Where splices are required, use splice boxes, do not use fittings for splices.
- R. To terminate copper lugs on aluminum bus, use Belleville washer and two tin or cadmium plated washers, one on either side in combination with aluminum joint compound on contacting surfaces. Tighten bolts until Belleville washer is flat.
- S. Use solderless pressure connectors with insulating covers for copper conductor splices and taps, 8 AWG and smaller.
- T. Use insulated spring wire connectors with plastic caps for copper conductor splices and taps, 10 AWG and smaller.
- U. Insulate bare surfaces of conductors with four layers (half lap in two directions) of electrical insulating tape.
- V. Connect power wiring to equipment for phasing A-B-C-N left to right, top to bottom, and front to back, where possible, and permanently identify phasing on structure or housing adjacent to connection.
- W. Phase identification A-B-C is equivalent to transformer phase identification X1-X2-X3 and H1-H2-H3.

3.04 FIELD QUALITY CONTROL

- A. Inspect and test in accordance with NETA ATS, except Section 4.
- B. Perform inspections and tests listed in NETA STD ATS, Section 7.3.2. Insulation resistance test is required for all conductors. Resistance test for parallel conductors listed as optional is not required.
- C. Correct deficiencies and replace damaged or defective conductors and cables.

END OF SECTION

SECTION 26 0526 - GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS

PART 1 GENERAL

1.01 REFERENCE STANDARDS

- A. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2010.
- B. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- C. UL(ECMD) - Electrical Construction Materials Directory; current edition.
- D. UL 467 - Grounding and Bonding Equipment; Current Edition, Including All Revisions.

1.02 QUALITY ASSURANCE

- A. Comply with requirements of NFPA 70.

PART 2 PRODUCTS

2.01 GROUNDING AND BONDING REQUIREMENTS

- A. Do not use products for applications other than as permitted by NFPA 70 and product listing.
- B. Unless specifically indicated to be excluded, provide all required components, conductors, connectors, conduit, boxes, fittings, supports, accessories, etc. as necessary for complete grounding and bonding system.
- C. Where conductor size is not indicated, size to comply with NFPA 70 but not less than applicable minimum size requirements specified.

2.02 GROUNDING AND BONDING COMPONENTS

- A. General Requirements:
 - 1. Provide products listed, classified, and labeled by Underwriter's Laboratories Inc. (UL) or testing firm acceptable to authority having jurisdiction as suitable for purpose indicated.
 - 2. Provide products listed and labeled as complying with UL 467 where applicable.
- B. Conductors for Grounding and Bonding, in Addition to Requirements of Section 26 0526:
 - 1. Use insulated copper conductors unless otherwise indicated.
- C. Connectors for Grounding and Bonding:
 - 1. Description: Connectors appropriate for application and suitable for conductors and items to be connected; listed and labeled as complying with UL 467.
 - 2. Unless otherwise indicated, use mechanical connectors or compression connectors for accessible connections.

PART 3 EXECUTION

3.01 GROUNDING CONDUCTOR REQUIREMENTS

- A. General use above and below grade: bare or insulated.
- B. In conduit with phase conductors: insulated.

3.02 INSTALLATION

- A. Install products in accordance with manufacturer's instructions.
- B. Install grounding and bonding system components in neat and workmanlike manner in accordance with NECA 1.
- C. Make grounding and bonding connections using specified connectors.
 - 1. Remove appropriate amount of conductor insulation for making connections without cutting, nicking or damaging conductors. Do not remove conductor strands to facilitate insertion into connector.
 - 2. Remove nonconductive paint, enamel, or similar coating at threads, contact points, and contact surfaces.

- 3. Mechanical Connectors: Secure connections according to manufacturer's recommended torque settings.
- 4. Compression Connectors: Secure connections using manufacturer's recommended tools and dies.
- D. Identify grounding and bonding system components in accordance with Section 26 0553.
- E. Bond ground conductor to conduit at each end of metallic conduit used for mechanical protection of ground conductor.

END OF SECTION

SECTION 26 0529 - HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS

PART 1 GENERAL

1.01 REFERENCE STANDARDS

- A. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2017.
- B. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2016a.
- C. ASTM B633 - Standard Specification for Electrodeposited Coatings of Zinc on Iron and Steel; 2019.
- D. MFMA-4 - Metal Framing Standards Publication; 2004.
- E. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2010.
- F. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

1.02 ADMINISTRATIVE REQUIREMENTS

- A. Coordination:
 - 1. Coordinate compatibility of support and attachment components with mounting surfaces at the installed locations.
 - 2. Coordinate the arrangement of supports with ductwork, piping, equipment and other potential conflicts installed under other sections or by others.
 - 3. Notify Architect of any conflicts with or deviations from Contract Documents. Obtain direction before proceeding with work.

PART 2 PRODUCTS

2.01 SUPPORT AND ATTACHMENT COMPONENTS

- A. General Requirements:
 - 1. Provide all required hangers, supports, anchors, fasteners, fittings, accessories, and hardware as necessary for the complete installation of electrical work.
 - 2. Provide products listed, classified, and labeled as suitable for the purpose intended, where applicable.
 - 3. Do not use products for applications other than as permitted by NFPA 70 and product listing.
 - 4. Steel Components: Use corrosion resistant materials suitable for the environment where installed.
 - a. Zinc-Plated Steel: Electroplated in accordance with ASTM B633.
 - b. Galvanized Steel: Hot-dip galvanized after fabrication in accordance with ASTM A123/A123M or ASTM A153/A153M.
- B. Conduit and Cable Supports: Straps, clamps, etc. suitable for the conduit or cable to be supported.
 - 1. Conduit Straps: One-hole or two-hole type; steel or malleable iron.
 - 2. Conduit Clamps: Bolted type unless otherwise indicated.
 - 3. Manufacturers:
 - a. Cooper Crouse-Hinds, a division of Eaton Corporation: www.cooperindustries.com.
 - b. Erico International Corporation: www.erico.com.
 - c. HoldRite, a brand of Reliance Worldwide Corporation: www.holdrite.com.
 - d. O-Z/Gedney, a brand of Emerson Electric Co: www.emerson.com.
 - e. Thomas & Betts Corporation: www.tnb.com.
- C. Outlet Box Supports: Hangers, brackets, etc. suitable for the boxes to be supported.

- D. Metal Channel (Strut) Framing Systems: Factory-fabricated continuous-slot metal channel (strut) and associated fittings, accessories, and hardware required for field-assembly of supports.
 - 1. Comply with MFMA-4.
- E. Hanger Rods: Threaded zinc-plated steel unless otherwise indicated.
 - 1. Minimum Size, Unless Otherwise Indicated or Required:
 - a. Single Conduit up to 1 inch (27 mm) trade size: 1/4 inch (6 mm) diameter.
 - b. Outlet Boxes: 1/4 inch (6 mm) diameter.
- F. Anchors and Fasteners:
 - 1. Unless otherwise indicated and where not otherwise restricted, use the anchor and fastener types indicated for the specified applications.
 - 2. Concrete: Use expansion anchors or screw anchors.
 - 3. Solid or Grout-Filled Masonry: Use expansion anchors or screw anchors.
 - 4. Hollow Masonry: Use toggle bolts.
 - 5. Hollow Stud Walls: Use toggle bolts.
 - 6. Steel: Use beam clamps, machine bolts, or welded threaded studs.
 - 7. Sheet Metal: Use sheet metal screws.
 - 8. Wood: Use wood screws.
 - 9. Plastic and lead anchors are not permitted.
 - 10. Powder-actuated fasteners are not permitted.
 - 11. Hammer-driven anchors and fasteners are not permitted.
 - 12. Post-Installed Concrete and Masonry Anchors: Evaluated and recognized by ICC Evaluation Service, LLC (ICC-ES) for compliance with applicable building code.
 - 13. Manufacturers - Mechanical Anchors:
 - a. Hilti, Inc.: www.us.hilti.com.
 - b. ITW Red Head, a division of Illinois Tool Works, Inc.: www.itwredhead.com.
 - c. Powers Fasteners, Inc.: www.powers.com.
 - d. Simpson Strong-Tie Company Inc.: www.strongtie.com.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that field measurements are as indicated.
- B. Verify that mounting surfaces are ready to receive support and attachment components.
- C. Verify that conditions are satisfactory for installation prior to starting work.

