



# PUMP REPLACEMENT AT RELL MANOR, AN LMH PROPERTY

FIRE

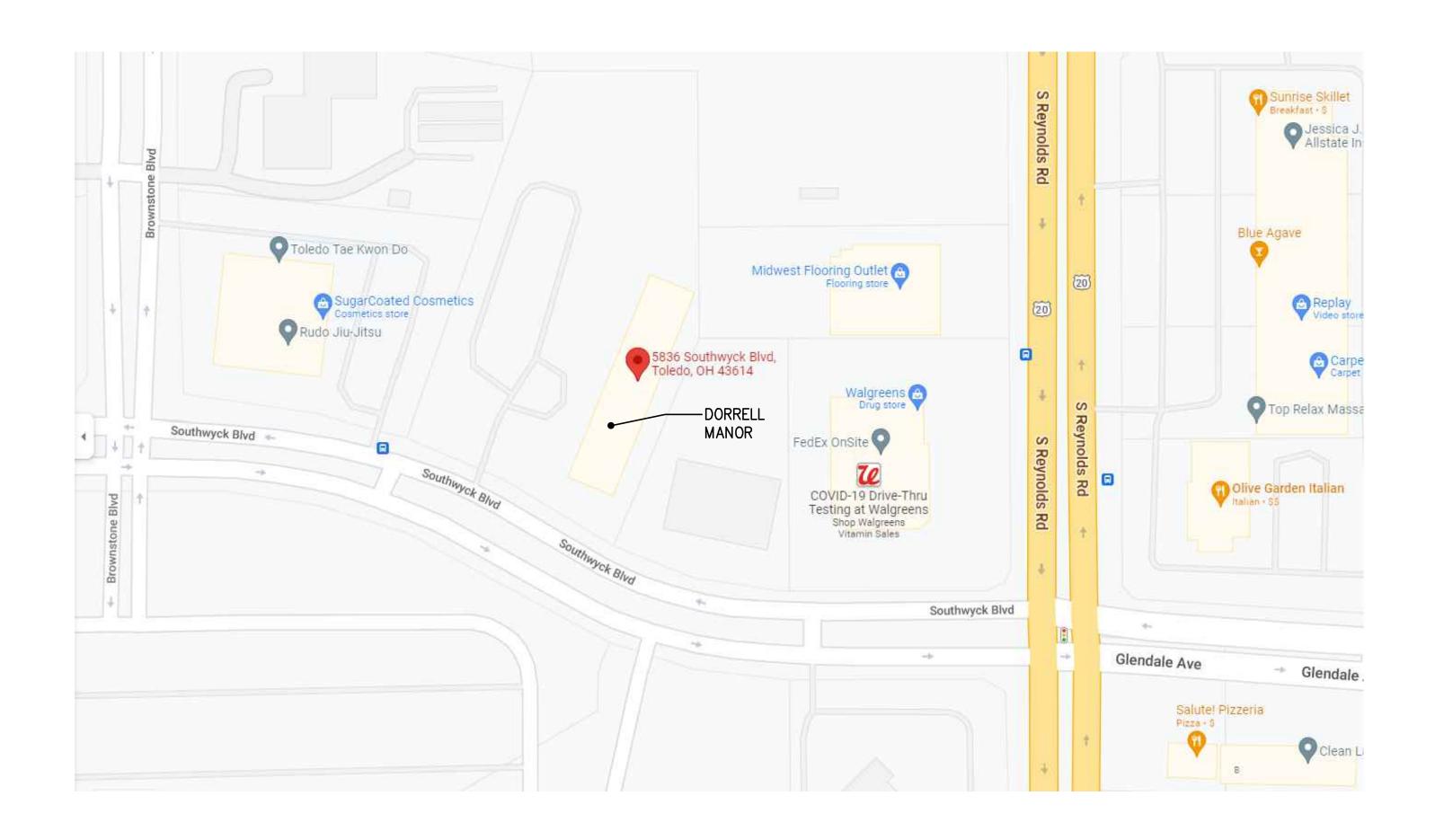
COVER

SHEET

03/15/23 22094



5836 SOUTHWYCK BOULEVARD, TOLEDO, OHIO

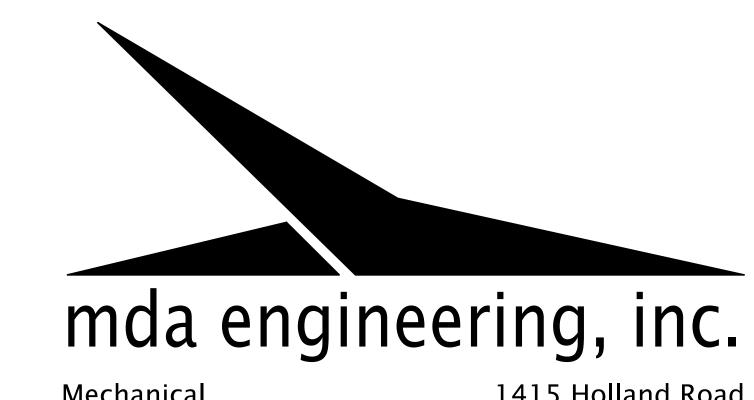


SITE LOCATION MAP NO SCALE

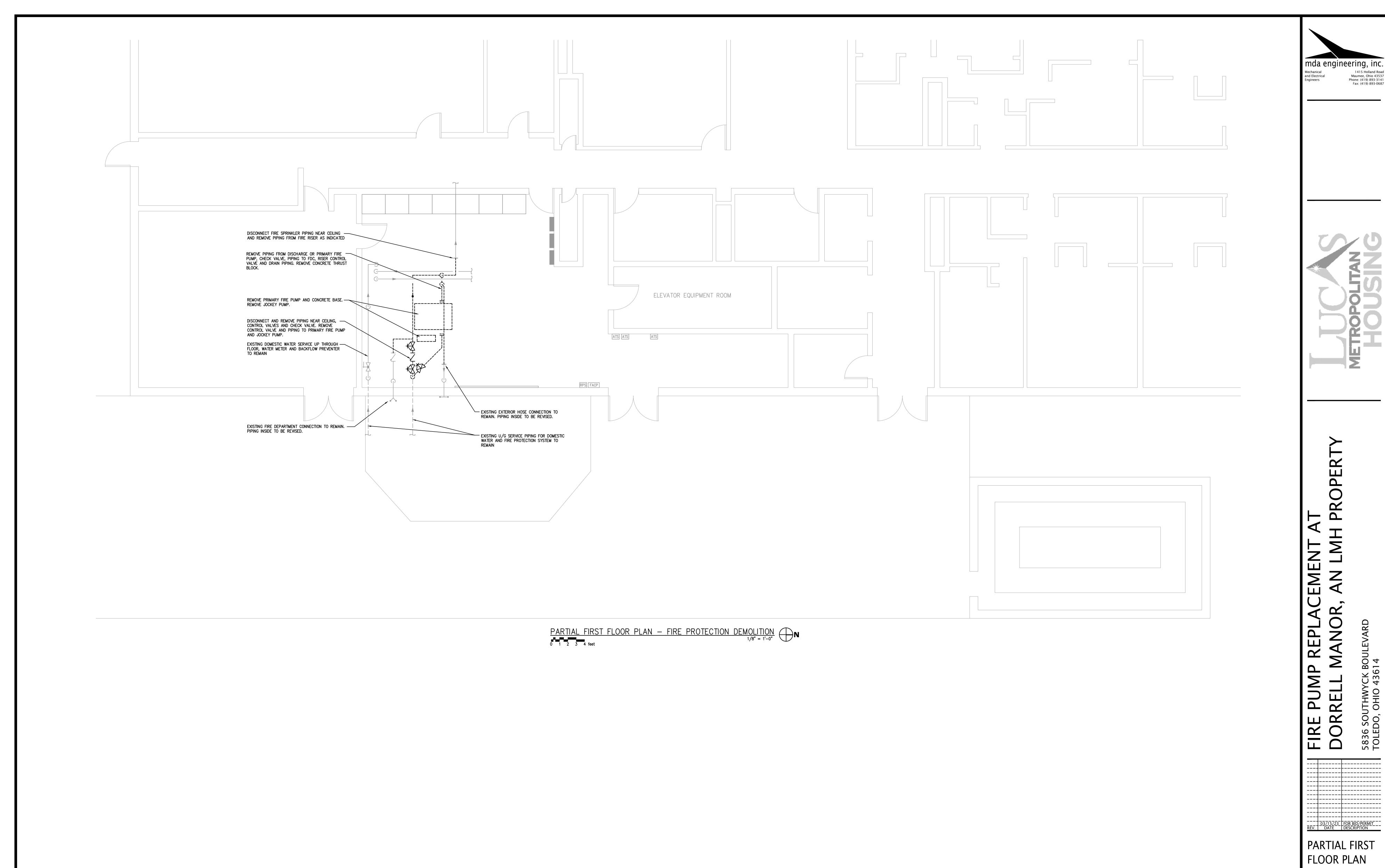
# SHEET LIST:

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G-1	COVER SHEET
F-1	PARTIAL FIRST FLOOR PLAN FIRE PROT. DEMOLITION
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E-4	ELECTRICAL SPECIFICATIONS

# PREPARED BY:



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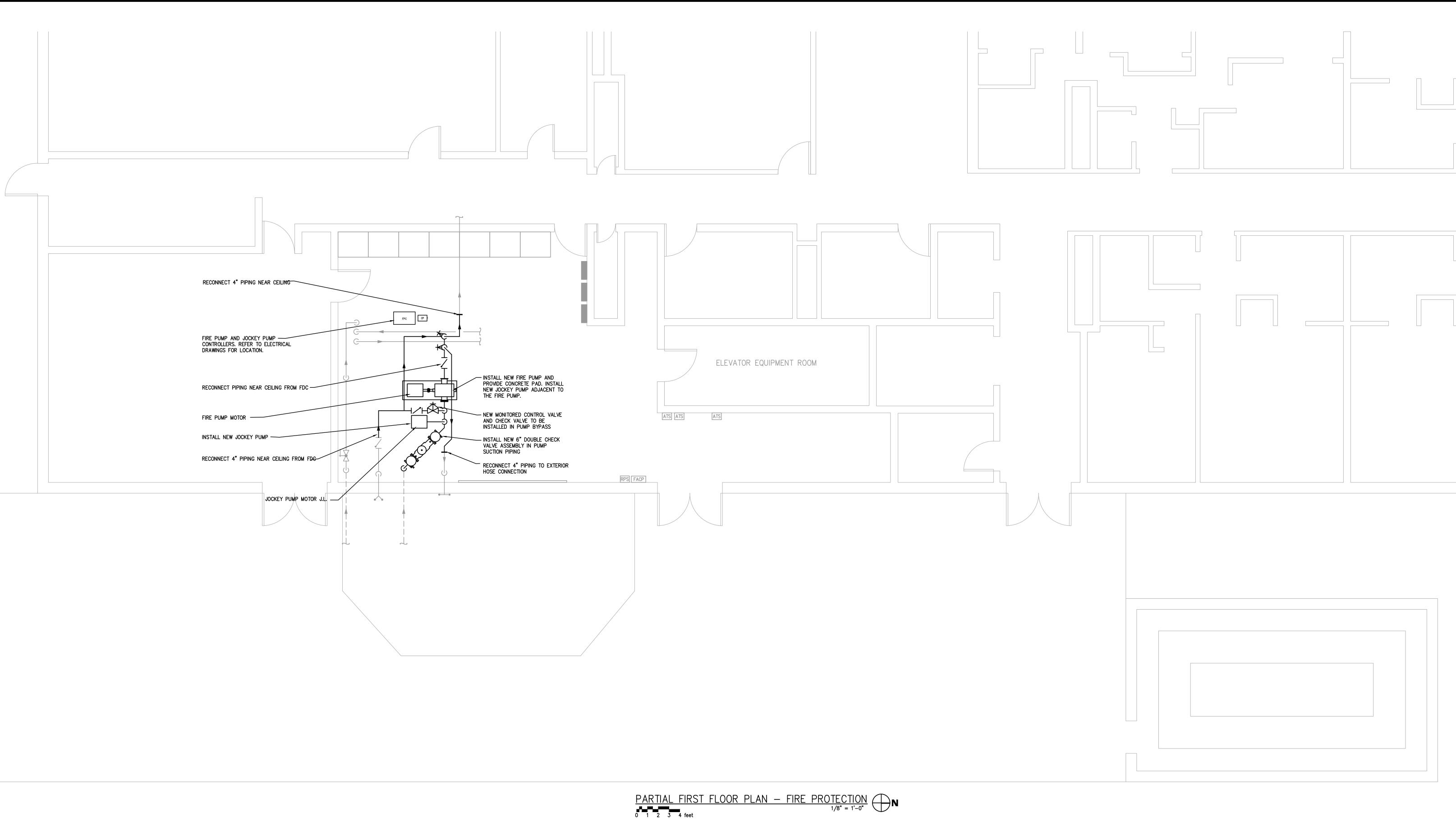
PROPER REPLACEMENT FIRE PUMP DORRELL M

1415 Holland Road Maumee, Ohio 43537 Phone: (419) 893-3141 Fax: (419) 893-0687

Date: Job No: 22094
SHEET NO.

FIRE PROT.

DEMOLITION



# FIRE WATCH REQUIREMENTS:

- 1. CONTRACTOR IS TO PROVIDE FIRE WATCH, WITH A TRAINED PERSON ON SITE, DURING PERIODS WHEN THE FIRE PROTECTION SYSTEM/PUMP OR FIRE ALARM SYSTEM IS OUT OF SERVICE PER THE FOLLOWING SCHEDULE:
- A. MONDAY FRIDAY, FROM 3AM TO 8AM (5 HRS/DAY) B. SATURDAY & SUNDAY, 3AM TO 5PM (14 HRS/DAY)
- THE OWNER WILL PROVIDE THE FIRE WATCH DURING THE FOLLOWING TIMES: A. MONDAY — FRIDAY, FROM 8AM TO 5PM. PROPERTY MANAGEMENT/MAINTENANCE WILL BE ON SITE AND CAN FULFILL THIS FUNCTION. B. MONDAY - SUNDAY, FROM 5PM TO 3AM, THERE WILL BE STATIC SECURITY ON SITE AND CAN FULFILL THIS FUNCTION.
- 2. FIRE WATCHER WILL NEED TO CONSTANTLY PATROL AREAS OF FIRE HAZARDS. ATTENDANT MUST HAVE EXPERIENCE WITH THE FACILITIES, AND HOW TO SOUND THE ALARM IN THE EVENT OF A FIRE HAZARD.
- 3. THE FIRE WATCHER NEEDS A SOLID UNDERSTANDING OF WHERE FIRE HAZARDS COULD ARISE, AND HOW TO USE FIRE-EXTINGUISHING EQUIPMENT. HE OR SHE WILL BE PROVIDING THE FIRE RISKS. THIS CAN INCLUDE NOTIFYING THE EMERGENCY SERVICES AND OPERATING FIRE EXTINGUISHERS, ETC.
- 4. DUE TO THE NATURE OF THE ROLE, FIRE WATCH DUTIES CAN'T BE PERFORMED ALONG WITH OTHER JOB FUNCTIONS.
- 5. COMPLY WITH ALL LOCAL FIRE DEPARTMENT REQUIREMENTS. 6. COORDINATE ALL REQUIREMENTS WITH THE OWNER.

# FIRE PUMP/JOCKEY PUMP:

FIRE PUMP:
MANUFACTURER: AC FIRE PUMP
TYPE: HORIZONTAL SPLIT CASE
FIRE PUMP SERIES: 8100 MODEL: 6x6x9F FLOW (GPM): 750 PRESSURE (PSI): 70 SPEED (RPM): 3600 MAX (BHP): 45

40 HP ELECTRIC MOTOR, 641 LOCK ROTOR AMPS, 114 FULL LOAD AMPS, 6" SUCTION/6" DISCHARGE. FRAME SIZE; 286 TS

FIRE PUMP CONTROLLER:
MANUFACTURER: TORNATECH MODEL: GPA STARTING METHOD: ACROSS THE LINE HORSE POWER: 40 VOLTAGE: 200-208

JOCKEY PUMP: TYPE: VERTICAL CENTRIFUGAL MANUFACTURER: GOULD MODEL: 1SV8 FLOW (GPM): 5 PRESSURE (PSI): 80 SPEED (RPM): 3600 HORSEPOWER (BHP): 0.92

PHASE: 3

0.75 HP ELECTRIC MOTOR, 200-208 VOLTS, 3-PHASE, 27.6 LOCK ROTOR AMPS, 3.5 FULL

JOCKEY PUMP CONTROLLER: MANUFACTURER: TORNATECH STARTING METHOD: ACROSS THE LINE HORSE POWER: 0.75 VOLTAGE: 200–208 PHASE: 3

# FIRE PROTECTION GENERAL NOTES:

- 1. CONTRACTOR SHALL VISIT SITE TO VERIFY ALL EXISTING CONDITIONS THAT MAY AFFECT THE WORK.
- 2. CONTRACT SHALL INCLUDE ALL MATERIALS, LABOR, TOOLS, ETC., FOR A COMPLETE AND OPERABLE INSTALLATION. ALL MATERIALS SHALL BE NEW, SPECIFICATION GRADE, AND U.L. LISTED PRODUCTS, UNLESS NOTED OTHERWISE.
- 3. COORDINATE ALL WORK AND SCHEDULES WITH OWNER, CONSTRUCTION MANAGER, OTHER CONTRACTORS AND APPROPRIATE UTILITY COMPANIES.
- 4. STORE MATERIALS WHERE DIRECTED. PROTECT STORED MATERIALS AND INSTALLED WORK FROM DAMAGE. REPAIR ALL DAMAGE.
- 5. REMOVE DIRT, DEBRIS AND UNUSED MATERIALS FROM SITE
- 6. SCHEDULE ALL FIRE PROTECTION SYSTEM INTERRUPTIONS WITH OWNER AND OTHER CONTRACTORS 72 HOURS PRIOR TO INTERRUPTION.

REGULARLY. AND DISPOSE OF BY PROPER AND LEGAL METHODS.

- 7. PATCH AND FINISH CONSTRUCTION DAMAGED DURING THE COURSE OF FIRE PROTECTION SYSTEM INSTALLATION. SEALS & FIRE STOPPING AT ALL WALL AND FLOOR PENETRATIONS.
- 8. PERFORM TESTING AND MAKE FINAL ADJUSTMENTS TO VERIFY PROPER PERFORMANCE OF ALL SYSTEMS AND EQUIPMENT.
- 9. MAINTAIN "AS BUILT" RECORDS OF ALL INSTALLED ITEMS AND PROVIDE TO CONSTRUCTION MANAGER AT PROJECT COMPLETION.
- NOTE: THESE NOTES ARE GENERAL IN NATURE. SPECIFIC MEANS, METHODS AND MATERIALS ARE DETAILED IN THE SPECIFICATIONS AND CONTRACTOR IS DIRECTED TO THOROUGHLY REVIEW THE FULL SPECIFICATION. CONTRACT SPECIFICATIONS SHALL GOVERN IN CASE OF CONFLICT.

FLOW TEST DATA	A —	4/28/2020
STATIC PRESSURE	_	49 PSI
RESID. PRESSURE	-	30 PSI
FLOW	-	2070 GPM
TEST LOCATION	-	HYDRANT FLOW TEST 8 HYDRANT 148 DHS
INFO SUPPLIED BY	-	CITY OF TOLEDO

PU

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and Electrical

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**PROTECTION** 

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03/15/23 FOR BID/PERMIT REV. DATE DESCRIPTION

PARTIAL FIRST

FLOOR PLAN

- 1.1 GENERAL SCOPE A. THE WORK REQUIRED UNDER THIS SPECIFICATION SHALL INCLUDE ALL LABOR, MATERIALS, TOOLS, EQUIPMENT, POWER, TRANSPORTATION, HOISTING IMPLEMENTS, ETC., NECESSARY FOR THE COMPLETION OF THE ELECTRICAL WORK OF THE CONTRACT: ALL AS SPECIFIED HEREIN, SHOWN ON THE DRAWINGS OR REASONABLY IMPLIED BY EITHER, COMPLETE IN EVERY RESPECT UNLESS SPECIFIED OTHERWISE HEREIN. THE WORK INCLUDED IN THIS CONTRACT SHALL CONSIST OF THE INSTALLATION, TEST AND GUARANTEE OF ALL WORK DESCRIBED ON THE
- 1.2 RELATED DOCUMENTS

A. DRAWINGS AND GENERAL PROVISIONS OF CONTRACT, INCLUDING GENERAL AND SUPPLEMENTARY CONDITIONS AND DIVISION 1 SPECIFICATION SECTIONS, APPLY TO THIS AND THE OTHER SECTIONS OF DIVISION 21. THIS WORK SHALL BE CONDUCTED AS A PRIME

1.3 DRAWINGS AND SPECIFICATIONS

PLANS AND SPECIFICATIONS.

- A. DRAWINGS INDICATE GENERAL ARRANGEMENT OF SYSTEM AND ARE TO BE FOLLOWED INSOFAR AS POSSIBLE. DEVIATIONS FROM DRAWINGS MAY BE NECESSITATED BY FIELD CONDITIONS. DETAILED LAYOUTS OF PROPOSED DEPARTURES TO BE SUBMITTED TO ENGINEER FOR
- B. DRAWINGS AND SPECIFICATIONS TO BE CONSIDERED COOPERATIVE AND ANYTHING APPEARING IN SPECIFICATIONS, BUT NOT ON DRAWINGS, OR VICE VERSA, TO BE CONSIDERED PART OF THE CONTRACT AND TO BE EXECUTED.
- C. DRAWINGS INDICATE SIZE AND APPROXIMATE LOCATION OF VARIOUS PARTS OF WORK AND ARE TO BE USED AS A GENERAL GUIDE FOR INSTALLATION. HOWEVER, DRAWINGS ARE, TO A CONSIDERABLE EXTENT. DIAGRAMMATIC AND EXACT LOCATIONS OF PIPING. DUCTWORK. ETC. MAY APPEAR ON THE DRAWINGS OR MUST BE WORKED OUT ON JOB. HOWEVER, NO CHANGES IN SIZES TO BE MADE WITHOUT WRITTEN APPROVAL OF ENGINEER. ERRORS OR OMISSIONS DISCOVERED BY BIDDING CONTRACTORS PRIOR TO BID OPENINGS, TO BE CALLED TO ATTENTION OF ENGINEER WITHOUT DELAY.
- D. IF A SPECIFIC ITEM IS SPECIFIED OR ON DRAWINGS FOR MULTIPLE TRADES. THIS CONTRACTOR SHALL INCLUDE ALL ITEMS IN THE BID REGARDLESS OF OTHER TRADES. RESOLUTION WILL BE BY ADDENDUM OR CHANGE ORDER.
- 1.4 PROJECT CLOSEOUT
- A. IN ORDER TO ACHIEVE A COMPLETE AND COMMISSIONED PROJECT, EACH CONTRACTOR IS RESPONSIBLE FOR THE FOLLOWING ITEMS:
- BUILDING INSPECTION CERTIFICATES.
- AS-BUILT DRAWINGS. CONSENT OF SURETY
- 4. FINAL PAYMENT REQUEST.
- 5. CONTRACTOR'S RELEASE AND CERTIFICATION.
- 6. DEMONSTRATION CERTIFICATES SIGNED BY OWNER.
- 7. DELIVERY OF EXTRA MATERIALS.
- 8. RETURN OF BORROWED KEYS AND WORKING PERMITS.
- 9. LETTER DECLARING PUNCH LIST ITEMS COMPLETED.
- 10. OPERATION AND MAINTENANCE MANUALS
- 11. FINAL GUARANTEE AND EXECUTION OF WARRANTIES. 12. OTHER REQUIREMENTS SPECIFIED IN DIVISION 1 SPECIFICATIONS.
- 1.5 RECORD DOCUMENTS

REPRESENTATIVES.

- A. PREPARE RECORD DOCUMENTS IN ACCORDANCE WITH THE REQUIREMENTS IN DIVISION 1.
- 1.6 EQUIPMENT AND SYSTEMS DEMONSTRATION
- A. EACH CONTRACTOR IS RESPONSIBLE FOR VERIFYING THE COMPLETE OPERATION OF THE EQUIPMENT AND SYSTEMS INSTALLED AS A PART OF THE WORK. AFTER THE CONTRACTOR IS SATISFIED THE WORK MEETS THE SPECIFIED INTENTS AND SEQUENCES OF OPERATION, THE CONTRACTOR SHALL SCHEDULE, THROUGH THE ENGINEER, A SESSION DURING WHICH ALL ASPECTS OF THE WORK ARE EXPLAINED TO THE OWNER'S PERSONNEL AND/OR
- 1.7 INSPECTION OF EXISTING AND GENERAL CONDITIONS
- A. THE CONTRACTOR WILL BE HELD TO HAVE PERSONALLY INSPECTED THE SITE OF THE PROPOSED WORK TO ARRIVE AT A CLEAR UNDERSTANDING OF THE CONDITIONS UNDER WHICH THE WORK IS TO BE PERFORMED, THE EXTENT OF OTHER CONTRACTOR'S ACTIVITIES IN THE AREA. AND TO BECOME FULLY ACQUAINTED WITH THE RECEIVING AND STORAGE SPACES AVAILABLE. THE CONTRACTOR SHALL BE HELD TO HAVE COMPARED THE PREMISES AND SITE WITH THE DRAWINGS AND SPECIFICATIONS. AND SHALL BE SATISFIED AS TO THE CONDITIONS OF THE PREMISES, THE ACTUAL ELEVATIONS, AND ANY OTHER CONDITIONS AFFECTING THE CARRYING OUT OF THE WORK, BEFORE THE DELIVERY OF THIS PROPOSAL.
- B. NO ALLOWANCES OR EXTRA CONSIDERATION ON BEHALF OF THE CONTRACTOR WILL SUBSEQUENTLY BE ALLOWED BY REASON OF THE CONTRACTOR'S FAILURE TO HAVE BECOME FAMILIAR WITH SITE CONDITIONS, ERROR OR OVERSIGHT ON THE PART OF THE CONTRACTOR OR DUE TO INTERFERENCE'S BY THE OWNER'S OR OTHER CONTRACTOR'S ACTIVITIES.
- ITEMS SPECIFIED ON FIRE PROTECTION EQUIPMENT SCHEDULES AND PLANS ARE THE BASIS OF DESIGN. EQUALITY OF OTHER EQUIPMENT SHALL BE DETERMINED BY THE OWNER AND ENGINEER. ANY MODIFICATION TO THESE DOCUMENTED METHODS THAT IS MADE NECESSARY BY ALTERNATE EQUIPMENT IS THE RESPONSIBILITY OF THE SUPPLIER OF THE ALTERNATE
- D. CONTRACTOR IS DIRECTED TO INCLUDE ALL NECESSARY OVERTIME AND PREMIUM TIME (SATURDAY, SUNDAY, HOLIDAYS) REQUIRED FOR THE COMPLETION OF THE INTENDED WORK TO MEET SPECIFIED SCHEDULES.
- E. DO NOT SCALE FIRE PROTECTION DRAWINGS. FOR EXACT DIMENSIONS, USE DIMENSIONED DRAWINGS OR ACTUAL FIELD CONDITIONS.
- 1.8 CODES, PERMITS AND COMPLIANCE
- A. CONTRACTOR SHALL OBTAIN AND PAY FOR ALL PERMITS, LICENSES AND INSPECTIONS REQUIRED BY LAWS OF GOVERNING BODIES. COMPLY WITH ALL APPLICABLE CODES, ORDINANCES AND ALL LEGAL REQUIREMENTS. NO EXTRA COMPENSATION WILL BE ALLOWED FOR ANY CHANGES NECESSARY FOR CODE COMPLIANCE REGARDLESS OF THE METHOD OF INSTALLATION SHOWN ON THE DRAWINGS OR SPECIFIED. B. ALL FIRE PROTECTION EQUIPMENT SHALL BE NEW AND SHALL BE LABELED OR LISTED BY UL
- OR A QUALIFIED TESTING ORGANIZATION.
- . ALL EQUIPMENT, DEVICES AND MATERIALS SHALL BE THE LATEST PRODUCTS OF MANUFACTURER AND SHALL CONFORM TO THE REQUIREMENTS NOTED ON THE PLANS.
- D. COMPLY WITH ALL REQUIREMENTS OF ALL APPLICABLE STATE AND LOCAL CODES AND ORDINANCES AND OWNER'S INSURANCE UNDERWRITER FOR SUBMITTALS, APPROVALS, MATERIALS, INSTALLATIONS, INSPECTIONS, AND TESTING.
- E. INSTALLER'S QUALIFICATIONS: FIRMS QUALIFIED TO INSTALL AND ALTER FIRE PROTECTION PIPING, EQUIPMENT, SPECIALTIES, ACCESSORIES, AND REPAIR AND SERVICE EQUIPMENT. A QUALIFIED FIRM IS ONE THAT IS EXPERIENCED (MINIMUM OF 5 PREVIOUS PROJECTS SIMILAR IN SIZE AND SCOPE TO THIS PROJECT) IN SUCH WORK, FAMILIAR WITH PRECAUTIONS REQUIRED, AND IN COMPLIANCE WITH THE REQUIREMENTS OF THE AUTHORITY HAVING JURISDICTION. SUBMIT EVIDENCE OF QUALIFICATIONS TO THE ENGINEER UPON REQUEST.
- F. NFPA STANDARDS: EQUIPMENT, SPECIALTIES, ACCESSORIES, INSTALLATION AND TESTING COMPLY WITH THE FOLLOWING: 1. NFPA 13 'STANDARD FOR THE INSTALLATION OF SPRINKLER SYSTEMS."
- 2. NFPA 25 STANDARD FOR THE INSPECTION, TESTING, AND MAINTENANCE OF WATER-BASED FIRE PROTECTION SYSTEMS".
- G. OWNER'S INSURANCE UNDERWRITER. H. DESIGN AND OBTAIN APPROVAL FROM AUTHORITY HAVING JURISDICTION FOR FIRE PROTECTION
- SYSTEM SPECIFIED I. CONDUCT FIRE HYDRANT FLOW TESTS AS REQUIRED TO OBTAIN HYDRAULIC DATA NEEDED TO
- PREPARE DESIGN FOR HYDRAULICALLY CALCULATED SYSTEMS.
- A. WORKMANSHIP SHALL BE OF THE HIGHEST QUALITY CONFORMING TO THE BEST FIRE
- PROTECTION INSTALLATION PRACTICE. ANY WORK OR MATERIAL, WHICH IS REJECTED, MUST BE REMOVED IMMEDIATELY AND REPLACED. NO SUB-STANDARD WORK WILL BE ACCEPTED. B. THE BREVITY OF THIS SPECIFICATION SHALL NOT BE CONSTRUED AS RELIEVING THE CONTRACTOR OF HIS RESPONSIBILITY TO PERFORM ALL WORK IN A FIRST CLASS WORKMANLIKE
- 1.10 SUBMITTALS AND RECORD DRAWINGS
- A. SUBMIT SYSTEM DRAWINGS AND PRODUCT DATA TO THE ENGINEER AND OWNER'S INSURANCE UNDERWRITER FOR APPROVAL FOR ALL EQUIPMENT, MATERIALS AND SYSTEM HYDRAULIC CALCULATIONS REQUIRED FOR THIS PROJECT PRIOR TO ORDERING OR MANUFACTURE OF SUCH. SHOP DRAWINGS NOT STAMPED WITH CONTRACTOR APPROVAL AND THE APPROVAL OF THE AUTHORITY HAVING JURISDICTION WILL BE REJECTED.
- B. THE CONTRACTOR SHALL KEEP AN ACCURATE RECORD OF ALL DEVIATIONS FROM THE APPROVED DESIGN DOCUMENTS AND SPECIFICATIONS WHICH MAY OCCUR IN THE WORK AS ACTUALLY CONSTRUCTED, AND SHALL SUBMIT SAME TO THE ENGINEER OR OWNER'S REPRESENTATIVE AT COMPLETION OF THE JOB.
- 1. DEVIATIONS FROM APPROVED "WORKING PLANS" FOR SPRINKLER SYSTEM PIPING REQUIRE WRITTEN APPROVAL FROM AUTHORITY WITH JURISDICTION. FILE WRITTEN APPROVAL WITH ARCHITECT PRIOR TO DEVIATING FROM APPROVED "WORKING PLANS."
- C. SUBMITTALS SHALL BE COORDINATED THROUGH THE ENGINEER 1.11 TESTS AND GUARANTEES
- A. ALL TESTS FOR VARIOUS SYSTEMS SHALL BE PERFORMED AS REQUIRED, CONSISTENT WITH GOOD GENERAL PRACTICE AND IN COMPLIANCE WITH CODES AND AUTHORITIES.
- B. AS A CONDITION PRECEDENT TO THE FINAL PAYMENT, THE CONTRACTOR SHALL EXECUTE TO THE OWNER A GUARANTEE IN A FORM APPROVED BY THE OWNER. GUARANTEE SHALL WARRANT THAT ALL WORK INCLUDED IN THIS DIVISION OF THE SPECIFICATIONS WILL REMAIN IN SERVICEABLE AND PERFECT CONDITION (ORDINARY WEAR AND TEAR, ABUSE AND CAUSES BEYOND THE CONTROL OF THE CONTRACTOR EXCLUDED) FOR A PERIOD OF ONE YEAR FROM DATE OF FINAL COMPLETION AND ACCEPTANCE OF WORK. AND THAT THE CONTRACTOR WILL MAKE GOOD AT HIS OWN EXPENSE, WITHOUT COST TO THE OWNER, ANY IMPERFECTIONS IN WHOLE OR IN PART WHICH MAY DEVELOP IN THIS WORK DURING THE PERIOD ABOVE SPECIFIED, INCLUDING ANY DAMAGE TO OTHER WORK CAUSED BY SUCH IMPERFECTIONS OR
- C. ALL FIRE PROTECTION SYSTEMS. DEVICES AND RELATED ITEMS SHALL BE TESTED. REPLACE ANY AND ALL DEFECTIVE ITEMS OR SYSTEMS BEFORE COMPLETION OF THE PROJECT.

REPAIRING OF SAME.

- A. FIELD VERIFY EXACT LOCATION OF ALL NEW EQUIPMENT WITH EXISTING CONDITIONS AND COORDINATE WITH THE GENERAL AND OTHER CONTRACTORS PRIOR TO ROUGH-IN AND/OR INSTALLING ANY OF THIS WORK
- B. FIELD VERIFY ALL CLEARANCES AND CONDITIONS PRIOR TO THE START OF ANY FIRE PROTECTION PIPING, SPRINKLER HEADS, ETC.: VERIFY LOCATIONS WITH ARCHITECTURAL, ELECTRICAL. STRUCTURAL. CIVIL AND MECHANICAL DRAWINGS PRIOR TO ROUGH-IN. REPORT ANY DISCREPANCIES TO THE ENGINEER PRIOR TO PROCEEDING WITH WORK.