3.02 INSTALLATION

- A. Install products in accordance with manufacturer's instructions.
- B. Perform work in accordance with NECA 1 (general workmanship).
- C. Install anchors and fasteners in accordance with ICC Evaluation Services, LLC (ICC-ES) evaluation report conditions of use where applicable.
- D. Provide independent support from building structure. Do not provide support from piping, ductwork, or other systems.
- E. Unless specifically indicated or approved by Architect, do not provide support from roof deck.
- F. Do not penetrate or otherwise notch or cut structural members without approval of Structural Engineer.
- G. Equipment Support and Attachment:
 - 1. Use metal fabricated supports or supports assembled from metal channel (strut) to support equipment as required.
- H. Secure fasteners according to manufacturer's recommended torque settings.
- I. Remove temporary supports.

3.03 FIELD QUALITY CONTROL

- A. Inspect support and attachment components for damage and defects.
- B. Repair cuts and abrasions in galvanized finishes using zinc-rich paint recommended by manufacturer. Replace components that exhibit signs of corrosion.
- C. Correct deficiencies and replace damaged or defective support and attachment components.

END OF SECTION

SECTION 26 0533.13 - CONDUIT FOR ELECTRICAL SYSTEMS

PART 1 GENERAL

1.01 RELATED REQUIREMENTS

- A. Section 26 0526 - Grounding and Bonding for Electrical Systems.
- B. Section 26 0529 - Hangers and Supports for Electrical Systems.

1.02 REFERENCE STANDARDS

- A. ANSI C80.1 - American National Standard for Electrical Rigid Steel Conduit (ERSC); 2005.
- B. ANSI C80.3 - American National Standard for Steel Electrical Metallic Tubing (EMT); 2005.
- C. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2010.
- D. NECA 101 - Standard for Installing Steel Conduits (Rigid, IMC, EMT); 2013.
- E. NEMA FB 1 - Fittings, Cast Metal Boxes, and Conduit Bodies for Conduit, Electrical Metallic Tubing, and Cable; 2012.
- F. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- G. UL 1 - Flexible Metal Conduit; Current Edition, Including All Revisions.
- H. UL 6 - Electrical Rigid Metal Conduit-Steel; Current Edition, Including All Revisions.
- I. UL 360 - Liquid-Tight Flexible Steel Conduit; Current Edition, Including All Revisions.
- J. UL 514B - Conduit, Tubing, and Cable Fittings; Current Edition, Including All Revisions.
- K. UL 797 - Electrical Metallic Tubing-Steel; Current Edition, Including All Revisions.

1.03 ADMINISTRATIVE REQUIREMENTS

- A. Coordination:
 - 1. Coordinate minimum sizes of conduits with the actual conductors to be installed, including adjustments for conductor sizes increased for voltage drop.
 - 2. Coordinate arrangement of conduits with structural members, ductwork, piping, equipment and other potential conflicts installed under other sections or by others.
 - 3. Verify exact conduit termination locations required for boxes, enclosures, and equipment installed under other sections or by others.
 - 4. Notify Architect of any conflicts with or deviations from contract documents. Obtain direction before proceeding with work.
- B. Sequencing:
 - 1. Do not begin installation of conductors and cables until installation of conduit is complete between outlet, junction and splicing points.

1.04 SUBMITTALS

- A. No product submittals required.

1.05 QUALITY ASSURANCE

- A. Comply with requirements of NFPA 70.
- B. Products: Listed and classified by Underwriters Laboratories Inc. as suitable for purpose specified and shown.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Receive, inspect, handle, and store conduit and fittings in accordance with manufacturer's instructions.
- B. Accept conduit on site. Inspect for damage.
- C. Protect conduit from corrosion and entrance of debris by storing above grade. Provide appropriate covering.

PART 2 PRODUCTS

2.01 CONDUIT APPLICATIONS

- A. Do not use conduit and associated fittings for applications other than as permitted by NFPA 70 and product listing.
- B. Unless otherwise indicated and where not otherwise restricted, use conduit types indicated for specified applications. Where more than one listed application applies, comply with most restrictive requirements. Where conduit type for particular application is not specified, use galvanized steel rigid metal conduit.

2.02 CONDUIT REQUIREMENTS

- A. Provide conduit, fittings, supports, and accessories required for a complete raceway system.
- B. Provide products listed, classified, and labeled by Underwriter's Laboratories Inc. (UL) or testing firm acceptable to authority having jurisdiction as suitable for purpose indicated.
- C. Where conduit size is not indicated, size to comply with NFPA 70 but not less than applicable minimum size requirements specified.
- D. Conduit Size: Comply with NFPA 70 unless larger size is indicated on Contract Documents.
 - 1. Minimum Size: 3/4 inch (19 mm) unless otherwise specified.
- E. Wet and Damp Locations.
 - 1. Use rigid steel conduit.
 - 2. Final Connection to Equipment Subject to Vibration or Motion: Use liquidtight flexible metal conduit.
- F. Dry Locations.
 - 1. Concealed: Use rigid steel conduit or electrical metallic tubing.
 - 2. Exposed.
 - a. General: Use rigid steel conduit.
 - 3. Service to Individual Recessed Fixtures: Use flexible metal conduit.
 - a. Minimum size 3/8 inch.
 - 4. Fixture Support Stems: Use rigid steel conduit.
 - 5. Final Connection to Transformers and Equipment Subject to Vibration or Movement: Use flexible metal conduit.
 - 6. Final Connection to Motors: Use liquidtight flexible metal conduit.

2.03 GALVANIZED STEEL RIGID METAL CONDUIT (RMC)

- A. Description: NFPA 70, Type RMC galvanized steel rigid metal conduit complying with ANSI C80.1 and listed and labeled as complying with UL 6.
- B. Fittings:
 - 1. Non-Hazardous Locations: Use fittings complying with NEMA FB 1 and listed and labeled as complying with UL 514B.
 - 2. Material: Use steel or malleable iron.
 - 3. Connectors and Couplings: Use threaded type fittings only. Threadless set screw and compression (gland) type fittings are not permitted.

2.04 METAL CONDUIT

- A. Manufacturers.
 - 1. Allied Tube & Conduit: www.alliedtube.com.
 - 2. Beck Manufacturing, Inc.: www.beckmfg.com.
 - 3. Picoma: www.picoma.com.
 - 4. Wheatland Tube Company: www.wheatland.com.
 - 5. Substitutions: See Section 01 6000 - Product Requirements.