C. ALL INTERRUPTION OF SERVICE TO EXISTING OR OPERABLE FACILITIES SHALL BE SCHEDULED WITH THE OWNER A MINIMUM TWO (2) WEEKS IN ADVANCE. NOTIFY EACH AFFECTED USER WHEN WATER SUPPLY WILL BE SHUT OFF; INCLUDING THE LOCAL FIRE MARSHAL AND THE OWNER'S INSURANCE UNDERWRITER. THE CONTRACTOR SHALL NOT INTERRUPT OR RESTORE SERVICE WITHOUT PRIOR CONSENT OF THE OWNER. THE INTERRUPTION SHALL BE ONLY FOR

CLA-VAL CO.

3.4 ALARM DEVICES

G. MANUFACTURERS

CONBRACO INDUSTRIES, INC.

6. WATTS REGULATOR CO.

5. HERSEY PRODUCTS, INC., GRINNELL CORP.

7. WILKINS REGULATOR DIV., ZURN INDUSTRIES, INC.

COVER THAT SENDS A SIGNAL WHEN THE COVER IS REMOVED.

CONTROLLED VALVE IN OTHER THAN FULL OPEN POSITION.

CONTROLLED VALVE IN OTHER THAN FULL OPEN POSITION.

1. ASCOA FIRE SYSTEMS, FIGGIE INTERNATIONAL CO.

CENTRAL SPRINKLER CORPORATION.

3. FIREMATIC SPRINKLER DEVICES, INC.

GLOBE FIRE SPRINKLER CORP.

STAR SPRINKLER CORP.

8. VICTAULIC COMPANY

9. VIKING CORP.

4. GEM SPRINKLER CO. DIV., GRINNELL CORP.

6. RELIABLE AUTOMATIC SPRINKLER CO., INC.

A. ALARM DEVICES: TYPES AND SIZES THAT WILL MATCH PIPING AND EQUIPMENT CONNECTIONS.

B. WATER-MOTOR-OPERATED ALARMS: UL 753, MECHANICAL OPERATION TYPE, 10 INCH

DIAMETER, CAST-ALUMINUM ALARM GONG, WITH RED ENAMEL FACTORY FINISH. INCLUDE

PELTON-WHEEL-TYPE OPERATOR WITH NYLON SHAFT BEARINGS AND SHAFT BEARINGS AND

SHAFT LENGTH AND SLEEVE TO SUIT WALL THICKNESS AND CONSTRUCTION; 3/4 INCH INLET

. WATERFLOW INDICATORS: UL 346, ELECTRICAL—SUPERVISION TYPE, VANE—TYPE WATERFLOW

DETECTOR, RATED TO 250 PSIG AND DESIGNED FOR HORIZONTAL AND VERTICAL INSTALLATION.

INCLUDE 2 SPDT (SINGLE-POLE, DOUBLE-THROW) CIRCUIT SWITCHES TO PROVIDE ISOLATED

ALARM AND AUXILIARY CONTACTS, 7 AMPERE, 125 VOLTS A.C. (7A, 125 V A.C.) AND 0.25

AMPERE, 24 VOLTS D.C. (0.25A, 24 V D.C.); COMPLETE WITH FACTORY-SET,

FIELD-ADJUSTABLE RETARD ELÈMENTS TO PREVENT FALSE SIGNALS AND TAMPER-PROOF

PRESSURE SWITCHES: UL 346, ELECTRICAL—SUPERVISION TYPE, SPDT (SINGLE—POLE,

DOUBLE-THROW), NORMALLY CLOSED CONTACTS, DESIGNED TO OPERATE ON RISING PRESSURE

SUPERVISORY SWITCHES: UL 753, FOR VALVES, ELECTRICAL-SUPERVISION TYPE, SPDT

(SINGLE-POLE, DOUBLE-THROW), NORMALLY CLOSED CONTACTS, DESIGNED TO SIGNAL

SPDT (SINGLE-POLE, DOUBLE-THROW), NORMALLY CLOSED CONTACTS, DESIGNED TO SIGNAL

F. SUPERVISORY SWITCHES: UL 753, FOR INDICATOR POSTS, ELECTRICAL-SUPERVISION TYPE,

- THE SPECIFIED SCHEDULED TIME. D. COORDINATE ALL POWER WIRING, SAFETY DISCONNECT MEANS, MOTOR CONTROL AND CONTROL WIRING FOR FIRE PROTECTION EQUIPMENT WITH THE ELECTRICAL CONTRACTOR.
- 1.13 IDENTIFICATION A. INSTALL SNAP-ON PLASTIC OR ADHESIVE PIPE MARKERS WITH SYSTEM IDENTIFICATION AND
- DIRECTION OF FLOW ON ALL PIPING SYSTEMS. B. PAINT ALL PIPING WITH OWNER'S SYSTEM IDENTIFICATION COLOR CODES. C. INSTALL ENGRAVED PLASTIC LAMINATE SIGN OR EQUIPMENT MARKER ON OR NEAR EACH MAJOR ITEM OF FIRE PROTECTION EQUIPMENT. SIGNAGE SHALL COMPLY WITH NFPA-13
- 1.14 DEMOLITION, REMOVALS, CLEAN-UP, PROTECTION AND TOUCH-UP
- A. REMOVE ALL EXISTING PIPING SCHEDULED FOR REMOVAL OR NOT REQUIRED TO REMAIN IN SERVICE. CONTRACTOR SHALL COORDINATE REMOVAL WITH OWNER AND ALL OTHER TRADES ON THE PROJECT. PROVIDE ADDITIONAL PIPING, SPRINKLER HEADS, ETC., TO MAINTAIN FUNCTIONAL SYSTEMS
- INSTALLATION OF THIS WORK. DEBRIS SHALL BE REMOVED FROM THE PROJECT SITE WEEKLY. THIS CONTRACTOR SHALL PROVIDE TO THE OWNER ANY SALVAGEABLE MATERIALS AS DIRECTED BY THE OWNER OR ENGINEER C. UPON COMPLETION OF WORK, THIS CONTRACTOR SHALL THOROUGHLY CLEAN ALL APPARATUS

B. THIS CONTRACTOR SHALL DISPOSE OF ALL MATERIALS GENERATED FROM REMOVAL AND

- FURNISHED BY THIS CONTRACT. D. ALL EQUIPMENT, ITEMS, DEVICES AND APPURTENANCES SHALL BE PROTECTED FROM DEBRIS AND DAMAGE WHILE STORED AT THE SITE AND DURING AND AFTER INSTALLATION. E. SCARRED FACTORY-FINISH FIRE PROTECTION EQUIPMENT SHALL BE TOUCHED UP WITH FACTORY-FINISHED PAINT. RUSTED OR MARRED SURFACES OF FIRE PROTECTION EQUIPMENT
- SHALL BE CLEANED AND PRIMED BEFORE PAINTING. F. PATCH FINISHED SURFACES AND BUILDING COMPONENTS USING NEW MATERIALS MATCHING EXISTING MATERIALS AND EXPERIENCED INSTALLERS.

REQUIREMENTS.

- A. THE FIRE SUPPRESSION SYSTEM SHALL BE DESIGNED, INSTALLED, INSPECTED, MAINTAINED, AND RECHARGED IN ACCORDANCE WITH THE MANUFACTURER'S LISTED INSTRUCTION MANUAL. B. FOLLOW MANUFACTURERS WRITTEN STARTUP PROCEDURES.
- C. COORDINATE SYSTEM COMMISSIONING WITH FIRE ALARM SYSTEM TESTS. OPERATE SYSTEM AS D. COORDINATE SYSTEM COMMISSIONING WITH FIRE PUMP TESTS. OPERATE SYSTEM AS
- E. DEMONSTRATION DEMONSTRATE SYSTEM EQUIPMENT AND SPECIALTIES AND ACCESSORIES.
- SCHEDULE DEMONSTRATION WITH AT LEAST 7 DAYS ADVANCE NOTICE.
- 1.16 MAINTENANCE MANUAL
- A. COMPLY WITH SPECIFICATION SECTION 017823 "OPERATION AND MAINTENANCE DATA".
- 2.0 BASIC MATERIALS AND METHODS 2.1 PIPE AND FITTINGS
- A. PIPE SIZES 2" AND SMALLER SHALL BE SCHEDULE 40 STEEL PIPE WITH THREADED ENDS, MALLEABLE IRON THREADED FITTINGS, AND THREADED JOINTS. B. PIPE SIZES 1 1/2" TO 6" SHALL BE SCHEDULE 40 OR SCHEDULE 10 STEEL PIPE WITH ROLLED -
- GROOVED ENDS, GROOVED-END STEEL PIPE FITTINGS AND GROOVED-COUPLED JOINTS. C. PIPE BETWEEN FIRE DEPARTMENT CONNECTION AND CHECK VALVES: UTILIZE SCHEDULE 40 GALVANIZED STEEL PIPE WITH THREADED OR GROOVED FITTINGS.
- D. PERFORM FIELD ACCEPTANCE TESTS OF EACH FIRE PROTECTION SYSTEM. 1. FLUSH, TEST AND INSPECT SPRINKLER-PIPING SYSTEMS ACCORDING TO NFPA 13 CHAPTER "SYSTEM ACCEPTANCE.
- E. REPLACE PIPING SYSTEM COMPONENTS THAT DO NOT PASS TEST PROCEDURES SPECIFIED THEN RETEST TO DEMONSTRATE COMPLIANCE. REPEAT PROCEDURE UNTIL SATISFACTORY RESULTS ARE OBTAINED
- 1. REPORT TEST RESULTS PROMPTLY AND IN WRITING TO ENGINEER AND OWNER'S INSURANCE UNDERWRITER 2. REPORT TEST RESULTS PROMPTLY AND IN WRITING TO AUTHORITY HAVING JURISDICTION.
- 2.2 HANGERS AND SUPPORTS A. HANGERS AND SUPPORT DEVICES SHALL COMPLY WITH AND BE INSTALLED PER NFPA 13 AND
- 1. EARTHQUAKE PROTECTION: WHERE REQUIRED, INSTALL PIPING ACCORDING TO NFPA 13 TO PROTECT FROM EARTHQUAKE DAMAGE.
- 2.3 PRESSURE GAGES A. PRESSURE GAGES: UL 393, 3 ½ TO 4 ½ INCHES DIAMETER DIAL WITH DIAL RANGE OF
- 0-250 PSIG. 2.4 INSTALLATION A. MINIMUM PIPE SIZES: NOT SMALLER THAN SIZES INDICATED FOR CONNECTION TO WATER
- SUPPLY PIPING, STANDPIPES AND BRANCHES FROM STANDPIPES TO SPRINKLERS. B. COMPONENTS AND INSTALLATION: CAPABLE OF PRODUCING PIPING SYSTEMS WITH THE FOLLOWING MINIMUM WORKING PRESSURE RATINGS EXCEPT WHERE INDICATED OTHERWISE. 1. SPRINKLER SYSTEMS: 175 PSIG.
- 3.0 PRODUCTS AND EXECUTION 3.1 FIRE PROTECTION VALVES
- A. GENERAL VALVES SHALL BE UL LISTED AND FM APPROVED WITH 175 PSIG NON-SHOCK MINIMUM WORKING PRESSURE RATING. VALVES FOR USE WITH GROOVED PIPING MAY BE
- B. GATE VALVES. 2 1/2 INCHES AND LARGER SHALL BE UL 262, IRON BODY, BRONZE MOUNTED TAPER WEDGE, OUTSIDE SCREW AND YOKE, RISING STEM. INCLUDE REPLACEABLE BRONZE WEDGE FACING RINGS AND FLANGED ENDS. MANUFACTURERS
- ASCOA FIRE SYSTEMS, FIGGIE INTERNATIONAL CO
- CENTRAL SPRINKLER CORPORATION. 3. FIREMATIC SPRINKLER DEVICES, INC.
- 4. GEM SPRINKLER CO. DIV., GRINNELL CORP.
- GLOBE FIRE SPRINKLER CORP 6. RELIABLE AUTOMATIC SPRINKLER CO., INC
- STAR SPRINKLER CORP.
- 8. VICTAULIC COMPANY
- VIKING CORP. 3.2 SPECIALTY VALVES
- A. ALARM CHECK VALVES: UL 193, 175-PSIG WORKING PRESSURE, DESIGNED FOR HORIZONTA OR VERTICAL INSTALLATION, WITH CAST-IRON, FLANGED INLET AND OUTLET, BRONZE GROOVED SEAT WITH O-RING SEALS, AND SINGLE-HINGE PIN AND LATCH DESIGN. INCLUDE TRIM SETS FOR BYPASS, DRAIN, ELECTRICAL SPRINKLER ALARM AND SWITCH, PRESSURE GAGES, PRECISION RETARDING CHAMBER AND FILL LINE ATTACHMENT WITH STRAINER.
- 1. DRIP CUP ASSEMBLY: PIPE DRAIN WITHOUT VALVES, AND SEPARATE FROM MAIN DRAIN 2. DRIP CUP ASSEMBLY: PIPE DRAIN WITH CHECK VALVE TO MAIN DRAIN PIPING.
- 3. OPTION: GROOVED-END CONNECTIONS FOR USE WITH GROOVED-END PIPING :. PRESSURE—REGULATING VALVES: UL 1468, 400 PSIG MINIMUM RATING, BRAS: PRESSURE—REGULATING TYPE. INCLUDE FEMALE NPS INLET AND OUTLET AND ADJUSTABLE SETTING FEATURE. SIZE 1 1/2 INCHES OR 2 1/2 INCHES AND STRAIGHT OR 90 DEGREE
- C. BALL DRIP VALVES: UL 1726, AUTOMATIC DRAIN VALVE, 3/4 INCH SIZE, SPRING-LOADED, BALL CHECK DEVICE WITH THREADED ENDS.
- DETECTOR VALVES: UL 213, GALVANIZED CAST-IRON BODY, BOLTED COVER WITH AIR BLEED DEVICE FOR ACCESS TO INTERNAL PARTS, AND FLANGED ENDS; DESIGNED FOR 175-PSIG WORKING PRESSURE. INCLUDE THREADED BYPASS TAPS IN THE INLET AND OUTLET FOR BYPASS METER CONNECTION. SET VALVE TO ALLOW MINIMAL WATER FLOW THROUGH BYPASS METER WHEN MAJOR WATER FLOW IS REQUIRED.
- 3.3 BACKFLOW PREVENTERS

1. AMES CO., INC.

- A. GENERAL: ASSE STANDARD BACKFLOW PREVENTERS OF SIZE INDICATED FOR MAXIMUM FLOW RATE INDICATED AND MAXIMUM PRESSURE LOSS INDICATED. WORKING PRESSURE: 150 PSIG MINIMUM EXCEPT WHERE INDICATED OTHERWISE
- 2. BRONZE, CAST-IRON, STEEL OR STAINLESS-STEEL BODY WITH FLANGED ENDS.
- 3. INTERIOR LINING: FDA-APPROVED EPOXY COATING, FOR BACKFLOW PREVENTERS HAVING CAST-IRON OR STEEL BODY.
- 4. INTERIOR COMPONENTS: CORROSION-RESISTANT MATERIALS. STRAINER ON INLET.
- B. DOUBLE-CHECK DETECTOR ASSEMBLY BACKFLOW PREVENTERS: UL 312 AND ASSE 1048. CONSISTING OF OS&Y GATE VALVES ON INLET AND OUTLET. AND STRAINER ON INLET. INCLUDE PRESSURE-DIFFERENTIAL RELIEF VALVE HAVING ASME A112.1.2 AIR-GAP FITTING LOCATED BETWEEN 2 POSITIVE-SEATING CHECK VALVES, TEST COCKS AND BYPASS WITH DISPLACEMENT-TYPE WATER METER, VALVES, AND DOUBLE-CHECK BACKFLOW PREVENTER,
- FOR CONTINUOUS PRESSURE APPLICATION.
- 1. PRESSURE LOSS: 5 PSIG MAXIMUM, THROUGH MIDDLE THIRD OF FLOW RANGE. C. MANUFACTURERS

- SECTION 213113 ELECTRIC-DRIVE, CENTRIFUGAL FIRE PUMPS

  - 1.1 RELATED DOCUMENTS
    - A. DRAWINGS AND GENERAL PROVISIONS OF THE CONTRACT, INCLUDING GENERAL AND
    - SUPPLEMENTARY CONDITIONS AND DIVISION 01 SPECIFICATION SECTIONS, APPLY TO THIS
  - 1.2 SUMMARY
  - A. SECTION INCLUDES:
  - 1. HORIZONTALLY MOUNTED, SINGLE-STAGE, SPLIT-CASE FIRE PUMPS.
  - 2. FIRE-PUMP ACCESSORIES AND SPECIALTIES. GROUT.
  - 1.3 INFORMATIONAL SUBMITTALS
  - A. SEISMIC QUALIFICATION CERTIFICATES: FOR FIRE PUMPS, ACCESSORIES, AND COMPONENTS,
  - 1. BASIS FOR CERTIFICATION: INDICATE WHETHER WITHSTAND CERTIFICATION IS BASED ON
  - ACTUAL TEST OF ASSEMBLED COMPONENTS OR ON CALCULATION. 2. DIMENSIONED OUTLINE DRAWINGS OF EQUIPMENT UNIT: IDENTIFY CENTER OF GRAVITY AND LOCATE AND DESCRIBE MOUNTING AND ANCHORAGE PROVISIONS.
  - 3. DETAILED DESCRIPTION OF EQUIPMENT ANCHORAGE DEVICES ON WHICH THE CERTIFICATION IS BASED AND THEIR INSTALLATION REQUIREMENTS.
  - B. PRODUCT CERTIFICATES: FOR FIRE PUMP, FROM MANUFACTURER.
  - C. SOURCE QUALITY-CONTROL REPORTS.
  - D. FIELD QUALITY-CONTROL REPORTS.
  - 2.1 PERFORMANCE REQUIREMENTS
  - A. NFPA COMPLIANCE: COMPLY WITH NFPA 20.