- B. Rigid Steel Conduit: Zinc coated, threaded steel in accordance with ANSI C80.1.
 - 1. Fittings: Malleable iron or steel, zinc or cadmium plated.
 - a. Taper threads.
 - b. Screw attached cover plates.
 - c. Gaskets in damp, wet or industrial areas.
 - 2. Expansion Fittings: Malleable iron or steel, zinc or cadmium plated.
 - a. Threaded end caps for receiving fixed and moveable conduits.
 - b. Metallic pressure packing.
 - c. Copper bonding jumper assembly.
 - d. Movement of conduit: 4 inch minimum.
 - 3. Locknuts: Malleable iron or steel, zinc or cadmium plated.
 - 4. Bushings for 1 inch and smaller.
 - a. Rigid insulating plastic.
 - b. Flame retardant, thermosetting plastic.
 - 5. Bushings for 1-1/4 inch and larger.
 - a. Malleable iron or steel, zinc or cadmium plated.
 - b. Flame retardant, thermosetting plastic insulating insert molded into bushing.
- C. Fittings and Conduit Bodies: NEMA FB 1; material to match conduit.

2.05 FLEXIBLE METAL CONDUIT (FMC)

- A. Manufacturers.
 - 1. AFC Cable Systems, Inc.: www.afcweb.com.
 - 2. Electri-Flex Company: www.electriflex.com.
 - 3. International Metal Hose: www.metalhose.com.
 - 4. Substitutions: See Section 01 6000 - Product Requirements.
- B. Description: NFPA 70, Type FMC standard wall steel flexible metal conduit listed and labeled as complying with UL 1, and listed for use in classified firestop systems to be used.
- C. Fittings:
 - 1. Description: Fittings complying with NEMA FB 1 and listed and labeled as complying with UL 514B.
 - 2. Material: Use steel or malleable iron.
- D. Fittings: NEMA FB 1.
 - 1. Secured by clamping action around periphery of conduit.
 - 2. Use of setscrews to anchor conduit is unacceptable.

2.06 LIQUIDTIGHT FLEXIBLE METAL CONDUIT (LFMC)

- A. Manufacturers.
 - 1. AFC Cable Systems, Inc.: www.afcweb.com.
 - 2. Electri-Flex Company: www.electriflex.com.
 - 3. International Metal Hose: www.metalhose.com.
 - 4. Substitutions: See Section 01 6000 - Product Requirements.
- B. Description: NFPA 70, Type LFMC polyvinyl chloride (PVC) jacketed steel flexible metal conduit listed and labeled as complying with UL 360.
- C. Fittings:
 - 1. Description: Fittings complying with NEMA FB 1 and listed and labeled as complying with UL 514B.
 - 2. Material: Use steel or malleable iron.

2.07 ELECTRICAL METALLIC TUBING (EMT)

- A. Manufacturers.
 - 1. Allied Tube & Conduit: www.alliedeg.com.
 - 2. Beck Manufacturing, Inc.: www.beckmfg.com.
 - 3. Wheatland Tube Company: www.wheatland.com.

- B. Description: NFPA 70, Type EMT steel electrical metallic tubing complying with ANSI C80.3 and listed and labeled as complying with UL 797.
- C. Fittings:
 - 1. Description: Fittings complying with NEMA FB 1 and listed and labeled as complying with UL 514B.
 - 2. Material: Use steel or malleable iron.
 - 3. Connectors and Couplings: Use compression (gland) type.
 - a. Do not use indenter type connectors and couplings.
- D. Fittings: NEMA FB 1.
 - 1. Zinc-plated steel.
 - 2. Compression type.

2.08 ACCESSORIES

- A. Conduit Joint Compound: Corrosion-resistant, electrically conductive; suitable for use with the conduit to be installed.
- B. Pull Strings: Use nylon cord with average breaking strength of not less than 200 pound-force (890 N).

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that field measurements are as indicated.
- B. Verify that mounting surfaces are ready to receive conduits.
- C. Verify that conditions are satisfactory for installation prior to starting work.

3.02 INSTALLATION

- A. Install products in accordance with manufacturer's instructions.
- B. Install conduit securely in neat and workmanlike manner in accordance with NECA 1.
- C. Install galvanized steel rigid metal conduit (RMC) in accordance with NECA 101.
- D. Conduit Routing:
 - 1. Unless dimensioned, conduit routing indicated is diagrammatic.
 - 2. When conduit destination is indicated without specific routing, determine exact routing required.
 - 3. Verify routing and termination locations of conduit prior to rough-in.
 - 4. Route exposed conduit parallel and perpendicular to walls.
 - 5. Arrange conduit to maintain adequate headroom, clearances, and access, and present neat appearance
 - 6. Bends and offsets.
 - a. Make changes in direction of conduit runs with symmetrical bends, fittings, or pull boxes.
 - b. Do not use bends around outside corners, use fittings.
 - c. Minimum Radius of Curvature.
 - 1) 24 inches for 2 and 2-1/2 inch conduit.
 - 2) 36 inches for 3 inch and larger conduits.
 - 7. Use conduit bodies to make sharp changes in direction, as around beams. Use hydraulic one shot bender to fabricate bends in metal conduit larger than 2 inch (50 mm) size.
 - 8. Except where conduit runs are shown in exact detail, install pull points at maximum of 200 foot intervals in straight runs.
- E. Conduit Support:
 - 1. Secure and support conduits in accordance with NFPA 70 and Section 26 0529 using suitable supports and methods approved by authority having jurisdiction.
 - 2. Provide independent support from building structure. Do not provide support from piping, ductwork, or other systems.

3. Arrange supports to prevent misalignment during wiring installation.
 4. Support single conduits using coated steel or malleable iron straps, lay-in adjustable hangers, clevis hangers, and split hangers.
 5. Support exposed conduit at minimum of.
 - a. Every 8 feet for conduit smaller than 2 inches.
 - b. Every 10 feet for conduit 2 inches and larger.
- F. Connections and Terminations:
1. Use approved zinc-rich paint or conduit joint compound on field-cut threads of galvanized steel conduits prior to making connections.
 2. Where two threaded conduits must be joined and neither can be rotated, use three-piece couplings or split couplings. Do not use running threads.
 3. Provide conduit nipples with two independent sets of threads.
 4. Use suitable adapters where required to transition from one type of conduit to another.
 5. Provide drip loops for liquidtight flexible conduit connections to prevent drainage of liquid into connectors.
 6. Terminate threaded conduits in boxes and enclosures using threaded hubs or double lock nuts for dry locations and raintight hubs for wet locations.
 7. Double Locknuts and Bushings.
 - a. Install on rigid conduit terminations into threadless openings.
 - b. Increase length of conduit threads at terminations sufficiently to allow bushing to be fully seated against end of conduit.
 8. Use conduit hubs to fasten conduit to sheet metal boxes in damp and wet locations.
 9. Provide insulating bushings or insulated throats at all conduit terminations to protect conductors.
 10. Secure joints and connections to provide maximum mechanical strength and electrical continuity.
 11. Where conduit joints occur in wet or damp locations, or in concrete encasement, make joints watertight by applying an acceptable compound on the entire thread area before assembling.
 12. Use suitable caps to protect installed conduit against entrance of dirt and moisture.
- G. Penetrations:
1. Do not penetrate or otherwise notch or cut structural members, including footings and grade beams, without approval of Structural Engineer.
 2. Make penetrations perpendicular to surfaces unless otherwise indicated.
 3. Provide sleeves for penetrations as indicated or as required to facilitate installation. Set sleeves flush with exposed surfaces unless otherwise indicated or required.
 4. Install conduit sleeves for exposed conduits or cables passing through walls, floors or other masonry construction.
 - a. Extend conduit sleeves 2 inches past outside surface of wall or floor.
 - b. Fill void between sleeve and conduit with suitable caulking to maintain rating of wall or floor. Fill void flush with end of sleeve.
 5. Conceal bends for conduit risers emerging above ground.
 6. Seal interior of conduits entering the building from underground at first accessible point to prevent entry of moisture and gases.
 7. Where conduits penetrate waterproof membrane, seal as required to maintain integrity of membrane.
- H. Conduit Movement Provisions: Where conduits are subject to movement, provide expansion and expansion/deflection fittings to prevent damage to enclosed conductors or connected equipment. This includes, but is not limited to:
1. Where conduits cross structural joints intended for expansion, contraction, or deflection.

- I. Condensation Prevention: Where conduits cross barriers between areas of potential substantial temperature differential, provide sealing fitting or approved sealing compound at accessible point near penetration to prevent condensation. This includes, but is not limited to:
 - 1. Where conduits pass from outdoors into conditioned interior spaces.
 - 2. Where conduits pass from unconditioned interior spaces into conditioned interior spaces.
- J. Provide grounding and bonding in accordance with Section 26 0526.
- K. Cut conduit square using saw or pipecutter; de-burr cut ends.
- L. Bring conduit to shoulder of fittings; fasten securely.

3.03 FIELD QUALITY CONTROL

- A. Repair cuts and abrasions in galvanized finishes using zinc-rich paint recommended by manufacturer. Replace components that exhibit signs of corrosion.
- B. Correct deficiencies and replace damaged or defective conduits.

3.04 CLEANING

- A. Clean interior of conduits to remove moisture and foreign matter.

3.05 PROTECTION

- A. Immediately after installation of conduit, use suitable manufactured plugs to provide protection from entry of moisture and foreign material and do not remove until ready for installation of conductors.

END OF SECTION

SECTION 26 0533.16 - BOXES FOR ELECTRICAL SYSTEMS

PART 1 GENERAL

1.01 RELATED REQUIREMENTS

- A. Section 26 0529 - Hangers and Supports for Electrical Systems.
- B. Section 26 0533.13 - Conduit for Electrical Systems:
 - 1. Conduit bodies and other fittings.
 - 2. Additional requirements for locating boxes to limit conduit length and/or number of bends between pulling points.
- C. Section 26 0553 - Identification for Electrical Systems: Identification products and requirements.
- D. Section 26 2726 - Wiring Devices:
 - 1. Additional requirements for locating boxes for wiring devices.

1.02 REFERENCE STANDARDS

- A. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2010.
- B. NECA 130 - Standard for Installing and Maintaining Wiring Devices; 2010.
- C. NEMA FB 1 - Fittings, Cast Metal Boxes, and Conduit Bodies for Conduit, Electrical Metallic Tubing, and Cable; 2012.
- D. NEMA OS 1 - Sheet-Steel Outlet Boxes, Device Boxes, Covers, and Box Supports; 2013.
- E. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- F. UL 514A - Metallic Outlet Boxes; Current Edition, Including All Revisions.

1.03 ADMINISTRATIVE REQUIREMENTS

- A. Coordination:
 - 1. Coordinate work with other trades to avoid placement of ductwork, piping, equipment, or other potential obstructions within dedicated equipment spaces and working clearances for electrical equipment required by NFPA 70.
 - 2. Coordinate arrangement of electrical equipment with dimensions and clearance requirements of actual equipment to be installed.
 - 3. Coordinate minimum sizes of boxes with actual installed arrangement of conductors, clamps, support fittings, and devices, calculated according to NFPA 70.
 - 4. Coordinate minimum sizes of pull boxes with actual installed arrangement of connected conduits, calculated according to NFPA 70.
 - 5. Coordinate placement of boxes with millwork, furniture, devices, equipment, etc. installed under other sections or by others.
 - 6. Coordinate work with other trades to preserve insulation integrity.
 - 7. Coordinate work with other trades to provide walls suitable for installation of flush-mounted boxes where indicated.
 - 8. Notify Architect of any conflicts with or deviations from contract documents. Obtain direction before proceeding with work.

1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. No product submittals required.
- C. Project Record Documents: Record actual locations and mounting heights of outlet and device boxes, junction boxes, and pull boxes.

1.05 QUALITY ASSURANCE

- A. Comply with requirements of NFPA 70.
- B. Products: Provide products listed and classified by Underwriters Laboratories Inc., as suitable for purpose specified and indicated.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Receive, inspect, handle, and store products in accordance with manufacturer's instructions.

PART 2 PRODUCTS

2.01 BOXES

- A. General Requirements:
 - 1. Do not use boxes and associated accessories for applications other than as permitted by NFPA 70 and product listing.
 - 2. Provide all boxes, fittings, supports, and accessories required for a complete raceway system and to accommodate devices and equipment to be installed.
 - 3. Provide products listed, classified, and labeled as suitable for the purpose intended.
 - 4. Where box size is not indicated, size to comply with NFPA 70 but not less than applicable minimum size requirements specified.
 - 5. Provide 20 per cent spare capacity in all enclosures.
 - 6. Provide grounding terminals within boxes where equipment grounding conductors terminate.
- B. Outlet and Device Boxes Up to 100 cubic inches (1,650 cu cm), Including Those Used as Junction and Pull Boxes:
 - 1. Use sheet-steel boxes for dry locations unless otherwise indicated or required.
 - 2. Use cast iron boxes for damp or wet locations unless otherwise indicated or required; furnish with compatible weatherproof gasketed covers.
 - 3. Use suitable concrete type boxes where flush-mounted in concrete.
 - 4. Use suitable masonry type boxes where flush-mounted in masonry walls.
 - 5. Use raised covers suitable for the type of wall construction and device configuration where required.
 - 6. Use shallow boxes where required by type of wall construction.
 - 7. Do not use "through-wall" boxes designed for access from both sides of wall.
 - 8. Sheet-Steel Boxes: Comply with NEMA OS 1, and list and label as complying with UL 514A.
 - 9. Cast Metal Boxes: Comply with NEMA FB 1, and list and label as complying with UL 514A; furnish with threaded hubs.
 - 10. Boxes for Supporting Luminaires and Ceiling Fans: Listed as suitable for type and weight of load to be supported; furnished with fixture stud to accommodate mounting of luminaire where required.
 - 11. Boxes for Ganged Devices: Use multigang boxes of single-piece construction. Do not use field-connected gangable boxes unless specifically indicated or permitted.
 - 12. Minimum Box Size, Unless Otherwise Indicated:
 - a. Wiring Devices (Other Than Communications Systems Outlets): 4 inch square by 1-1/2 inch deep (100 by 38 mm) trade size.
 - b. Communications Systems Outlets: 4 inch square by 2-1/8 inch (100 by 54 mm) trade size.
 - 13. Wall Plates: Comply with Section 26 2726.