  - B. PUMP EQUIPMENT, ACCESSORY, AND SPECIALTY PRESSURE RATING: 175 PSIG MINIMUM UNLESS HIGHER PRESSURE RATING IS INDICATED.
  - C. ELECTRICAL COMPONENTS, DEVICES, AND ACCESSORIES: LISTED AND LABELED AS DEFINED IN NFPA 70, BY A QUALIFIED TESTING AGENCY, AND MARKED FOR INTENDED LOCATION AND APPLICATION.
  - 2.2 GENERAL REQUIREMENTS FOR CENTRIFUGAL FIRE PUMPS A. DESCRIPTION: FACTORY-ASSEMBLED AND -TESTED FIRE-PUMP AND DRIVER UNIT.
  - B. BASE: FABRICATED AND ATTACHED TO FIRE-PUMP AND DRIVER UNIT, WITH REINFORCEMENT TO RESIST MOVEMENT OF PUMP DURING SEISMIC EVENTS WHEN BASE IS ANCHORED TO BUILDING SUBSTRATE.
  - C. FINISH: RED PAINT APPLIED TO FACTORY—ASSEMBLED AND —TESTED UNIT BEFORE
  - 2.3 HORIZONTALLY MOUNTED, SINGLE-STAGE, SPLIT-CASE FIRE PUMPS
  - A. MANUFACTURERS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, PROVIDE PRODUCTS BY ONE OF THE FOLLOWING:
  - A-C FIRE PUMP; A XYLEM BRAND.
  - 2. CPS PRODUCTS, INC.
  - PACO PUMPS; GRUNDFOS PUMPS CORPORATION, USA.
  - 4. PATTERSON PUMP COMPANY; A GORMAN-RUPP COMPANY. PEERLESS PUMP COMPANY.
  - 6. PENTAIR PUMP GROUP. 7. REDDY-BUFFALOES PUMP COMPANY
  - 8. RUHRPUMPEN, INC. 9. S.A. ARMSTRONG LIMITED.

B. PUMP:

- 1. CASING: AXIALLY SPLIT CASE, CAST IRON, WITH ASME B16.1 PIPE-FLANGE
- 2. IMPELLER: DOUBLE SUCTION, CAST BRONZE, STATICALLY AND DYNAMICALLY BALANCED, AND KEYED TO SHAFT WEAR RINGS: REPLACEABLE BRONZE.
- 4. SHAFT AND SLEEVE: ALLOY STEEL SHAFT WITH BRONZE SLEEVE. a. SHAFT BEARINGS: GREASE-LUBRICATED BALL BEARINGS IN CAST-IRON HOUSING.
- b. SEALS: STUFFING BOX WITH MINIMUM OF FOUR RINGS OF GRAPHITE-IMPREGNATED BRAIDED YARN AND BRONZE PACKING GLAND. 5. MOUNTING: PUMP AND DRIVER SHAFTS ARE HORIZONTAL, WITH PUMP AND DRIVER ON
- C. COUPLING: FLEXIBLE AND CAPABLE OF ABSORBING TORSIONAL VIBRATION AND SHAFT MISALIGNMENT. INCLUDE METAL COUPLING GUARD.
- 1. TYPE: ELECTRIC MOTOR; NEMA MG 1, POLYPHASE DESIGN B.
- E. CAPACITIES AND CHARACTERISTICS: SEE FLOOR PLAN
- 2.4 FIRE-PUMP ACCESSORIES AND SPECIALTIES A. AUTOMATIC AIR-RELEASE VALVES: COMPLY WITH NFPA 20 FOR INSTALLATION IN
- B. CIRCULATION RELIEF VALVES: UL 1478, BRASS, SPRING LOADED; FOR INSTALLATION IN PUMP DISCHARGE PIPING.
- C. RELIEF VALVES: MANUFACTURERS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, PROVIDE PRODUCTS

  - a. BERMAD CONTROL VALVES.
- b. CLA-VAL. c. KUNKLE VALVE.
- d. OCV CONTROL VALVES e. WATTS.
- f. ZURN INDUSTRIES, LLC. 2. DESCRIPTION: UL 1478, BRONZE OR CAST IRON, SPRING LOADED; FOR INSTALLATION IN FIRE-SUPPRESSION WATER-SUPPLY PIPING.
- D. INLET FITTING: ECCENTRIC TAPERED REDUCER AT PUMP SUCTION INLET
- E. OUTLET FITTING: CONCENTRIC TAPERED REDUCER AT PUMP DISCHARGE OUTLET 2.5 GROUT
- A. STANDARD: ASTM C1107, GRADE B, POST-HARDENING AND VOLUME-ADJUSTING, DRY, HYDRAULIC-CEMENT GROUT.
- B. CHARACTERISTICS: NONSHRINK AND RECOMMENDED FOR INTERIOR AND EXTERIOR
- C. DESIGN MIX: 5000-PSI (34-MPA), 28-DAY COMPRESSIVE STRENGTH. D. PACKAGING: PREMIXED AND FACTORY PACKAGED.
- 2.6 SOURCE QUALITY CONTROL A. TESTING: TEST AND INSPECT FIRE PUMPS ACCORDING TO UL 448 REQUIREMENTS FOR "OPERATION TEST" AND "MANUFACTURING AND PRODUCTION TESTS."
- 1. VERIFICATION OF PERFORMANCE: RATE FIRE PUMPS ACCORDING TO UL 448 B. FIRE PUMPS WILL BE CONSIDERED DEFECTIVE IF THEY DO NOT PASS TESTS AND
- INSPECTIONS. C. PREPARE TEST AND INSPECTION REPORTS.
- 3.1 EXAMINATION A. EXAMINE EQUIPMENT BASES AND ANCHORAGE PROVISIONS, WITH INSTALLER PRESENT, FOR COMPLIANCE WITH REQUIREMENTS FOR INSTALLATION TOLERANCES. AND OTHER
- CONDITIONS AFFECTING PERFORMANCE OF FIRE PUMPS. B. EXAMINE ROUGHING-IN FOR FIRE-SUPPRESSION PIPING SYSTEMS TO VERIFY ACTUAL
- LOCATIONS OF PIPING CONNECTIONS BEFORE FIRE—PUMP INSTALLATION. C. PROCEED WITH INSTALLATION ONLY AFTER UNSATISFACTORY CONDITIONS HAVE BEEN CORRECTED.
- 3.2 INSTALLATION A. FIRE-PUMP INSTALLATION STANDARD: COMPLY WITH NFPA 20 FOR INSTALLATION OF FIRE PUMPS, RELIEF VALVES, AND RELATED COMPONENTS.
- B. EQUIPMENT MOUNTING: 1. INSTALL FIRE PUMPS ON CAST-IN-PLACE CONCRETE EQUIPMENT BASES, COMPLY WITH REQUIREMENTS FOR EQUIPMENT BASES AND FOUNDATIONS SPECIFIED IN
- SECTION 033000 "CAST-IN-PLACE CONCRETE. 2. COMPLY WITH REQUIREMENTS FOR VIBRATION ISOLATION AND SEISMIC-CONTROL DEVICES SPECIFIED IN SECTION 210548 "VIBRATION AND SEISMIC CONTROLS FOR FIRE-SUPPRESSION PIPING AND EQUIPMENT."

3. COMPLY WITH REQUIREMENTS FOR VIBRATION ISOLATION DEVICES SPECIFIED IN

- SECTION 210548.13 "VIBRATION CONTROLS FOR FIRE-SUPPRESSION PIPING AND
- C. INSTALL FIRE-PUMP SUCTION AND DISCHARGE PIPING EQUAL TO OR LARGER THAN SIZES
- REQUIRED BY NFPA 20. D. SUPPORT PIPING AND PUMPS SEPARATELY, SO WEIGHT OF PIPING DOES NOT REST ON
- E. INSTALL VALVES THAT ARE SAME SIZE AS CONNECTING PIPING
- . INSTALL PRESSURE GAGES ON FIRE—PUMP SUCTION AND DISCHARGE FLANGE PRESSURE-GAGE TAPPINGS. G. INSTALL PIPING HANGERS AND SUPPORTS, ANCHORS, VALVES, GAGES, AND EQUIPMENT
- H. ELECTRICAL WIRING: INSTALL ELECTRICAL DEVICES FURNISHED BY EQUIPMENT MANUFACTURERS BUT NOT FACTORY MOUNTED. FURNISH COPIES OF MANUFACTURERS' WIRING DIAGRAM SUBMITTALS TO ELECTRICAL INSTALLER.

- A. ALIGN SPLIT—CASE PUMP AND DRIVER SHAFTS AFTER COMPLETE UNIT HAS BEEN LEVELED ON CONCRETE BASE, GROUT HAS SET, AND ANCHOR BOLTS HAVE BEEN TIGHTENED.
- B. AFTER ALIGNMENT IS CORRECT, TIGHTEN ANCHOR BOLTS EVENLY. FILL BASEPLATE COMPLETELY WITH GROUT, WITH METAL BLOCKS AND SHIMS OR WEDGES IN PLACE. TIGHTEN ANCHOR BOLTS AFTER GROUT HAS HARDENED. CHECK ALIGNMENT AND MAKE REQUIRED CORRECTIONS.
- C. ALIGN PIPING CONNECTIONS. ALIGN PUMP AND DRIVER SHAFTS FOR ANGULAR AND PARALLEL ALIGNMENT ACCORDING TO HI 1.4 AND TO TOLERANCES SPECIFIED BY MANUFACTURER.

- A. DRAWINGS INDICATE GENERAL ARRANGEMENT OF PIPING, FITTINGS, AND SPECIALTIES.
- B. INSTALL PIPING ADJACENT TO PUMPS AND EQUIPMENT TO ALLOW SERVICE AND MAINTENANCE.
- C. CONNECT RELIEF-VALVE DISCHARGE TO DRAINAGE PIPING OR POINT OF DISCHARGE.

EQUIPMENT INSTALLATIONS, INCLUDING CONNECTIONS.

LEAKS AND RETEST UNTIL NO LEAKS EXIST

FOR TESTS ONLY AND DO NOT CONVEY TO OWNER.

CONTROLLER, TEST FOR COMPLIANCE WITH REQUIREMENTS.

SUPPORTS ACCORDING TO NFPA 20.

- D. CONNECT FIRE PUMPS TO THEIR CONTROLLERS.
- 3.5 FIELD QUALITY CONTROL A. TEST EACH FIRE PUMP WITH ITS CONTROLLER AS A UNIT. COMPLY WITH REQUIREMENTS
- FOR ELECTRIC-MOTOR-DRIVER FIRE-PUMP CONTROLLERS SPECIFIED IN SECTION 262933 "CONTROLLERS FOR FIRE-PUMP DRIVERS." B. MANUFACTURER'S FIELD SERVICE: ENGAGE A FACTORY-AUTHORIZED SERVICE REPRESENTATIVE TO INSPECT, TEST, AND ADJUST COMPONENTS, ASSEMBLIES, AND
- PERFORM THE FOLLOWING TESTS AND INSPECTIONS. 1. AFTER INSTALLING COMPONENTS, ASSEMBLIES, AND EQUIPMENT, INCLUDING
- 2. TEST ACCORDING TO NFPA 20 FOR ACCEPTANCE AND PERFORMANCE TESTING. 3. LEAK TEST: AFTER INSTALLATION, CHARGE SYSTEM AND TEST FOR LEAKS. REPAIR
- UNITS TO CONFIRM PROPER MOTOR ROTATION AND UNIT OPERATION. 5. TEST AND ADJUST CONTROLS AND SAFETIES. REPLACE DAMAGED AND MALFUNCTIONING CONTROLS AND EQUIPMENT.

4. OPERATIONAL TEST: AFTER ELECTRICAL CIRCUITRY HAS BEEN ENERGIZED, START

D. COMPONENTS, ASSEMBLIES, AND EQUIPMENT WILL BE CONSIDERED DEFECTIVE IF THEY DO NOT PASS TESTS AND INSPECTIONS. E. PREPARE TEST AND INSPECTION REPORTS.

F. FURNISH FIRE HOSES IN NUMBER, SIZE, AND LENGTH REQUIRED TO REACH STORM DRAIN

OR OTHER ACCEPTABLE LOCATION TO DISPOSE OF FIRE-PUMP TEST WATER. HOSES ARE

3.6 STARTUP SERVICE

3.7 DEMONSTRATION

END OF SECTION 213113

1. COMPLETE INSTALLATION AND STARTUP CHECKS ACCORDING TO MANUFACTURER'S WRITTEN INSTRUCTIONS.

A. ENGAGE A FACTORY-AUTHORIZED SERVICE REPRESENTATIVE TO PERFORM STARTUP

### A. ENGAGE A FACTORY-AUTHORIZED SERVICE REPRESENTATIVE TO TRAIN OWNER'S MAINTENANCE PERSONNEL TO ADJUST, OPERATE, AND MAINTAIN FIRE PUMPS.

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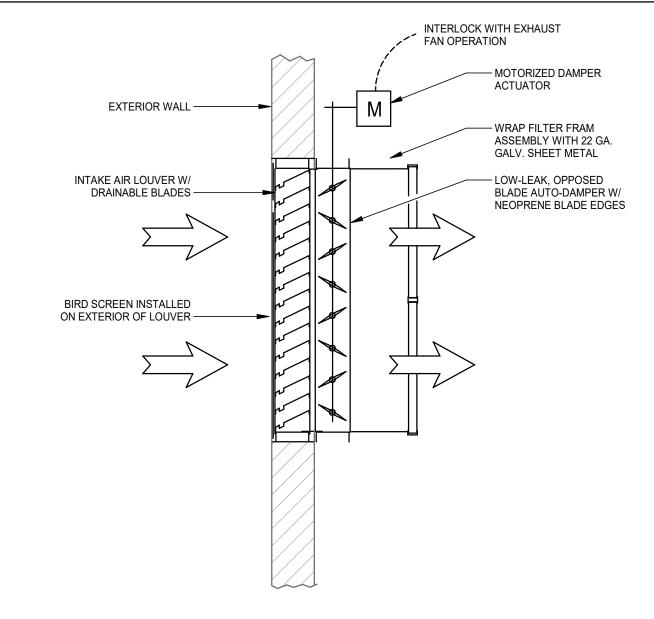
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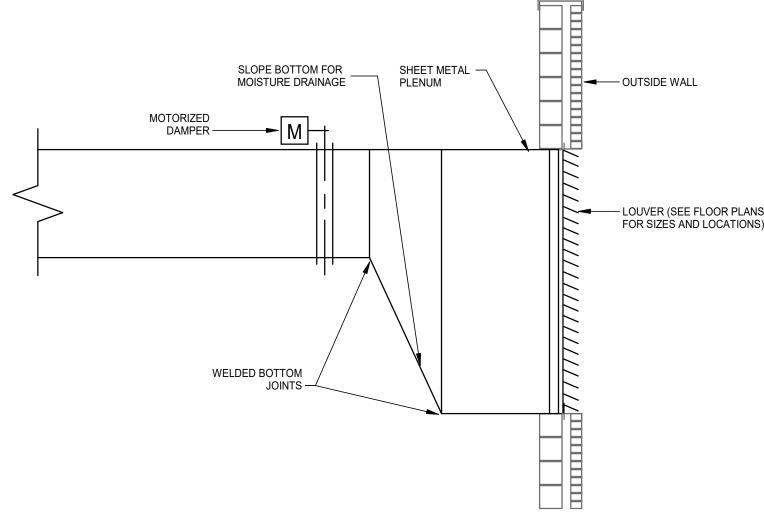
Job No: 03/15/23 22094 SHEET NO.

Checked By

EC MOTOR, FACTORY WIRED INLET DAMPER, SPRING VIBRATION HANGERS.

LOUVER SCHEDULE													
TAG	MAKE	MODEL	LOCATION	TYPE	CFM	MIN. FREE AREA (SQFT.)	SP	WIDTH	SIZE HEIGHT	DEPTH	FINISH	SCREEN	REMARKS
L-2	GREENHECK	ESD-635	FIRE PUMP ROOM	DRAINABLE BLADE	730 CFM	4.7	0.004	2' - 10"	3' - 0"	0' - 6"	BAKED ENAMEL	BIRD	
L-3	GREENHECK	ESD-635	FIRE PUMP ROOM	DRAINABLE BLADE	730 CFM	1.0	0.080	1' - 6"	1' - 8"	0' - 6"	BAKED ENAMEL	BIRD	





INTAKE LOUVER DETAIL

# INTAKE LOUVER DETAIL

## MECHANICAL SPECIFICATIONS

- 1.0 GENERAL 1.1 GENERAL SCOPE
- A. THE WORK REQUIRED UNDER THIS SPECIFICATION SHALL INCLUDE ALL LABOR, MATERIALS, TOOLS. EQUIPMENT. POWER. TRANSPORTATION. HOISTING IMPLEMENTS. ETC., NECESSARY FOR THE COMPLETION OF THE MECHANICAL WORK OF THE CONTRACT: ALL AS SPECIFIED HEREIN, SHOWN ON THE DRAWINGS OR REASONABLY IMPLIED BY EITHER, COMPLETE IN EVERY RESPECT UNLESS SPECIFIED OTHERWISE HEREIN. THE WORK INCLUDED IN THIS CONTRACT SHALL CONSIST OF THE INSTALLATION, TEST AND GUARANTEE OF ALL WORK

DESCRIBED ON THE PLANS AND SPECIFICATIONS.

- 1.2 RELATED DOCUMENTS
  - DRAWINGS AND GENERAL PROVISIONS OF CONTRACT, INCLUDING GENERAL AND SUPPLEMENTARY CONDITIONS AND DIVISION 1 SPECIFICATION SECTIONS, APPLY TO THIS AND THE OTHER SECTIONS OF DIVISION 23.
- DRAWINGS AND SPECIFICATIONS
- DRAWINGS INDICATE GENERAL ARRANGEMENT OF SYSTEM AND ARE TO BE FOLLOWED INSOFAR AS POSSIBLE. DEVIATIONS FROM DRAWINGS MAY BE NECESSITATED BY FIELD CONDITIONS. DETAILED LAYOUTS OF PROPOSED DEPARTURES TO BE SUBMITTED TO THE ENGINEER FOR APPROVAL.
- B. DRAWINGS AND SPECIFICATIONS TO BE CONSIDERED COOPERATIVE AND ANYTHING APPEARING IN SPECIFICATIONS, BUT NOT ON DRAWINGS, OR VICE VERSA, TO BE CONSIDERED PART OF THE CONTRACT AND TO BE EXECUTED.
- C. DRAWINGS INDICATE SIZE AND APPROXIMATE LOCATION OF VARIOUS PARTS OF WORK AND ARE TO BE USED AS A GENERAL GUIDE FOR INSTALLATION. HOWEVER, DRAWINGS ARE, TO A CONSIDERABLE EXTENT, DIAGRAMMATIC AND EXACT LOCATIONS OF PIPING, DUCTWORK, ETC., MAY APPEAR ON THE DRAWINGS OR MUST BE WORKED OUT ON JOB. HOWEVER, NO CHANGES IN SIZES TO BE MADE WITHOUT WRITTEN APPROVAL OF THE ENGINEER. ERRORS OR OMISSIONS DISCOVERED BY BIDDING CONTRACTORS PRIOR TO BID OPENINGS, TO BE CALLED TO ATTENTION OF THE ENGINEER WITHOUT DELAY.
- IF A SPECIFIC ITEM IS SPECIFIED OR ON DRAWINGS FOR MULTIPLE TRADES. THIS CONTRACTOR SHALL INCLUDE ALL ITEMS IN THE BID REGARDLESS OF OTHER TRADES. RESOLUTION WILL BE BY ADDENDUM OR CHANGE ORDER.
- 1.4 EQUIPMENT AND SYSTEMS DEMONSTRATION
- EACH CONTRACTOR IS RESPONSIBLE FOR VERIFYING THE COMPLETE OPERATION OF THE EQUIPMENT AND SYSTEMS INSTALLED AS A PART OF THE WORK. AFTER THE CONTRACTOR IS SATISFIED THE WORK MEETS THE SPECIFIED INTENTS AND SEQUENCES OF OPERATION, THE CONTRACTOR SHALL SCHEDULE, THROUGH THE ENGINEER, A SESSION DURING WHICH ALL ASPECTS OF THE WORK ARE EXPLAINED TO THE OWNER'S PERSONNEL AND/OR REPRESENTATIVES.
- INSPECTION OF EXISTING AND GENERAL CONDITIONS
- THE CONTRACTOR WILL BE HELD TO HAVE PERSONALLY INSPECTED THE SITE OF THE PROPOSED WORK TO ARRIVE AT A CLEAR UNDERSTANDING OF THE CONDITIONS UNDER WHICH THE WORK IS TO BE PERFORMED, THE EXTENT OF OTHER CONTRACTOR'S ACTIVITIES IN THE AREA, AND TO BECOME FULLY ACQUAINTED WITH THE RECEIVING AND STORAGE SPACES AVAILABLE. THE CONTRACTOR SHALL BE HELD TO HAVE COMPARED THE PREMISES AND SITE WITH THE DRAWINGS AND SPECIFICATIONS, AND SHALL BE SATISFIED AS TO THE CONDITIONS OF THE PREMISES, THE ACTUAL ELEVATIONS, AND ANY OTHER CONDITIONS AFFECTING THE CARRYING OUT OF THE WORK, BEFORE THE DELIVERY OF THIS PROPOSAL.
- B. NO ALLOWANCES OR EXTRA CONSIDERATION ON BEHALF OF THE CONTRACTOR WILL SUBSEQUENTLY BE ALLOWED BY REASON OF THE CONTRACTOR'S FAILURE TO HAVE BECOME FAMILIAR WITH SITE CONDITIONS, ERROR OR OVERSIGHT ON THE PART OF THE CONTRACTOR OR DUE TO INTERFERENCE'S BY THE OWNER'S OR OTHER CONTRACTOR'S
- C. ITEMS SPECIFIED ON MECHANICAL EQUIPMENT SCHEDULES AND PLANS ARE THE BASIS OF DESIGN. EQUALITY OF OTHER EQUIPMENT SHALL BE DETERMINED BY THE OWNER AND ENGINEER. ANY MODIFICATION TO THESE DOCUMENTED METHODS THAT IS MADE NECESSARY BY ALTERNATE EQUIPMENT IS THE RESPONSIBILITY OF THE SUPPLIER OF THE
- CONTRACTOR IS DIRECTED TO INCLUDE ALL NECESSARY OVERTIME AND PREMIUM TIME SATURDAY, SUNDAY, HOLIDAYS) REQUIRED FOR THE COMPLETION OF THE INTENDED WORK
- TO MEET SPECIFIED SCHEDULES. DO NOT SCALE MECHANICAL DRAWINGS. FOR EXACT DIMENSIONS, USE DIMENSIONED
- CODES, PERMITS AND COMPLIANCE

DRAWINGS OR ACTUAL FIELD CONDITIONS.

- CONTRACTOR SHALL OBTAIN AND PAY FOR ALL PERMITS, LICENSES AND INSPECTIONS REQUIRED BY LAWS OF GOVERNING BODIES. COMPLY WITH ALL APPLICABLE CODES AND ORDINANCES AND ALL LEGAL REQUIREMENTS. NO EXTRA COMPENSATION WILL BE ALLOWED FOR ANY CHANGES NECESSARY FOR CODE COMPLIANCE REGARDLESS OF THE METHOD OF INSTALLATION SHOWN ON THE DRAWINGS OR SPECIFIED.
- ALL MECHANICAL WORK SHALL COMPLY WITH CURRENT EDITIONS OF ALL APPLICABLE STATE AND LOCAL CODES AND ORDINANCES.
- ALL EQUIPMENT, DEVICES AND MATERIALS SHALL BE THE LATEST PRODUCTS OF MANUFACTURER AND SHALL CONFORM TO THE REQUIREMENTS NOTED ON PLANS.
- WORKMANSHIP
- WORKMANSHIP SHALL BE OF THE HIGHEST QUALITY CONFORMING TO THE BEST MECHANICAL INSTALLATION PRACTICE. ANY WORK OR MATERIAL WHICH IS REJECTED MUST BE REMOVED IMMEDIATELY AND REPLACED. NO SUB-STANDARD WORK WILL BE ACCEPTED.
- THE BREVITY OF THIS SPECIFICATION SHALL NOT BE CONSTRUED AS RELIEVING THE CONTRACTOR OF HIS RESPONSIBILITY TO PERFORM ALL WORK IN A FIRST CLASS WORKMAN
- SUBMITTALS AND RECORD DRAWINGS
- SUBMIT SHOP DRAWINGS AND CATALOG DATA FOR APPROVAL FOR ALL EQUIPMENT AND MATERIALS SPECIFIED FOR THIS PROJECT PRIOR TO ORDERING OR MANUFACTURE OF SUCH. SHOP DRAWINGS NOT STAMPED WITH CONTRACTOR APPROVAL WILL BE REJECTED.
- B. THE CONTRACTOR SHALL KEEP AN ACCURATE RECORD OF ALL DEVIATIONS FROM THE APPROVED DESIGN DOCUMENTS AND SPECIFICATIONS WHICH MAY OCCUR IN THE WORK AS ACTUALLY CONSTRUCTED, AND SHALL SUBMIT SAME TO THE ENGINEER AT COMPLETION OF
- C. SUBMITTALS SHALL BE COORDINATED THROUGH THE ENGINEER.
- 1.9 TESTS AND GUARANTEES
- ALL TESTS FOR VARIOUS SYSTEMS SHALL BE PERFORMED AS REQUIRED, CONSISTENT WITH GOOD GENERAL PRACTICE AND IN COMPLIANCE WITH CODES AND AUTHORITIES.
- AS A CONDITION PRECEDENT TO THE FINAL PAYMENT, THE CONTRACTOR SHALL EXECUTE TO THE OWNER A GUARANTEE IN A FORM APPROVED BY THE OWNER. GUARANTEE SHALL WARRANT THAT ALL WORK INCLUDED IN THIS DIVISION OF THE SPECIFICATIONS WILL REMAIN IN SERVICEABLE AND PERFECT CONDITION (ORDINARY WEAR AND TEAR, ABUSE AND CAUSES BEYOND THE CONTROL OF THE CONTRACTOR EXCLUDED) FOR A PERIOD OF ONE YEAR FROM DATE OF FINAL COMPLETION AND ACCEPTANCE OF WORK AND THAT THE CONTRACTOR WILL MAKE GOOD AT HIS OWN EXPENSE, WITHOUT COST TO THE OWNER, ANY IMPERFECTIONS IN WHOLE OR IN PART WHICH MAY DEVELOP IN THIS WORK DURING THE PERIOD ABOVE SPECIFIED, INCLUDING ANY DAMAGE TO OTHER WORK CAUSED BY SUCH IMPERFECTIONS OR REPAIRING OF SAME.
- ALL MECHANICAL SYSTEMS, DEVICES AND RELATED ITEMS SHALL BE TESTED. REPLACE ANY AND ALL DEFECTIVE DEVICE ITEMS OR SYSTEMS BEFORE COMPLETION OF THE PROJECT.
- 1.10 COORDINATION
- FIELD VERIFY EXACT LOCATION OF ALL NEW EQUIPMENT WITH EXISTING CONDITIONS AND COORDINATE WITH THE GENERAL AND OTHER CONTRACTORS PRIOR TO ROUGH-IN AND/OR INSTALLING ANY OF THIS WORK.

- FIELD VERIFY ALL CLEARANCES AND CONDITIONS PRIOR TO THE START OF ANY DUCTWORK. 2.0 ETC., VERIFY LOCATIONS OF ALL PIPING, DUCTWORK, EQUIPMENT, DEVICES, ETC., WITH FIRE PROTECTION AND ELECTRICAL DRAWINGS AND EXISTING CONDITIONS PRIOR TO ROUGH-IN. REPORT ANY DISCREPANCIES TO THE ENGINEER PRIOR TO PROCEEDING WITH WORK.
- ALL INTERRUPTIONS OF SERVICES TO EXISTING OR OPERABLE FACILITIES SHALL BE SCHEDULED WITH THE OWNER A MINIMUM TWO (2) WEEKS IN ADVANCE. THE CONTRACTOR SHALL NOT INTERRUPT OR RESTORE SERVICES WITHOUT PRIOR CONSENT OF THE OWNER. THE INTERRUPTION SHALL BE ONLY FOR THE SPECIFIC SCHEDULED TIME. THE ELECTRICAL CONTRACTOR WILL BE RESPONSIBLE FOR SHUTDOWN AND START-UP OF ELECTRICAL
- COORDINATE ALL POWER WIRING, SAFETY DISCONNECT MEANS, MOTOR CONTROL AND CONTROL WIRING FOR MECHANICAL EQUIPMENT WITH THE ELECTRICAL CONTRACTOR.
- REFER TO ELECTRICAL DRAWINGS FOR WORK INVOLVING ELECTRICAL POWER SUPPLY WIRING FROM POWER SOURCE TO UNIT CONNECTION POINTS.
- LOCATE AND INSTALL ALL REQUIRED DEVICES IN ACCORDANCE WITH AMERICAN DISABILITIES ACT GUIDELINES. PREPARE COORDINATION DRAWINGS TO A SCALE OF ONE QUARTER INCH EQUALS ONE FOOT
- OR LARGER; DETAILING MAJOR ELEMENTS, COMPONENTS AND SYSTEMS OF MECHANICAL EQUIPMENT AND MATERIALS IN RELATIONSHIP WITH OTHER SYSTEMS. INSTALLATIONS ELEVATIONS, AND BUILDING COMPONENTS. THE CONTRACTOR ASSUMES AL RESPONSIBILITY FOR INSTALLATION OF ALL SYSTEMS IF COORDINATION DRAWINGS ARE NOT
- A. INSTALL ENGRAVED PLASTIC LAMINATE SIGN OR EQUIPMENT MARKER ON OR NEAR EACH MAJOR ITEM OF MECHANICAL EQUIPMENT
- DEMOLITION, REMOVALS, CLEAN-UP, PROTECTION AND TOUCH-UP
- REMOVE ALL EXISTING DUCTWORK, EQUIPMENT, DEVICES, ETC., SCHEDULED FOR REMOVAL OR NOT REQUIRED TO REMAIN IN SERVICE. CONTRACTOR SHALL COORDINATE REMOVAL WITH OWNER AND ALL OTHER TRADES ON THE PROJECT. ALL PIPING, DUCTWORK, ETC. SHALL BE REMOVED BACK TO THE POINT OF SERVICE. PROVIDE ADDITIONAL PIPING, DUCTWORK, ETC., TO MAINTAIN FUNCTIONAL SYSTEMS.
- THIS CONTRACTOR SHALL DISPOSE OF ALL MATERIALS GENERATED FROM REMOVAL AND INSTALLATION OF THIS WORK. DEBRIS SHALL BE REMOVED FROM THE PROJECT SITE WEEKLY. THIS CONTRACTOR SHALL PROVIDE TO THE OWNER ANY SALVAGEABLE MATERIALS AS DIRECTED BY THE OWNER.
- ALL EQUIPMENT, ITEMS, DEVICES AND APPURTENANCES SHALL BE PROTECTED FROM DEBRIS AND DAMAGE WHILE STORED AT THE SITE AND DURING AND AFTER INSTALLATION.
- UPON COMPLETION OF WORK, THIS CONTRACTOR SHALL THOROUGHLY CLEAN ALL APPARATUS FURNISHED BY THIS CONTRACT.
- SCARRED FACTORY-FINISHED MECHANICAL EQUIPMENT SHALL BE TOUCHED UP WITH FACTORY FURNISHED PAINT. RUSTED OR MARRED SURFACES OF MECHANICAL EQUIPMENT SHALL BE CLEANED AND PRIMED BEFORE PAINTING.
- PATCH FINISHED SURFACES AND BUILDING COMPONENTS USING NEW MATERIALS MATCHING EXISTING MATERIALS AND EXPERIENCED INSTALLERS.
- ALL CUTTING AND PATCHING OF WALLS IS THE RESPONSIBILITY OF THIS CONTRACTOR UNLESS SPECIFICALLY STATED OTHERWISE ON THE DRAWINGS.
- GENERAL INSTALLATION REQUIREMENTS
- DO NOT SCALE MECHANICAL DRAWINGS. FOR EXACT DIMENSIONS USE DIMENSIONED DRAWINGS ON ACTUAL FIELD CONDITIONS.
- THE CONTRACTOR SHALL FAMILIARIZE HIM/HERSELF WITH ALL CONDITIONS UNDER WHICH ALL WORK MUST BE PERFORMED AND VERIFY/CHECK ALL ELEVATIONS. REPORT ANY DISCREPANCIES TO THE ENGINEER.
- THE CONTRACTOR IS RESPONSIBLE FOR FULLY COORDINATING ALL WORK WITH OTHER TRADES PRIOR TO FABRICATING AND/OR INSTALLING ANY WORK TO ENSURE PROPER CLEARANCES FOR INSTALLATION AND MAINTENANCE ARE MAINTAINED. DRAWINGS ARE DIAGRAMMATIC AND INDICATE GENERAL ARRANGEMENT OF SYSTEMS. EXACT LOCATION OF EQUIPMENT, MATERIAL, DEVICE, ETC. MUST BE WORKED OUT IN THE FIELD.
- THE CONTRACTOR SHALL TURN OVER TO THE OWNER AND/OR DISPOSE OF AS DIRECTED ALL EXISTING EQUIPMENT AND MATERIALS BEING REMOVED.
- ALL EQUIPMENT SHALL BE NEW AND SHALL BE EQUAL IN QUALITY AND TYPE AND HAVE ALL ACCESSORIES AS NOTED ON THE DRAWINGS AND IN THE SPECIFICATIONS. MAKE EQUIPMENT SELECTIONS AND PROVIDE INSTALLATIONS WHICH MEET OR EXCEED THE ENERGY PERFORMANCE, HEATING/COOLING CAPACITIES, AND NOISE LEVELS NOTED ON THE FLOOR PLANS AND SPECIFICATIONS. ADJUSTMENTS TO CONSTRUCTION AND ACCESSORIES ON SUBMITTED EQUIPMENT MAY BE REQUIRED TO ACHIEVE THIS EQUALITY AND SHALL BE INCLUDED AT NO EXTRA COST TO THE OWNER. MAKE ANY CHANGES IN DUCTWORK, PIPING, FRAMING, ETC., AS REQUIRED TO ACCOMMODATE SUBSTITUTED EQUIPMENT.
- SUBMIT FOR APPROVAL DATA ON PROPOSED EQUIPMENT AND MATERIALS. SUBMITTALS SHALL INCLUDE EQUIPMENT SIZES, CAPACITY, MOTOR LOCATIONS, PERFORMANCE CURVES, AND OTHER PERTINENT DATA. EACH SUBMITTAL SHALL INCLUDE IDENTIFICATION TAGS OR SYMBOLS TO MATCH CONTRACT DOCUMENTS.
- INSTALL ALL EQUIPMENT AND MATERIALS AND PERFORM ALL WORK IN ACCORDANCE WITH ALL NATIONAL, STATE, AND LOCAL CODES AND REGULATIONS INCLUDING ENERGY EFFICIENCY GUIDELINES.
- REFER TO H.V.A.C. SEQUENCES OF OPERATION (DRAWINGS AND/OR SPECIFICATIONS). PROVIDE ALL EQUIPMENT, MATERIALS, DEVICES, ETC. AS REQUIRED TO ACHIEVE THOSE
- MAINTAIN MINIMUM 10'-0" CLEARANCE BETWEEN OUTDOOR AIR INTAKES AND EXHAUST, FLUES, AND PLUMBING VENTS.
- ALL INTERACTIVE WALL MOUNTED DEVICES (THERMOSTATS, SENSORS, CONTROLLERS, ETC.) SHALL BE MOUNTED PER ADA REQUIREMENTS.