14. Manufacturers:
 - a. Cooper Crouse-Hinds, a division of Cooper Industries: www.cooperindustries.com.
 - b. Hubbell Incorporated; Bell Products: www.hubbell-bell.com.
 - c. Hubbell Incorporated; RACO Products: www.hubbell-raco.com.
 - d. O-Z/Gedney, a brand of Emerson Industrial Automation: www.emersonindustrial.com.
 - e. Thomas & Betts Corporation: www.tnb.com.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that field measurements are as indicated.
- B. Verify that mounting surfaces are ready to receive boxes.
- C. Verify that conditions are satisfactory for installation prior to starting work.

3.02 INSTALLATION

- A. Install products in accordance with manufacturer's instructions.
- B. Install boxes in accordance with NECA 1 (general workmanship) and, where applicable, NECA 130, including mounting heights specified in those standards where mounting heights are not indicated.
- C. Arrange equipment to provide minimum clearances in accordance with manufacturer's instructions and NFPA 70.
- D. Unless otherwise indicated, provide separate boxes for line voltage and low voltage systems.
- E. Unless otherwise indicated, boxes may be surface-mounted where exposed conduits are indicated or permitted.
- F. Box Locations:
 1. Unless dimensioned, box locations indicated are approximate.
 2. Locate boxes as required for devices installed under other sections or by others.
 - a. Switches, Receptacles, and Other Wiring Devices: Comply with Section 26 2726.
 3. Locate boxes so that wall plates do not span different building finishes.
 4. Locate boxes so that wall plates do not cross masonry joints.
 5. Unless otherwise indicated, where multiple outlet boxes are installed at the same location at different mounting heights, install along a common vertical center line.
 6. Fire Resistance Rated Walls: Install flush-mounted boxes such that the required fire resistance will not be reduced.
 7. Locate junction and pull boxes as indicated, as required to facilitate installation of conductors, and to limit conduit length and/or number of bends between pulling points in accordance with Section 26 0533.13.
- G. Box Supports:
 1. Secure and support boxes in accordance with NFPA 70 and Section 26 0529 using suitable supports and methods approved by the authority having jurisdiction.
 2. Provide independent support from building structure except for cast metal boxes (other than boxes used for fixture support) supported by threaded conduit connections in accordance with NFPA 70. Do not provide support from piping, ductwork, or other systems.
- H. Install boxes plumb and level.
- I. Flush-Mounted Boxes:
 1. Install boxes in noncombustible materials such as concrete, tile, gypsum, plaster, etc. so that front edge of box or associated raised cover is not set back from finished surface more than 1/4 inch (6 mm) or does not project beyond finished surface.
 2. Install boxes in combustible materials such as wood so that front edge of box or associated raised cover is flush with finished surface.

- 3. Repair rough openings around boxes in noncombustible materials such as concrete, tile, gypsum, plaster, etc. so that there are no gaps or open spaces greater than 1/8 inch (3 mm) at the edge of the box.
- J. Install boxes as required to preserve insulation integrity.
- K. Install permanent barrier between ganged wiring devices when voltage between adjacent devices exceeds 300 V.
- L. Close unused box openings.
- M. Install blank wall plates on junction boxes and on outlet boxes with no devices or equipment installed or designated for future use.
- N. Provide grounding and bonding in accordance with Section 26 0526.
- O. Identify boxes in accordance with Section 26 0553.
- P. Install boxes securely, in neat and workmanlike manner, as specified in NECA 1.
- Q. Install in locations as shown on drawings, and as required for splices, taps, wire pulling, equipment connections, and as required by NFPA 70.
- R. Size in accordance with NFPA 70 requirements for wiring space.
- S. Orient boxes to accommodate wiring devices oriented as specified in Section 26 2726.
- T. Align adjacent wall mounted outlet boxes for switches, thermostats, and similar devices.
- U. Locate flush mounting box in masonry wall to require cutting of masonry unit corner only. Coordinate masonry cutting to achieve neat opening.

3.03 ADJUSTING

- A. Install knockout closures in unused box openings.

3.04 CLEANING

- A. Clean interior of boxes to remove dirt, debris, plaster and other foreign material.
- B. Clean exposed surfaces and restore finish.

3.05 PROTECTION

- A. Immediately after installation, protect boxes from entry of moisture and foreign material until ready for installation of conductors.

END OF SECTION

SECTION 26 0553 - IDENTIFICATION FOR ELECTRICAL SYSTEMS

PART 1 GENERAL

1.01 RELATED REQUIREMENTS

- A. Section 26 0519 - Low-Voltage Electrical Power Conductors and Cables: Color coding for power conductors and cables 600 V and less; vinyl color coding electrical tape.

1.02 REFERENCE STANDARDS

- A. ANSI Z535.2 - American National Standard for Environmental and Facility Safety Signs; 2011.
- B. ANSI Z535.4 - American National Standard for Product Safety Signs and Labels; 2011.
- C. ASME A13.1 - Scheme for the Identification of Piping Systems; 2007 (ANSI/ASME A13.1).
- D. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- E. UL 969 - Marking and Labeling Systems; Current Edition, Including All Revisions.

1.03 ADMINISTRATIVE REQUIREMENTS

- A. Coordination:
 - 1. Verify final designations for equipment, systems, and components to be identified prior to fabrication of identification products.
- B. Sequencing:
 - 1. Coordinate with work of other trades.
 - 2. Do not install identification products until final surface finishes and painting are complete.

1.04 QUALITY ASSURANCE

- A. Conform to requirements of ASME A13.1 and NFPA 70.

1.05 FIELD CONDITIONS

- A. Do not install adhesive products when ambient temperature is lower than recommended by manufacturer.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Ideal Industries, Inc.: www.idealindustriesinc.com.
- B. Panduit Corporation: www.panduit.com.
- C. Thomas and Betts Corporation: www.tnb.com.

2.02 REQUIREMENTS

- A. Provide single type for each application category.
- B. Use manufacturer's standard products.
- C. Minimum character size and length of color field: Comply with ASME A13.1, Table 3, unless noted otherwise.
- D. Color: Comply with ASME A13.1 and NFPA 70.

2.03 MATERIALS

- A. Engraved Nameplates and Labels.
 - 1. Laminated phenolic engraving stock.
 - 2. Thickness: Not less than 0.062 inch.
 - 3. Legend: White background with black letters unless otherwise specified or required by national, state or local codes.

- B. Adhesive Labels.
 - 1. Preprinted, flexible, self-adhesive vinyl.
 - 2. Laminate over legend with clear, and chemical weather resistant coating.
- C. Colored Adhesive Tape.
 - 1. Self-adhesive vinyl tape.
 - 2. 1 inch wide by not less than 3 mils thick.
- D. Tape Markers.
 - 1. Vinyl or vinyl cloth, self-adhesive, wrap-around tape.
 - 2. Preprinted numbers and letters.
- E. Colored Plastic Sleeves.
 - 1. Flexible, preprinted, color-coded, acrylic bands.
 - 2. Pretensioned, wrap-around, to provide gripping action when placed in position.
 - 3. Sized to suite diameter of line identified.
- F. Fasteners for Plastic-Laminated, Fiberglass and Metal Signs.
 - 1. Self-tapping machine screws.
 - 2. No. 10/32 stainless steel with nuts, flat washers, and lock washers.
- G. Cable Ties.
 - 1. Fungus-inert self-extinguishing, type 6/6 nylon.
 - 2. One-piece, self-locking.
 - 3. Width: Not less than 3/16 inch.
 - 4. Tensile Strength: 50 pound minimum.
 - 5. Temperature Range: Minus 40 degrees C to 85 degrees C.