WALL/FLOORS AS REQUIRED TO FACILITATE INSTALLATION OF DUCTWORK.

- THE MECHANICAL CONTRACTOR SHALL BE RESPONSIBLE FOR CUTTING AND PATCHING OF
- PROTECT ALL EXISTING BUILDING COMPONENTS INCLUDING ALL EXISTING STRUCTURE FINISHES, AND MATERIALS AT ALL TIMES FROM DAMAGE DUE TO WORK UNDER THIS CONTRACT OR FROM DAMAGE DUE TO EXPOSURE TO THE ELEMENTS. ANY SUCH DAMAGE SHALL BE REPAIRED, PATCHED, OR REPLACED TO MATCH THE ORIGINAL EXISTING CONDITION
- INSTALL ALL DUCTWORK AND PIPING AS HIGH AS POSSIBLE TO FLOOR STRUCTURE. COORDINATE DUCTWORK AND PIPING ROUTING WITH FIRE SUPPRESSION, PLUMBING, AND ELECTRICAL TRADES.
- N. FABRICATE AND INSTALL ALL DUCTWORK IN ACCORDANCE WITH THE LATEST EDITION OF SMACNA GUIDELINES FOR DUCT CONSTRUCTION. ALL RECTANGULAR AND ROUND RIGID DUCTS SHALL BE OF SMACNA GAGE STEEL UNLESS OTHERWISE NOTED ON THE DRAWINGS.
- ALL RECTANGULAR AND SQUARE DUCTWORK ELBOWS SHALL BE CONSTRUCTED WITH TURNING VANES. THE MECHANICAL CONTRACTOR SHALL BE RESPONSIBLE FOR ALL CONTROL WIRING AND RACEWAYS REQUIRED FOR THIS PROJECT INCLUDING 120 VOLT INTERLOCKS, 120 VOLT
- POWER SUPPLY TO CONTROLLERS, AND DATA CONNECTIONS TO PANELS UNLESS INDICATED
- INSTALL ALL CABLING AND RACEWAYS PER REQUIREMENTS OF ELECTRICAL DRAWINGS AND SPECIFICATIONS. PROVIDE PERMANENT PLASTIC NAME PLATE FOR ALL EQUIPMENT INSTALLED INDICATING THE PLAN DESIGNATION OF THE UNIT (EF-1, AHU-1, ETC.) AND ALSO, THE BUILDING AREA SERVED

(CLASSROOMS 2-4, CONFERENCE ROOM, ETC.).

MAINTENANCE MANUALS

AT NO COST TO THE OWNER.

A. COMPLY WITH SPECIFICATION SECTION 017823 "OPERATION AND MAINTENANCE DATA

- DUCT INSULATION
- FIRE-TEST-RESPONSE CHARACTERISTICS: AS DETERMINED BY TESTING MATERIALS IDENTICAL TO THOSE SPECIFIED IN THIS SECTION ACCORDING TO ASTM E 84, BY A TESTING AND INSPECTING AGENCY ACCEPTABLE TO AUTHORITIES HAVING JURISDICTION. FACTORY LABEL INSULATION AND JACKET MATERIALS AND SEALER AND CEMENT MATERIAL CONTAINERS WITH APPROPRIATE MARKINGS OF APPLICABLE TESTING AND INSPECTING
- 1. INSULATION INSTALLED INDOORS: FLAME-SPREAD RATING OF 25 OR LESS, AND SMOKE-DEVELOPED RATING OF 50 OR LESS.
- MINERAL-FIBER BOARD THERMAL INSULATION: GLASS FIBERS BONDED WITH A THERMOSETTING RESIN. COMPLY WITH ASTM C 612, TYPE 1B, WITHOUT FACING AND WITH ALL-SERVICE JACKET MANUFACTURED FROM KRAFT PAPER, REINFORCING SCRIM, ALUMINUM FOIL AND VINYL FILM. MINERAL-FIBER BLANKET THERMAL INSULATION: GLASS FIBERS BONDED WITH A THERMOSETTING RESIN. COMPLY WITH ASTM C 553, TYPE II, WITHOUT FACING AND
- FIELD-APPLIED JACKETS

B. INSULATION MATERIALS

FOIL AND PAPER JACKET: LAMINATED, GLASS-FIBER-REINFORCED, FLAME-RETARDANT KRAFT PAPER AND ALUMINUM FOIL.

WITH ALL-SERVICE JACKET MANUFACTURED FROM KRAFT PAPER, REINFORCING

- APPLY INSULATION MATERIALS. ACCESSORIES AND FINISHES ACCORDING TO THE MANUFACTURER'S WRITTEN INSTRUCTIONS; WITH SMOOTH, STRAIGHT, AND EVEN
- SURFACES; AND FREE OF VOIDS THROUGHOUT THE LENGTH OF DUCTS AND FITTINGS. INDOOR DUCT AND PLENUM APPLICATION SCHEDULE:

SCRIM, ALUMINUM FOIL AND VINYL FILM.

SERVICE: RECTANGULAR OUTSIDE-AIR DUCTS, EXPOSED: INSTALL MINERAL FIBER BLANKET INSULATION, 2 INCHES THICK, SINGLE LAYER WITH FOIL AND PAPER JACKET

SERVICE: EXHAUST-AIR DUCTS (BETWEEN FAN OUTLET AND EXTERIOR TERMINATION):

INSTALL MINERAL FIBER BLANKET INSULATION, 2 INCHES THICK, SINGLE LAYER WITH

- FOIL AND PAPER JACKET AND VAPOR RETARDER.

FEDERAL CODE REQUIREMENTS.

- DUCTWORK AND DUCT ACCESSORIES CONSTRUCT RECTANGULAR DUCTWORK TO MEET ALL FUNCTIONAL CRITERIA DEFINED IN SECTION VII OF THE SMACNA "HVAC DUCT CONSTRUCTION STANDARDS METAL AND FLEXIBLE", 2005 EDITION. ALL DUCTWORK MUST COMPLY WITH ALL LOCAL, STATE AND
- FABRICATE RECTANGULAR DUCTS WITH GALVANIZED SHEET STEEL, IN ACCORDANCE WITH SMACNA "HVAC DUCT CONSTRUCTION STANDARDS," TABLES 1-3 THROUGH 1-19, INCLUDING THEIR ASSOCIATED DETAILS. CONFORM TO THE REQUIREMENTS IN THE REFERENCED STANDARD FOR METAL THICKNESS, REINFORCING TYPES AND INTERVALS, TIE ROD APPLICATIONS, AND JOINT TYPES AND INTERVALS.
- STATIC PRESSURE CLASSIFICATIONS: UNLESS OTHERWISE INDICATED, CONSTRUCT DUCTS TO THE FOLLOWING:
- LOW PRESSURE OUTSIDE AIR DUCTS: 2-INCHES WG. EXHAUST DUCTS: 2-INCHES WG, NEGATIVE OR POSITIVE PRESSURE.
- D. SEAL DUCT JOINTS AND SEAMS WITH DUCT SEALANT, TAPE OR MASTICS. 1. PRESSURE CLASSIFICATION 2-INCHES WG: TRANSVERSE AND LONGITUDINAL JOINTS.
- PROVIDE LOW-LEAKAGE STANDARD GALVANIZED VOLUME CONTROL DAMPERS, MULTIPLE (FOR DAMPERS 12 INCHES IN HEIGHT AND GREATER) OR SINGLE-BLADE (FOR DAMPERS UNDER 12 INCHES IN HEIGHT), OPPOSED BLADE DESIGN, LOW-LEAKAGE RATING, WITH LINKAGE OUTSIDE OF AIR STREAM AND SUITABLE FOR HORIZONTAL OR VERTICAL APPLICATIONS. FURNISH WITH NEOPRENE BLADE SEALS AND ALUMINUM JAMB SEALS.
- CONSTRUCT ALL RECTANGULAR ELBOWS WITH TURNING VANES. COMPLY WITH SMACNA'S "HVAC DUCT CONSTRUCTION STANDARDS - METAL AND FLEXIBLE" FOR VANES AND VANE RUNNERS. VANE RUNNERS SHALL AUTOMATICALLY ALIGN VANES. FLEXIBLE CONNECTORS: FLAME-RETARDANT NONCOMBUSTIBLE FABRICS, COATINGS, AND
- ADHESIVES COMPLYING WITH UL181, CLASS 1. FACTORY FABRICATED WITH 3-1/2 INCH WIDE FABRIC STRIP ATTACHED TO TWO STRIPS OF GALVANIZED SHEET STEEL. FABRIC SHALL BE DOUBLE COATED WITH NEOPRENE AND RATED FOR SERVICE TEMPERATURE RANGE OF MINUS 40 TO PLUS 200 DEG. F.
- DUCT-MOUNTED ACCESS DOORS AND PANELS
- GENERAL: REFER TO THE ACCESS DOOR MATERIALS SCHEDULE FOR FRAME AND DOOR THICKNESS, NUMBER OF HINGES AND LOCKS, AND LOCATION OF LOCKS. PROVIDE CONSTRUCTION AND AIRTIGHTNESS SUITABLE FOR DUCT PRESSURE CLASS.
- FRAME: GALVANIZED SHEET STEEL. PROVIDE WITH BEND-OVER TABS AND FOAM GASKETS DOOR: DOUBLE-WALL, GALVANIZED SHEET METAL CONSTRUCTION WITH INSULATION FILL AND THICKNESS, NUMBER OF HINGES AND LOCKS AS INDICATED FOR DUCT PRESSURE CLASS. PROVIDE VISION PANEL WHERE INDICATED. PROVIDE 1-INCH BY 1-INCH BUTT HINGE OR PIANO HINGE AND CAM LATCHES.
- SEAL AROUND FRAME ATTACHMENT TO DUCT AND DOOR TO FRAME WITH NEOPRENE OR
- INSULATION: 1-INCH THICK FIBER GLASS OR POLYSTYRENE FOAM BOARD.
- PRODUCTS AND EXECUTION
- QUALITY ASSURANCE: PROVIDE FANS THAT ARE U.L. LISTED AND LABELED. MOTORS AND ELECTRICAL ACCESSORIES SHALL COMPLY WITH NEMA STANDARDS.
- MANUFACTURERS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, PROVIDE PRODUCTS BY ONE OF THE FOLLOWING: ACME, CARNES, COOK, GREENHECK, JENN.
- GENERAL: PROVIDE FANS THAT ARE FACTORY FABRICATED AND ASSEMBLED, FACTORY
- TESTED AND FACTORY FINISHED WITH INDICATED CAPACITIES AND CHARACTERISTICS. INLINE CABINET FANS: DIRECT-DRIVE AS INDICATED, CENTRIFUGAL CONSISTING OF HOUSING, WHEEL, FAN SHAFT, BEARINGS, MOTOR, DRIVE ASSEMBLY.
- CABINET CONSTRUCTION: THE FAN HOUSING IS CONSTRUCTED OF RIGID STRUCTURAL MEMBERS AND FORMED GALVANIZED STEEL PANELS. WHEEL: AN ALUMINUM, BACKWARD INCLINED, NON-OVERLOADING CENTRIFUGAL
- DUCT COLLARS: INLET AND DISCHARGE DUCT COLLARS. MOTOR: PERMANENTLY LUBRICATED, SEALED BALL BEARING ELECTRICALLY COMMUTATED MOTORS (FCM) BEARINGS: 100 PERCENT FACTORY TESTED BEARINGS ARE DESIGNED SPECIFICALLY FOR AIR HANDLING APPLICATIONS WITH A MINIMUM L10 LIFE IN EXCESS OF 100,000
- FAN SHAFT: PRECISELY SIZED, GROUND AND POLISHED SO THE FIRST CRITICAL SPEED IS AT LEAST 25 PERCENT OVER THE MAXIMUM OPERATING SPEED. DISCONNECT SWITCH: NEMA-1 DISCONNECT SWITCH IS FACTORY-MOUNTED AND WIRING IS PROVIDED FROM THE MOTOR AS STANDARD.
- ALL INTERIOR COMPONENTS. 10. ACCESSORIES: a. ELECTRICALLY COMMUTATED MOTOR (ECM) WITH FACTORY WIRED SPEED

ACCESS PANELS: TWO REMOVABLE ACCESS PANELS PERMITTING EASY ACCESS TO

SPRING VIBRATION ISOLATION HANGERS. c. FACTORY WIRED MOTORIZED INLET DAMPER.

HOURS (L50 AVERAGE LIFE IN EXCESS OF 500,000 HOURS).

INSTALL FANS LEVEL AND PLUMB IN ACCORDANCE WITH MANUFACTURER'S WRITTEN

- AIR INLETS AND OUTLETS
- MANUFACTURER: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, PROVIDE AIR OUTLETS AND INLETS OF ONE OF THE FOLLOWING:
- LOUVERS: AIR BALANCE INC., AIROLITE, AMERICAN WARMING AND VENTILATING INC. ARROW UNITED INDUSTRIES, INC., CESCO, GREENHECK, LOUVERS AND DAMPERS, INC. PENN VENTILATOR CO., INC., AND RUSKIN MFG. CO.
- B. EXCEPT AS OTHERWISE INDICATED, PROVIDE MANUFACTURER'S STANDARD GRILLES, REGISTER AND DIFFUSERS AND LOUVERS WHERE SHOWN; OF SIZE, SHAPE, CAPACITY AND TYPE INDICATED; CONSTRUCTED OF MATERIALS AND COMPONENTS AS INDICATED, AND AS REQUIRED FOR COMPLETE INSTALLATION.
- LOUVERS: BAKED ENAMEL FINISH WITH COLOR SELECTED BY ARCHITECT.
- INSTALL AIR OUTLETS AND INLETS IN ACCORDANCE WITH MANUFACTURER'S WRITTEN INSTRUCTIONS AND IN ACCORDANCE WITH RECOGNIZED INDUSTRY PRACTICES TO ENSURE THAT PRODUCTS SERVE INTENDED FUNCTION.
- CONTROL EQUIPMENT AND SYSTEMS
- A. CONTROL SYSTEM CONSISTS OF SENSORS, INDICATORS, ACTUATORS, FINAL CONTROL ELEMENTS, INTERFACE EQUIPMENT, OTHER APPARATUS AND ACCESSORIES CONNECTED TO CONTROLLERS TO OPERATE MECHANICAL SYSTEMS ACCORDING TO SEQUENCES OF
- OPERATION INDICATED OR SPECIFIED, AND TO PROVIDE COMPLETE, FUNCTIONAL SYSTEMS. CODES AND STANDARDS: COMPLY WITH THE FOLLOWING: NFPA 90A, NATIONAL ELECTRIC CODE UNDERWRITERS LABORATORIES, NEMA FEDERAL COMMUNICATIONS COMMISSION ELECTRONICS INDUSTRIES ASSOCIATION STD. RS-232, IEEE, ANSI.
- C. MANUFACTURERS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, PROVIDE PRODUCTS BY ONE OF THE FOLLOWING:
- THERMOSTATS
- JOHNSON CONTROLS WHITE RODGERS.
- DAMPER ACTUATORS
- BARBER-COLMAN HONEYWELL. JOHNSON CONTROLS. BELIMO.
- ELECTRIC CONTROL SYSTEM AND COMPONENTS SIEBE/BARBER-COLMAN
- JOHNSON CONTROLS. LANDIS & GYR POWERS. ROBERTSHAW.

TOUR & ANDERSON.

- D. ACTUATORS: ELECTRIC MOTORS: SIZE TO OPERATE WITH SUFFICIENT RESERVE POWER TO
- PROVIDE SMOOTH MODULATING ACTION OR 2-POSITION ACTION. 1. PERMANENT SPLIT-CAPACITOR OR SHADED-POLE TYPE: EQUIP SPRING-RETURN MOTORS WITH INTEGRAL SPIRAL-SPRING MECHANISM IN HOUSING DESIGN FOR EASY REMOVAL FOR SERVICE OR ADJUSTMENT OF LIMIT SWITCHES, AUXILIARY SWITCHES OR
- FEEDBACK POTENTIOMETER. E. CONTROL WIRING REQUIREMENTS
  - ALL CONDUIT AND CABLE TO RUN PARALLEL TO BUILDING STEEL.
- PROVIDE SUFFICIENT SLACK AND FLEXIBLE CONNECTIONS TO ALLOW FOR VIBRATION ALL WIRES MUST BE PLENUM RATED, EVEN WHEN INSTALLING IN CONDUIT.
- ALL WIRING SHALL BE LABELED AT EACH END. INDICATE WHAT LOCATION/DEVICE WIRE IS COMING FROM AND WHERE IT IS GOING. WIRING SHALL BE CONTINUOUS, WITHOUT SPLICES. DO NOT RUN LOW VOLTAGE WIRE IN THE SAME CONDUIT OR BUNDLES AS LINE VOLTAGE OR POWER WIRING.

A TRUE EARTH GROUND MUST BE PROVIDED AT CONTROLLERS AND CONTROL PANELS.

ALL CONDUCTORS INSTALLED EXPOSED TO VIEW SHALL BE ROUTED IN ELECTRICAL

- METALLIC TUBING (EMT) AND FITTINGS UTILIZING CAST METAL BOXES.
- F. PROVIDE PERMANENT LABEL ON EACH CONTROL DEVICE INCLUDING ROOM SENSORS. LABEL WIRING AND CABLING WITH SYSTEM ADDRESS AND TERMINATION NUMBER. INSTALL CONTROL EQUIPMENT AND SYSTEMS AS REQUIRED, IN ACCORDANCE WITH SYSTEM MANUFACTURER'S WRITTEN INSTRUCTIONS, AND WITH RECOGNIZED INDUSTRY PRACTICES, AND ENSURE THAT EQUIPMENT COMPLIES WITH REQUIREMENTS. COMPLY WITH REQUIREMENTS
- OF NEC. AND APPLICABLE PORTIONS OF NECA'S "STANDARD OF INSTALLATION" PERTAINING TO GENERAL ELECTRICAL INSTALLATION PRACTICES. INSTALL ALL RACEWAY AND WIRING IN ACCORDANCE WITH ALL REQUIREMENTS OF DIVISION 26,
- ELECTRICAL SPECIFICATIONS.
- SEQUENCES OF OPERATION
- A. EQUIPMENT ROOM VENTILATION 1. OPEN MOTORIZED INTAKE DAMPER ON LOUVER, L-3, ON RISE IN SPACE TEMPERATURE
- ABOVE 80 DEG. F, (ADJUSTABLE). ON CONTINUED RISE IN SPACE TEMPERATURE ABOVE 90 DEG. F, (ADJUSTABLE) OPEN FAN EF-1 MOTORIZED DAMPER AND ENERGIZE THE FAN.
- ON FALL IN SPACE TEMPERATURE, REVERSE THE SEQUENCE 3.5 TESTING, ADJUSTING AND BALANCING
  - . EMPLOY THE SERVICES OF AN INDEPENDENT TESTING, ADJUSTING AND BALANCING AGENCY CERTIFIED BY THE ASSOCIATED AIR BALANCE COUNCIL TO TEST AND BALANCE THE INDICATED
  - B. TEST, ADJUST, AND BALANCE THE FOLLOWING MECHANICAL SYSTEMS:

2. VERIFY TEMPERATURE CONTROL SYSTEM OPERATION.

SYSTEMS. SUBMIT A COPY OF THE REPORT TO THE ENGINEER FOR REVIEW.

03/15/23 FOR BID/PERMIT REV. DATE DESCRIPTION

SPECIFICATIONS Drawn By: Checked By:

MECHANICAL

SCHEDULES,

03/15/23

l lob No:

SHEET NO.

mda engineering, inc

Mechanical and

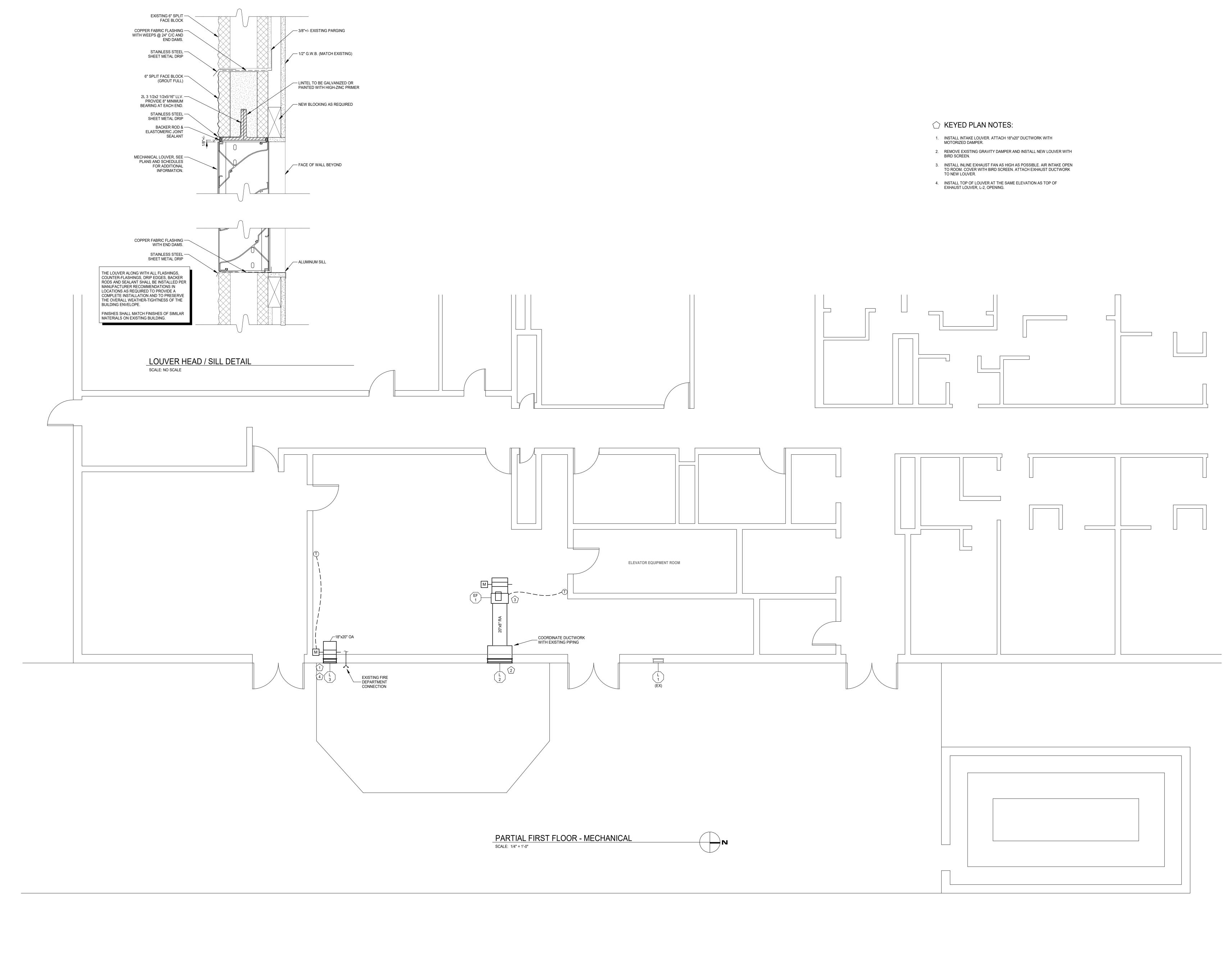
**Electrical Engineers** 

1415 Holland Road

www.mdaengr.com

Maumee, Ohio 43537

Phone: (419) 893-3141



mda engineering, inc.

Mechanical and
Electrical Engineers

Maumee, Ohio 43537

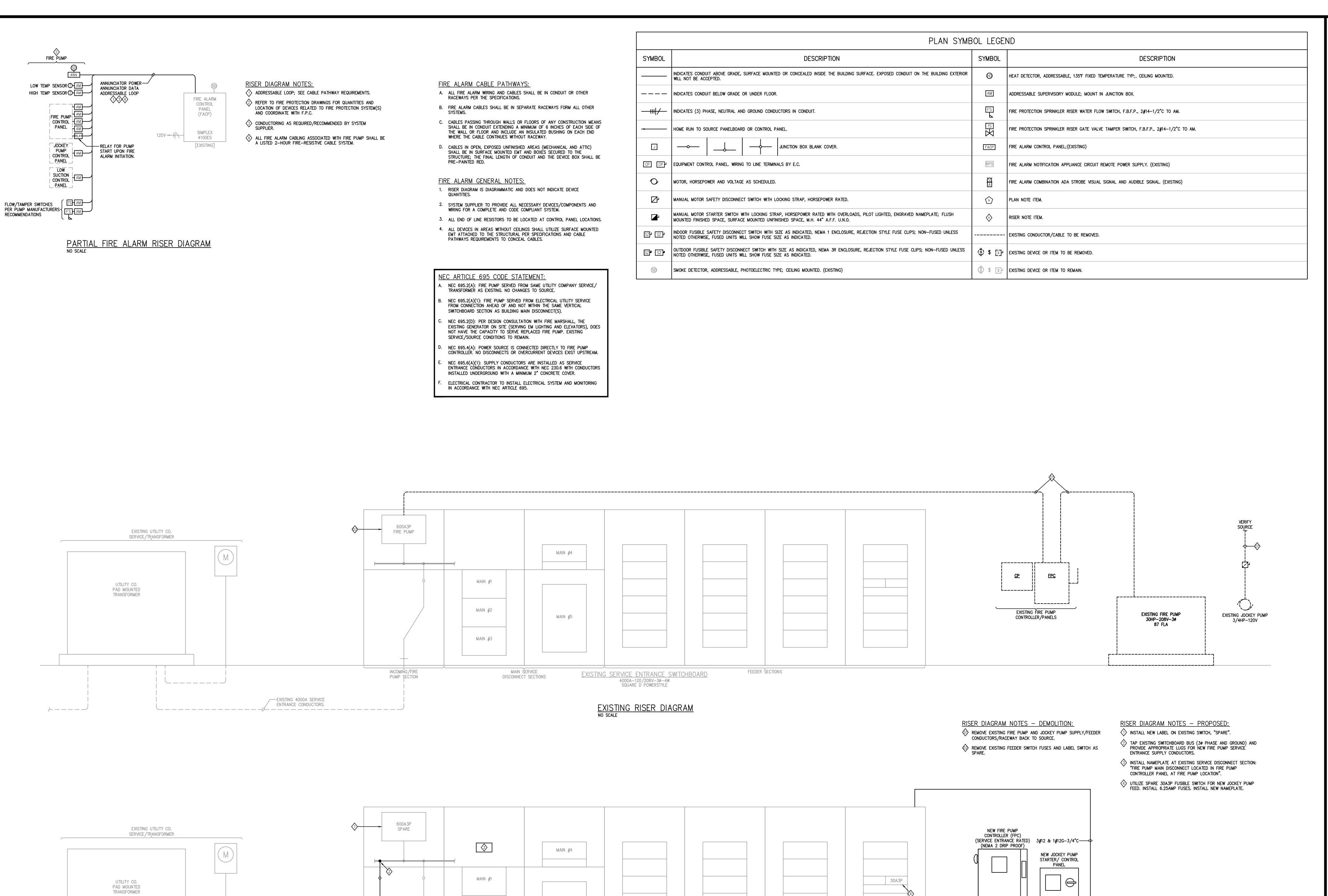
Phane: (410) 993-3141 1415 Holland Road Maumee, Ohio 43537 Phone: (419) 893-3141 www.mdaengr.com

> FIRE PUMP REPLACMENT AT DORREL MANOR, AN LMH PROPERT 5836 SOUTHWYCK BOULEVARD TOLEDO, OHIO 43614

1 03/15/23 FOR BID/PERMIT
REV. DATE DESCRIPTION

PARTIAL FLOOR
PLAN - MECHANICAL

03/15/23 SHEET NO.



FEEDER SECTIONS

MAIN #2

MAIN #3

PUMP SECTION

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EXISTING 4000A SERVICE

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ENTRANCE CONDUCTORS.

MAIN SERVICE

DISCONNECT SECTIONS

MAIN #5

EXISTING SERVICE ENTRANCE SWITCHBOARD

4000A-120/208V-3Ø-4W
SQUARE D POWERSTYLE

5

mda engineering, inc. Maumee, Ohio 43537 Phone: (419) 893-3141 and Electrical ngineers Fax: (419) 893-0687

ELECTRICAL

NEW FIRE PUMP 40HP-208V-3ø 114 FLA, 641 LRC

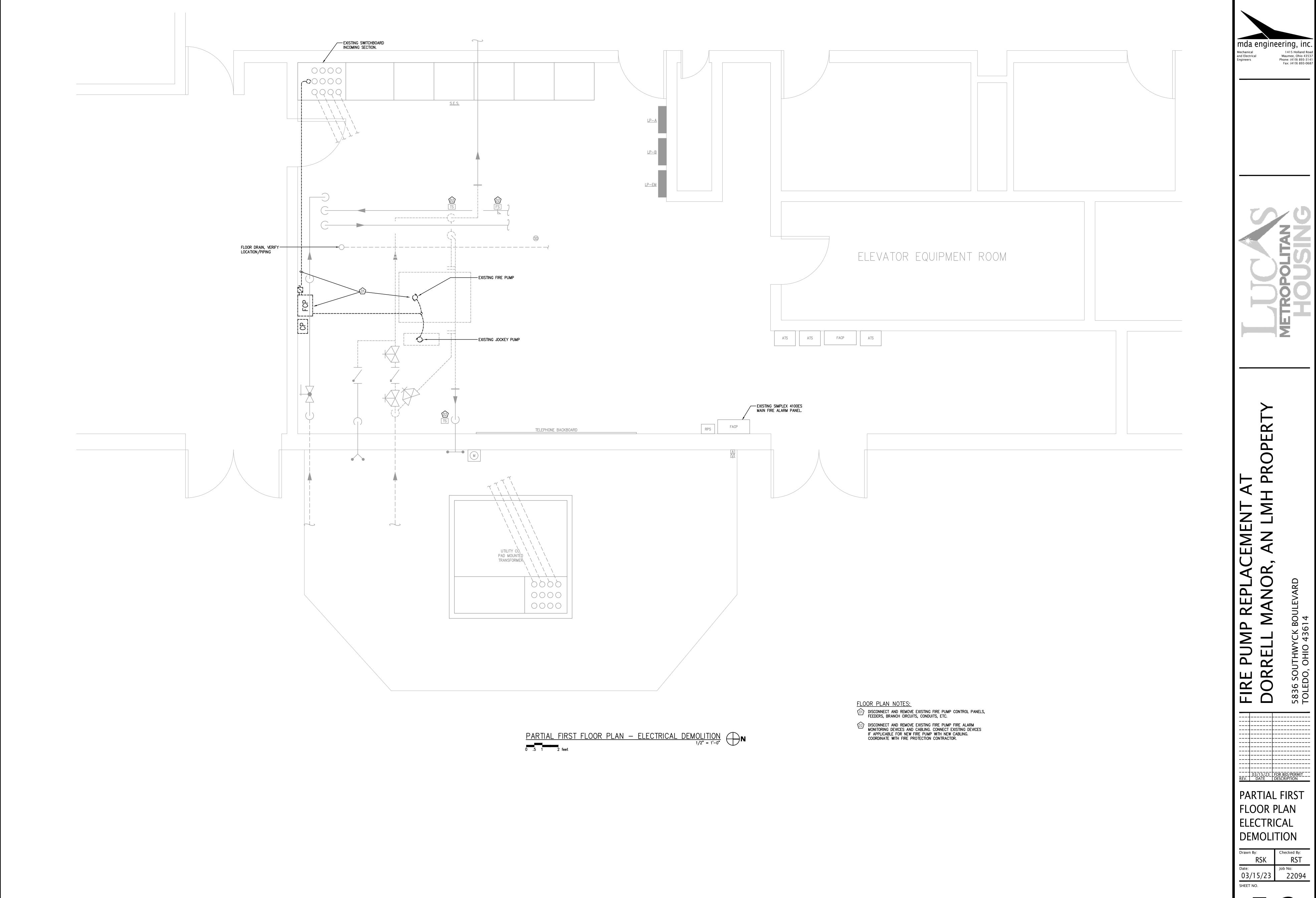
3#12 & 1#12G-3/4"C---/

`—3#3/0 & 1#6G−2"C (CU)—

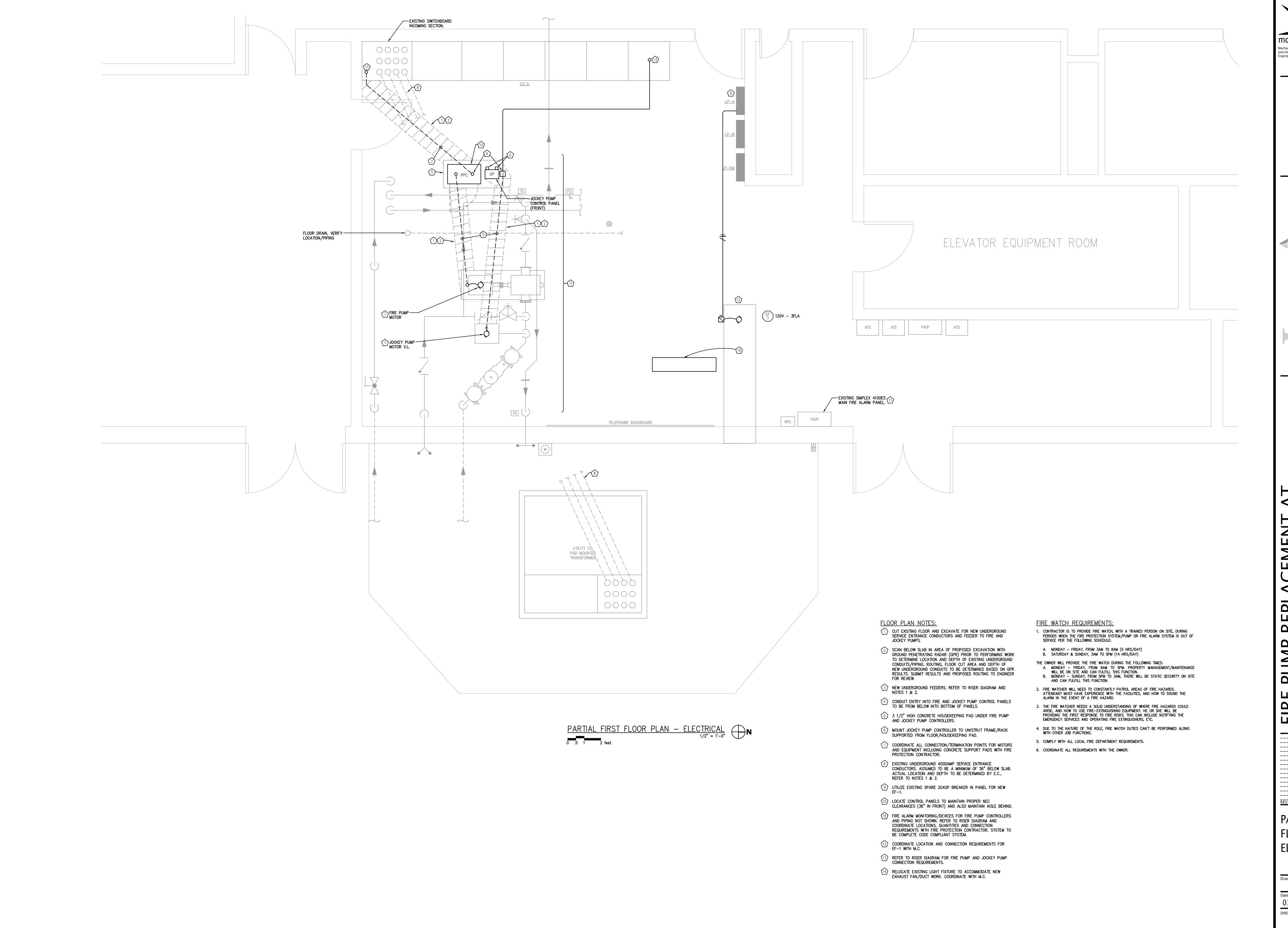
NEW JOCKEY PUMP

3/4HP-208V-3ø, 3.5 FLA

DETAILS



Date: Job No: 22094
SHEET NO.