2.04 APPLICATION

- A. Provide identification where specified, indicated and as required by OSHA and NFPA 70.
- B. Coordinate names, abbreviations, colors, and other designations used for electrical identification with corresponding designations used in Contract Documents or required by codes and standards.
- C. Use consistent designations throughout project.
- D. Engraved Nameplates and Signs.
 - 1. For equipment identification on.
 - a. Electrical distribution and control equipment.
 - 2. Legends.
 - a. Starter, disconnect switch, transformer, combination starter and control panel.
 - 1) Device name.
 - 2) Protective device name and location.
 - 3) Load name.
 - 4) Character height: 3/16 inch.
- E. Conductor Identification.
 - 1. Conductor insulation color.
 - a. Factory apply to entire length of conductors.
 - b. Color code.
 - 1) Line and load circuits, AC or DC, above 100 volts: Black.
 - 2) AC control circuits, 150 volts and below: Red.
 - 3) DC control circuits, 150 volts and below: Blue.
 - 4) Equipment grounding conductors (noncurrent carrying): Green with or without white stripe.
 - 5) Grounded conductors (current carrying) 6 AWG and smaller: White.

2. Conductor phase identification.
 - a. Unique color scheme for each system voltage.
 - b. In absence of Owner's standard or existing site color scheme, use following.
 - 1) 480/277 volt system.
 - (a) Phase A: Brown.
 - (b) Phase B: Orange.
 - (c) Phase C: Yellow.
 - (d) Neutral: Gray.
 - (e) Ground: Green.
 - 2) 208/120 volt system.
 - (a) Phase A: Black.
 - (b) Phase B: Red.
 - (c) Phase C: Blue.
 - (d) Neutral: White.
 - (e) Ground: Green.
 - 3) Use color coding to identify phase and grounded conductors at each terminal and splice.
 - 4) Use consistent method throughout installation.
 - 5) Color coding system.
 - (a) Colored adhesive tape.
 - (1) Width: 1 inch.
 - (2) Half-lap turns for distance of 3 inches from terminal points, splices and taps.
 - (3) Last two laps without tension to prevent unwinding.
 - (4) Avoid obscuring cable identification markings.
 - (b) Colored cable ties.
 - (1) Apply in groups of three ties of specified color to each wire at each terminal and splice.
 - (2) Start 3 inches from terminal or splice.
 - (3) Space 3 inches apart.
3. Circuit identification.
 - a. Use consistent system of tags or adhesive labels.
 - b. Identify conductors at terminations and splices.
 - c. Provide circuit identification for.
 - 1) Conductors to be extended in future.
 - (a) Indicate source and circuit numbers.
 - 2) Multiple power and/or lighting circuits in same enclosure.
 - (a) Identify each conductor with source, voltage, circuit number and phase.
 - (b) Use color coding for voltage and phase identification.
 - 3) Multiple control and/or communications circuits in same enclosure.
 - (a) Identify each conductor by its system and circuit designation.

PART 3 EXECUTION

3.01 PREPARATION

- A. Clean surfaces to receive adhesive products according to manufacturer's instructions.

3.02 INSTALLATION

- A. Install products in accordance with manufacturer's instructions.
- B. Install identification products centered, level, and parallel with lines of item being identified.
- C. Install self-adhesive labels and markers to achieve maximum adhesion, with no bubbles or wrinkles and edges properly sealed.

- D. Install nameplates and labels parallel to equipment lines.
- E. Secure nameplates to equipment front using metallic drive screws except.
 - 1. Where otherwise specified.
 - 2. For devices subject to periodic replacement or removal for repair, mount nameplates separate from and adjacent to the device.
- F. Clean surfaces of dust, loose materials and oily films before applying adhesive identification products.
- G. Install cable ties with special tools or pliers. Tighten to snug fit and cut off excess.
- H. Complete panel directory for each panelboard.
 - 1. Clearly type directory and mount inside panel door.
 - 2. Provide complete description of items controlled by each individual breaker.

3.03 FIELD QUALITY CONTROL

- A. Replace self-adhesive labels and markers that exhibit bubbles, wrinkles, curling or other signs of improper adhesion.

END OF SECTION

SECTION 26 2726 - WIRING DEVICES

PART 1 GENERAL

1.01 RELATED REQUIREMENTS

- A. Section 26 0533.16 - Boxes for Electrical Systems.

1.02 REFERENCE STANDARDS

- A. FS W-C-596 - Connector, Electrical, Power, General Specification for; Federal Specification; Revision G, 2001.
- B. IEEE C62.41.1 - IEEE Guide on Surge Environment in Low Voltage (1000V and Less) AC Power Circuits; Institute of Electrical and Electronics Engineers; 2002 (Reaffirmed 2008).
- C. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2010.
- D. NEMA WD 1 - General Color Requirements for Wiring Devices; 1999 (R 2010).
- E. NEMA WD 6 - Wiring Devices - Dimensional Specifications; 2012.
- F. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- G. UL 20 - General-Use Snap Switches; Current Edition, Including All Revisions.
- H. UL 98 - Enclosed and Dead-Front Switches; Underwriters Laboratories; 2004 (2012).
- I. UL 498 - Attachment Plugs and Receptacles; Current Edition, Including All Revisions.
- J. UL 514D - Cover Plates for Flush-Mounted Wiring Devices; Current Edition, Including All Revisions.
- K. UL 943 - Ground-Fault Circuit-Interrupters; Current Edition, Including All Revisions.
- L. UL 1449 - Standard for Surge Protective Devices; Current Edition, Including All Revisions.

1.03 ADMINISTRATIVE REQUIREMENTS

- A. Coordination:
 - 1. Coordinate placement of outlet boxes with millwork, furniture, equipment, etc. installed under other sections or by others.
 - 2. Coordinate installation and preparation of uneven surfaces, such as split face block, to provide suitable surface for installation of wiring devices.
 - 3. Notify Architect of conflicts or deviations from contract documents to obtain direction prior to proceeding with work.
- B. Sequencing:
 - 1. Do not install wiring devices until final surface finishes and painting are complete.

1.04 QUALITY ASSURANCE

- A. Comply with requirements of NFPA 70.
- B. Products: Listed, classified, and labeled as suitable for the purpose intended.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Cooper Wiring Devices: www.cooperwiringdevices.com.
- B. Hubbell Incorporated: www.hubbell-wiring.com.
- C. Leviton Manufacturing Company, Inc.: www.leviton.com.
- D. Pass & Seymour, a brand of Legrand North America, Inc.: www.legrand.us.
- E. Source Limitations: Where possible, for each type of wiring device furnish products produced by single manufacturer and obtained from single supplier.

2.02 WIRING DEVICES

- A. Provide products listed and classified by Underwriters Laboratories Inc. as suitable for purpose specified and indicated.

2.03 REQUIREMENTS

- A. Wiring device colors in accordance with NEMA WD 1.
- B. Wiring device dimensions and receptacle configurations in accordance with NEMA WD 6.

2.04 WALL SWITCHES

- A. All Wall Switches: AC only, quiet operating, general-use snap switches with silver alloy contacts, complying with NEMA WD 1 and NEMA WD 6, and listed as complying with UL 20; types as indicated on drawings.
 - 1. Wiring Provisions: Terminal screws for side wiring and screw actuated binding clamp for back wiring with separate ground terminal screw.
- B. Switch Colors: Black.
- C. Industrial Grade.
 - 1. Operation: Toggle operated in walls.
 - 2. For use on AC Systems, direct lighting control.
 - 3. Industrial specification grade.
 - 4. Quiet type.
 - 5. Wiring: Back and side.
 - 6. Rated 20 amperes, 120/277 volts AC.
 - 7. Acceptable products: HBL1220 Series by Hubbell or equivalent from other acceptable manufacturers listed in Section 2.01.

2.05 RECEPTACLES

- A. All Receptacles: Self-grounding, complying with NEMA WD 1 and NEMA WD 6, and listed as complying with UL 498, and where applicable, FS W-C-596; types as indicated on drawings.
 - 1. Wiring Provisions: Terminal screws for side wiring or screw actuated binding clamp for back wiring with separate ground terminal screw.
 - 2. NEMA configurations specified are according to NEMA WD 6.
- B. GFCI Receptacles: Convenience receptacle with integral ground fault circuit interrupter to meet regulatory requirements.
 - 1. Color: Black.
 - 2. Duplex receptacle, 15 ampere, (GFCI) for 120V single phase service.
 - a. Characteristics.
 - 1) Configuration: NEMA 5-15R.
 - 2) Performance standard: UL Standard 943 Class A GFCI.
 - b. Acceptable products: GFR5252A Series by Hubbell or equivalent from acceptable manufacturers listed in Section 2.01.

2.06 WALL PLATES

- A. Wall Plates: Comply with UL 514D.
 - 1. Configuration: One piece cover as required for quantity and types of corresponding wiring devices.
 - 2. Size: Standard.
 - 3. Screws: Metal with slotted heads finished to match wall plate finish.
- B. Stainless Steel Wall Plates: Brushed satin finish, Type 302 stainless steel.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that field measurements are as shown on drawings.
- B. Verify that outlet boxes are installed in proper locations and at proper mounting heights and are properly sized to accommodate devices and conductors in accordance with NFPA 70.
- C. Verify that wall openings are neatly cut and will be completely covered by wall plates.
- D. Verify that final surface finishes are complete, including painting.
- E. Verify that branch circuit wiring installation is completed, tested, and ready for connection to wiring devices.
- F. Verify that conditions are satisfactory for installation prior to starting work.
- G. Coordinate with architectural plans and wall elevations.

3.02 PREPARATION

- A. Clean dirt, debris, plaster, and other foreign materials from outlet boxes.

3.03 INSTALLATION

- A. Perform work in neat and workmanlike manner in accordance with NECA 1 and, where applicable, NECA 130, including mounting heights specified in those standards unless otherwise indicated.
- B. Coordinate locations of outlet boxes provided under Section 26 0533.16 as required for installation of wiring devices provided under this section.
 - 1. Mounting Heights: Unless otherwise indicated, as follows:
 - a. Wall Switches: 48 inches (1200 mm) above finished floor.
 - b. Receptacles: 48 inches (1200mm) above finished floor.
- C. Install wiring devices in accordance with manufacturer's instructions.
- D. Install permanent barrier between ganged wiring devices when voltage between adjacent devices exceeds 300 V.
- E. Where required, connect wiring devices using pigtails not less than 6 inches (150 mm) long. Do not connect more than one conductor to wiring device terminals.
- F. Connect wiring devices by wrapping conductor clockwise 3/4 turn around screw terminal and tightening to proper torque specified by the manufacturer. Where present, do not use push-in pressure terminals that do not rely on screw-actuated binding.
- G. Unless otherwise indicated, connect wiring device grounding terminal to branch circuit equipment grounding conductor and to outlet box with bonding jumper.
- H. Install wiring devices plumb and level with mounting yoke held rigidly in place.
- I. Install wall switches with OFF position down.
- J. Install vertically mounted receptacles with grounding pole on top and horizontally mounted receptacles with grounding pole on left.
- K. Install wall plates to fit completely flush to wall with no gaps and rough opening completely covered without strain on wall plate. Repair or reinstall improperly installed outlet boxes or improperly sized rough openings. Do not use oversized wall plates in place of meeting this requirement.
- L. Install blank wall plates on junction boxes and on outlet boxes without wiring devices installed or designated for future use.

3.04 FIELD QUALITY CONTROL

- A. Inspect each wiring device for damage and defects.
- B. Operate each wall switch with circuit energized to verify proper operation.
- C. Test each receptacle to verify operation and proper polarity.
- D. Test each GFCI receptacle for proper tripping operation according to manufacturer's instructions.
- E. Correct wiring deficiencies and replace damaged or defective wiring devices.

3.05 ADJUSTING

- A. Adjust devices and wall plates to be flush and level.

3.06 CLEANING

- A. Clean exposed surfaces to remove dirt, paint, or other foreign material and restore to match original factory finish.

END OF SECTION

SECTION 26 2813 - FUSES

PART 1 GENERAL

1.01 REFERENCE STANDARDS

- A. IEC 60947-4-1 - Low Voltage Switchgear and Controlgear - Part 4-1: Contactors and Motor-Starters - Electromechanical Contactors and Motor-Starters; International Electrotechnical Commission; 2009.
- B. NEMA FU 1 - Low Voltage Cartridge Fuses; 2012.
- C. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- D. UL 198C - High Interrupting Capacity Fuses, Current Limiting Types; Current Edition, Including All Revisions.
- E. UL 248-1 - Low-Voltage Fuses - Part 1: General Requirements; Current Edition, Including All Revisions.
- F. UL 248-12 - Low-Voltage Fuses - Part 12: Class R Fuses; Current Edition, Including All Revisions.
- G. UL 489 - Molded-Case Circuit Breakers, Molded-Case Switches and Circuit-Breaker Enclosures; Underwriters Laboratories; Current Edition, Including All Revisions.
- H. UL 508E - Outline of Investigation for IEC Type 2 Coordination Short Circuit Tests; 2006.
- I. UL (ECMD) - Electrical Construction Materials Directory; Underwriters Laboratories; current edition.

1.02 ADMINISTRATIVE REQUIREMENTS

- A. Coordination:
 - 1. Coordinate fuse requirements according to manufacturer's recommendations and nameplate data for actual equipment to be installed.
 - 2. Notify Architect of any conflicts with or deviations from contract documents. Obtain direction before proceeding with work.

1.03 QUALITY ASSURANCE

- A. Comply with requirements of NFPA 70.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Cooper Bussmann, a division of Cooper Industries: www.cooperindustries.com.
- B. Edison Fusegear: www.edisonfuse.com.
- C. Littelfuse, Inc.: www.littelfuse.com.
- D. Mersen: ep-us.mersen.com.

2.02 FUSES

- A. Provide products listed and classified by Underwriters Laboratories Inc. as suitable for purpose indicated.
- B. Unless specifically indicated to be excluded, provide fuses for fusible equipment as required for a complete operating system.
- C. Provide fuses of same type, rating, and manufacturer within same switch.
- D. Comply with UL 248-1.
- E. Unless otherwise indicated, provide cartridge type fuses complying with NEMA FU 1, Class and ratings as indicated.

- F. Voltage Rating: Suitable for circuit voltage.
- G. Power Load Feeder Switches: Class RK1 (time delay).
- H. Class R Fuses: Comply with UL 248-12.
 - 1. Class RK1, Dual Element Time-Delay Fuses:
 - a. Acceptable Products (250 Volt).
 - 1) Cooper Bussmann; Low Peak, Type LPN-RK.
 - 2) Edison Fusegear; Type LENRK.
 - 3) Littlefuse; Power Pro, Type LLNRK.
 - 4) Mersen; Amp Trap 2000, Type A2D-R.
 - b. Acceptable Products (600 Volt).
 - 1) Cooper Bussmann; Low Peak, Type LPS-RK.
 - 2) Edison Fusegear; Type LESRK.
 - 3) Littlefuse; Power Pro, Type LLSRK.
 - 4) Mersen; Amp Trap 2000, Type A6D-R.
- I. Class G Fuses: Comply with UL 198C.
 - 1. Fast Acting:
 - a. Acceptable Products:
 - 1) Cooper Bussmann; Type SC..
 - 2) Edison Fusegear; Type SEC.
 - 3) Littlefuse; Type SLC..
 - 4) Mersen; Type AG..
 - 2. Time-Delay:
 - a. Products:
 - 1) Cooper Bussmann; Type SC..
 - 2) Edison Fusegear; Type SEC.
 - 3) Littlefuse; Type SLC..
 - 4) Mersen; Type AG..
- J. Class In-Line Fuses: Comply with UL 248-14.
 - 1. Fast Acting:
 - a. Acceptable Products:
 - 1) Cooper Bussmann; Type GLR.
 - 2) Edison Fusegear; Type GLR.
 - 3) Littlefuse; Type LGR.
 - 4) Mersen; Type SLR.
 - 2. Time-Delay:
 - a. Acceptable Products:
 - 1) Cooper Bussmann; Type GMF.
 - 2) Edison Fusegear; Type GMF.
 - 3) Littlefuse; Type LMF.
 - 4) Mersen; Type SMF.
- K. Provide following accessories where indicated or where required to complete installation:
 - 1. Fuse Reducers: For adapting indicated fuses to permit installation in switch designed for fuses with larger ampere ratings.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that fuse ratings are consistent with circuit voltage and manufacturer's recommendations and nameplate data for equipment.
- B. Verify that conditions are satisfactory for installation prior to starting work.

3.02 INSTALLATION

- A. Do not install fuses until circuits are ready to be energized.
- B. Protect fuses from water damage before and after installation.
- C. Install fuses with label oriented such that manufacturer, type, and size are easily read.
- D. Torque fasteners to manufacturer's recommendations.

END OF SECTION

SECTION 26 2816.16 - ENCLOSED SWITCHES

PART 1 GENERAL

1.01 RELATED REQUIREMENTS

- A. Section 26 0526 - Grounding and Bonding for Electrical Systems.
- B. Section 26 0529 - Hangers and Supports for Electrical Systems.
- C. Section 26 0553 - Identification for Electrical Systems: Engraved nameplates.
- D. Section 26 2813 - Fuses.

1.02 REFERENCE STANDARDS

- A. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2010.
- B. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum); 2014.
- C. NETA ATS - Acceptance Testing Specifications for Electrical Power Equipment and Systems; 2013.
- D. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- E. UL 50 - Enclosures for Electrical Equipment, Non-Environmental Considerations; Current Edition, Including All Revisions.
- F. UL 50E - Enclosures for Electrical Equipment, Environmental Considerations; Current Edition, Including All Revisions.
- G. UL 98 - Enclosed and Dead-Front Switches; Current Edition, Including All Revisions.

1.03 ADMINISTRATIVE REQUIREMENTS

- A. Coordination:
 - 1. Coordinate work with other trades. Avoid placement of ductwork, piping, equipment, or other potential obstructions within dedicated equipment spaces and within working clearances for electrical equipment required by NFPA 70.
 - 2. Coordinate arrangement of electrical equipment with the dimensions and clearance requirements of actual equipment to be installed.
 - 3. Verify with manufacturer that conductor terminations are suitable for use with conductors to be installed.
 - 4. Notify Architect of any conflicts with or deviations from contract documents. Obtain direction before proceeding with work.

1.04 QUALITY ASSURANCE

- A. Comply with requirements of NFPA 70.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Eaton Corporation; Cutler-Hammer Products: www.eaton.com.
- B. General Electric Company: www.geindustrial.com.
- C. Schneider Electric; Square D Products: www.schneider-electric.us.
- D. Siemens Energy and Automation: www.sea.siemens.com.

2.02 ENCLOSED SAFETY SWITCHES

- A. Description: Quick-make, quick-break enclosed safety switches listed and labeled as complying with UL 98; heavy duty; ratings, configurations, and features as indicated on the drawings.
- B. Provide products listed, classified, and labeled as suitable for the purpose intended.

- C. Unless otherwise indicated, provide products suitable for continuous operation under the following service conditions:
 - 1. Altitude: Less than 6,600 feet (2,000 m).
 - 2. Ambient Temperature: Between minus 22 degrees F () and 104 degrees F (40 degrees C).
- D. Horsepower Rating: Suitable for connected load.
- E. Voltage Rating: Suitable for circuit voltage.
- F. Short Circuit Current Rating:
 - 1. Minimum Ratings:
 - a. Heavy Duty Single Throw Switches Protected by Class R Fuses: 200,000 rms symmetrical amperes.
- G. Provide with switch blade contact position that is visible when cover is open.
- H. Conductor Terminations: Suitable for use with conductors to be installed.
- I. Provide solidly bonded equipment ground bus in each enclosed safety switch, with suitable lug for terminating each equipment grounding conductor.
- J. Enclosures: Comply with NEMA 250, and list and label as complying with UL 50 and UL 50E.
 - 1. Environment Type according to NEMA 250: Unless otherwise indicated, as specified for following installation locations:
 - a. Indoor Clean, Dry Locations: Type 1.
- K. Provide safety interlock to prevent opening the cover with the switch in ON position with capability of overriding interlock for testing purposes.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that field measurements are as shown on drawings.
- B. Verify that ratings of enclosed switches are consistent with indicated requirements.
- C. Verify that mounting surfaces are ready to receive enclosed safety switches.
- D. Verify that conditions are satisfactory for installation prior to starting work.

3.02 INSTALLATION

- A. Install products in accordance with manufacturer's instructions.
- B. Install enclosed switches securely, in neat and workmanlike manner in accordance with NECA 1.
- C. Arrange equipment to provide minimum clearances in accordance with manufacturer's instructions and NFPA 70.
- D. Provide required support and attachment in accordance with Section 26 0529.
- E. Install enclosed switches plumb.
- F. Except where indicated to be mounted adjacent to equipment they supply, mount enclosed switches such that highest position of operating handle does not exceed 79 inches (2000 mm) above floor or working platform.
- G. Provide grounding and bonding in accordance with Section 26 0526.

3.03 FIELD QUALITY CONTROL

- A. Inspect and test in accordance with NETA ATS, except Section 4.
- B. Perform inspections and tests listed in NETA ATS, Section 7.5.1.1.
- C. Correct deficiencies and replace damaged or defective enclosed safety switches or associated components.

3.04 ADJUSTING

- A. Adjust tightness of mechanical and electrical connections to manufacturer's recommended torque settings.

3.05 CLEANING

- A. Clean dirt and debris from switch enclosures and components according to manufacturer's instructions.
- B. Repair scratched or marred exterior surfaces to match original factory finish.

END OF SECTION