METROPOLITA

1415 Holland Road Maumee, Ohio 43537 Phone: (419) 893-3141 Fax: (419) 893-0687

FIRE PUMP REPLACEMENT AT
DORRELL MANOR, AN LMH PROPERTY

PARTIAL FIRST
FLOOR PLAN
ELECTRICAL

Drawn By: Checked By:

RSK RST

Date: Job No:

03/15/23 22094

E-3

## 1.1 GENERAL SCOPE

A. THE WORK REQUIRED UNDER THIS SPECIFICATION SHALL INCLUDE ALL LABOR, MATERIALS, TOOLS, EQUIPMENT, POWER, TRANSPORTATION, HOISTING IMPLEMENTS, ETC., NECESSARY FOR THE COMPLETION OF THE ELECTRICAL WORK OF THE CONTRACT: ALL AS SPECIFIED HEREIN, SHOWN ON THE DRAWINGS OR REASONABLY IMPLIED BY EITHER, COMPLETE IN EVERY RESPECT UNLESS SPECIFIED OTHERWISE HEREIN. THE WORK INCLUDED IN THIS CONTRACT SHALL CONSIST OF THE INSTALLATION, TEST AND GUARANTEE OF ALL WORK DESCRIBED ON THE PLANS AND SPECIFICATIONS.

## RELATED DOCUMENTS

DRAWINGS AND GENERAL PROVISIONS OF CONTRACT, INCLUDING GENERAL AND SUPPLEMENTARY CONDITIONS AND DIVISION 1 SPECIFICATION SECTIONS, APPLY TO THIS AND THE OTHER SECTIONS OF DIVISION 26.

## DRAWINGS AND SPECIFICATIONS

- DRAWINGS INDICATE GENERAL ARRANGEMENT OF SYSTEM AND ARE TO BE FOLLOWED INSOFAR AS POSSIBLE. DEVIATIONS FROM DRAWINGS MAY BE NECESSITATED BY FIELD CONDITIONS. DETAILED LAYOUTS OF PROPOSED DEPARTURES TO BE SUBMITTED TO ENGINEER FOR APPROVAL.
- DRAWINGS AND SPECIFICATIONS TO BE CONSIDERED COOPERATIVE AND ANYTHING APPEARING IN SPECIFICATIONS. BUT NOT ON DRAWINGS, OR VICE VERSA, TO BE CONSIDERED PART OF THE CONTRACT AND TO BE EXECUTED.
- DRAWINGS INDICATE SIZE AND APPROXIMATE LOCATION OF VARIOUS PARTS OF WORK AND ARE TO BE USED AS A GENERAL GUIDE FOR INSTALLATION. HOWEVER, DRAWINGS ARE, TO A CONSIDERABLE EXTENT, DIAGRAMMATIC AND EXACT LOCATIONS OF CONDUIT, CABLE TRAY, OUTLET BOXES, SURFACE RACEWAY ETC., MAY APPEAR ON THE DRAWINGS OR MUST BE WORKED OUT ON JOB. HOWEVER, NO CHANGES IN SIZES TO BE MADE WITHOUT WRITTEN APPROVAL OF ENGINEER. ERRORS OR OMISSIONS DISCOVERED BY BIDDING CONTRACTORS PRIOR TO BID OPENINGS, TO BE CALLED TO ATTENTION OF ENGINEER WITHOUT DELAY.
- D. IF A SPECIFIC ITEM IS SPECIFIED OR ON DRAWINGS FOR MULTIPLE TRADES, THIS CONTRACTOR SHALL INCLUDE ALL ITEMS IN THE BID REGARDLESS OF OTHER TRADES. RESOLUTION 1.10 SUBMITTALS AND RECORD DRAWINGS WILL BE BY ADDENDUM OR CHANGE ORDER.
- SHOULD A CONFLICT IN REQUIREMENTS OF THE CONTRACT DOCUMENTS, TECHNICAL SPECIFICATIONS AND/OR DRAWINGS OCCUR, THE MORE STRINGENT REQUIREMENT SHALL APPLY AND BE INCLUDED IN THE BASE BID.

## 1.4 PROJECT CLOSEOUT

- IN ORDER TO ACHIEVE A COMPLETE AND COMMISSIONED PROJECT, EACH CONTRACTOR IS RESPONSIBLE FOR THE FOLLOWING ITEMS:
- BUILDING INSPECTION CERTIFICATES. AS-BUILT DRAWINGS.
- CONSENT OF SURETY CONTRACTORS RELEASE AND CERTIFICATION.
- DEMONSTRATION CERTIFICATES SIGNED BY OWNER. DELIVERY OF EXTRA MATERIALS. RETURN OF BORROWED KEYS AND WORKING PERMITS.
- LETTER DECLARING PUNCH LIST ITEMS COMPLETED. OPERATION AND MAINTENANCE MANUALS.
- FINAL GUARANTEE AND EXECUTION OF WARRANTIES. OTHER REQUIREMENTS SPECIFIED IN DIVISION 1 SPECIFICATIONS.

## RECORD DOCUMENTS

PREPARE RECORD DOCUMENTS IN ACCORDANCE WITH THE REQUIREMENTS IN DIVISION 1.

## EQUIPMENT AND SYSTEMS DEMONSTRATION

EACH CONTRACTOR IS RESPONSIBLE FOR VERIFYING THE COMPLETE OPERATION OF THE EQUIPMENT AND SYSTEMS INSTALLED AS A PART OF THE WORK. AFTER THE CONTRACTOR IS SATISFIED THE WORK MEETS THE SPECIFIED INTENTS AND SEQUENCES OF OPERATION, THE CONTRACTOR SHALL SCHEDULE, THROUGH THE ENGINEER, A SESSION DURING WHICH ALL ASPECTS OF THE WORK ARE EXPLAINED TO THE OWNER'S PERSONNEL AND/OR REPRESENTATIVES.

## INSPECTION OF EXISTING AND GENERAL CONDITIONS

- THE CONTRACTOR WILL BE HELD TO HAVE PERSONALLY INSPECTED THE SITE OF THE PROPOSED WORK TO ARRIVE AT A CLEAR UNDERSTANDING OF THE CONDITIONS UNDER WHICH THE WORK IS TO BE PERFORMED. THE EXTENT OF OTHER CONTRACTOR'S ACTIVITIES IN THE AREA, AND TO BECOME FULLY ACQUAINTED WITH THE RECEIVING AND STORAGE SPACES AVAILABLE. THE CONTRACTOR SHALL COMPARE THE PREMISES AND SITE WITH THE DRAWINGS AND SPECIFICATIONS, AND SHALL BE SATISFIED AS TO THE CONDITIONS OF THE PREMISES, THE ACTUAL ELEVATIONS, AND ANY OTHER CONDITIONS AFFECTING THE SCOPE OR COMPLETION PERFORMANCE OF THE WORK, BEFORE THE DELIVERY OF THIS PROPOSAL.
- B. NO ALLOWANCES OR EXTRA CONSIDERATION ON BEHALF OF THE CONTRACTOR WILL BE ALLOWED BY REASON OF THE CONTRACTOR'S FAILURE TO BECOME FAMILIAR WITH SITE CONDITIONS: ERROR OR OVERSIGHT ON THE PART OF THE CONTRACTOR OR DUE TO INTERFERENCE'S BY THE OWNER'S OR OTHER CONTRACTOR'S ACTIVITIES.

- ITEMS SPECIFIED ON ELECTRICAL EQUIPMENT SCHEDULES AND PLANS ARE THE BASIS OF DESIGN. EQUALITY OF OTHER EQUIPMENT SHALL BE DETERMINED BY THE OWNER AND ENGINEER. ANY MODIFICATION TO THESE DOCUMENTED METHODS THAT IS MADE NECESSARY BY ALTERNATE EQUIPMENT IS THE RESPONSIBILITY OF THE SUPPLIER OF THE ALTERNATE EQUIPMENT.
- D. CONTRACTOR IS DIRECTED TO INCLUDE ALL NECESSARY OVERTIME AND PREMIUM TIME (SATURDAY, SUNDAY, HOLIDAYS) REQUIRED FOR THE COMPLETION OF THE INTENDED WORK TO MEET SPECIFIED SCHEDULES.
- DO NOT SCALE ELECTRICAL DRAWINGS. FOR EXACT DIMENSIONS, USE DIMENSIONED DRAWINGS OR ACTUAL FIELD CONDITIONS.

## CODES, PERMITS, AND COMPLIANCE

- CONTRACTOR SHALL OBTAIN AND PAY FOR ALL PERMITS, LICENSES AND INSPECTIONS REQUIRED BY LAWS OF GOVERNING BODIES. COMPLY WITH ALL APPLICABLE CODES. ORDINANCES AND ALL LEGAL REQUIREMENTS. NO EXTRA COMPENSATION WILL BE ALLOWED FOR ANY CHANGES NECESSARY FOR CODE COMPLIANCE REGARDLESS OF THE METHOD OF INSTALLATION SHOWN ON THE DRAWINGS OR SPECIFIED.
- B. ALL ELECTRICAL WORK SHALL COMPLY WITH CURRENT ADOPTED EDITIONS OF NATIONAL ELECTRICAL CODE, NFPA, THE LIFE SAFETY CODE AND ALL APPLICABLE STATE AND LOCAL CODES AND ORDINANCES.
- ALL ELECTRICAL EQUIPMENT SHALL BE NEW AND SHALL BE LABELED OR LISTED BY U.L. OR A QUALIFIED TESTING ORGANIZATION.
- ALL EQUIPMENT, DEVICES, AND MATERIALS SHALL BE THE LATEST PRODUCTS OF MANUFACTURER AND SHALL CONFORM TO THE REQUIREMENTS NOTED ON PLANS.

## 1.9 WORKMANSHIP

- WORKMANSHIP SHALL BE OF THE HIGHEST QUALITY CONFORMING TO THE BEST ELECTRICAL INSTALLATION PRACTICE. ANY WORK OR MATERIAL, WHICH IS REJECTED, MUST BE REMOVED IMMEDIATELY AND REPLACED. NO SUB-STANDARD WORK WILL BE ACCEPTED.
- THE BREVITY OF THIS SPECIFICATION SHALL NOT BE CONSTRUED AS RELIEVING THE CONTRACTOR OF HIS RESPONSIBILITY TO PERFORM ALL WORK IN A FIRST CLASS WORKMANLIKE MANNER.

- SUBMIT SHOP DRAWINGS AND CATALOG DATA FOR APPROVAL FOR ALL NEW EQUIPMENT AND MATERIALS SPECIFIED FOR THIS PROJECT PRIOR TO ORDERING OR MANUFACTURE OF SUCH. SHOP DRAWINGS NOT STAMPED WITH CONTRACTORS APPROVAL WILL NOT BE REVIEWED.
- THE CONTRACTOR SHALL KEEP AN ACCURATE RECORD OF ALL DEVIATIONS FROM THE APPROVED DESIGN AND SPECIFICATIONS WHICH MAY OCCUR IN THE WORK AS ACTUALLY CONSTRUCTED, AND SHALL SUBMIT SAME TO THE ENGINEER OR OWNER'S REPRESENTATIVE AT COMPLETION OF THE JOB.
- C. SUBMITTALS SHALL BE COORDINATED THROUGH THE ENGINEER.

## 1.11 TESTS AND GUARANTEE

- ALL TESTS FOR VARIOUS SYSTEMS SHALL BE PERFORMED AS REQUIRED. CONSISTENT WITH GOOD GENERAL PRACTICE AND IN COMPLIANCE WITH CODES AND AUTHORITIES.
- B. AS A CONDITION PRECEDENT TO FINAL PAYMENT, THE CONTRACTOR SHALL EXECUTE TO THE OWNER A GUARANTEE IN A FORM APPROVED BY THE OWNER. GUARANTEE SHALL WARRANT THAT ALL WORK INCLUDED IN THIS SPECIFICATION WILL REMAIN IN SERVICEABLE CONDITION (ORDINARY WEAR, ABUSE AND CAUSES BEYOND THE CONTROL OF THE CONTRACTOR EXCLUDED) FOR A PERIOD OF ONE YEAR FROM DATE OF FINAL COMPLETION AND ACCEPTANCE OF WORK. THE CONTRACTOR AGREES TO CORRECT, WITHOUT COST TO THE OWNER, ANY IMPERFECTIONS IN WHOLE OR IN PART WHICH MAY DEVELOP IN THIS WORK, INCLUDING ANY DAMAGE TO OTHER WORK CAUSED BY SUCH IMPERFECTIONS OR REPAIRING OF
- C. ELECTRICAL CONTRACTOR IS RESPONSIBLE FOR PROPER DIRECTION OF MOTOR ROTATION. DAMAGE TO MOTORS. EQUIPMENT, OR SYSTEMS DUE TO IMPROPER ROTATION SHALL BE CORRECTED AT THIS CONTRACTOR'S EXPENSE.
- ALL ELECTRICAL SYSTEMS, DEVICES AND RELATED ITEMS SHALL BE TESTED. REPLACE ANY AND ALL DEFECTIVE DEVICE ITEMS OR SYSTEMS BEFORE COMPLETION OF THE PROJECT.

# 1.12 COORDINATION

- FIELD VERIFY EXACT LOCATION OF ALL NEW EQUIPMENT WITH EXISTING CONDITIONS AND COORDINATE WITH THE GENERAL AND OTHER CONTRACTORS PRIOR TO ROUGH-IN AND/OR INSTALLING ANY OF THIS WORK.
- B. FIELD VERIFY ALL CLEARANCES AND CONDITIONS PRIOR TO THE INSTALLATION OF ANY CONDUIT, CABLE TRAY, RACEWAY, ETC.; VERIFY LOCATIONS OF ALL OUTLET BOXES, SURFACE MOUNTED DEVICES, PANELBOARD ENCLOSURES, FIXTURE LOCATIONS, ETC., WITH CIVIL, ARCHITECTURAL, STRUCTURAL AND MECHANICAL DRAWINGS PRIOR TO ROUGH-IN. REPORT ANY DISCREPANCIES TO THE ENGINEER PRIOR TO PROCEEDING WITH
- ALL POWER OUTAGES TO EXISTING OR OPERABLE FACILITIES SHALL BE SCHEDULED WITH THE OWNER A MINIMUM TWO (2) WEEKS IN ADVANCE. THE CONTRACTOR SHALL NOT INTERRUPT OR RESTORE POWER WITHOUT PRIOR CONSENT TO THE OWNER. ANY INTERRUPTION SHALL BE ONLY FOR THE SPECIFIC SCHEDULED TIME. THE OWNER OR MECHANICAL CONTRACTOR WILL BE RESPONSIBLE FOR SHUTDOWN AND START-UP OF MECHANICAL OR PROCESS SYSTEMS.

- COORDINATE ALL POWER WIRING, SAFETY DISCONNECT MEANS, MOTOR CONTROL AND CONTROL WIRING FOR MECHANICAL EQUIPMENT WITH THE MECHANICAL CONTRACTOR. ELECTRICAL CONTRACTOR SHALL FURNISH AND INSTALL ALL WIRING TO MOTOR OR EQUIPMENT THROUGH STARTERS AND SAFETY
- E. THE MECHANICAL CONTRACTOR, MECHANICAL EQUIPMENT SUPPLIER OR TEMPERATURE CONTROL CONTRACTOR WILL BE RESPONSIBLE FOR ALL LOW VOLTAGE TEMPERATURE CONTROL WIRING REQUIRED FOR THE PROJECT. THIS ELECTRICAL CONTRACTOR SHALL INSTALL, TERMINATE AND LABEL ALL POWER, CONTROL AND INTERLOCK WIRING DETAILED ON THESE
- F. LOCATE AND INSTALL ALL NEW DEVICES AND FIXTURES IN ACCORDANCE WITH AMERICAN DISABILITY ACT GUIDELINES.

## 1.13 IDENTIFICATION

- FURNISH AND INSTALL SELF-ADHESIVE VINYL LABELS WITH 1/2 INCH LETTERS INDICATING PANEL NAME AND VOLTAGE ON ALL PANELS AND CABINETS. STARTERS, PUSHBUTTONS AND DISCONNECT SWITCHES SHALL HAVE PHENOLIC LABELS WITH 3/8 INCH HIGH LETTERS INDICATING NAME OR ITEM CONTROLLED. ALL LABELS SHALL BE WHITE SURFACE WITH BLACK LETTERS AND BE UV, WATER AND ABRASION RESISTANT.
- B. INSTALL CLEAR ADHESIVE TAPE WITH 1/4 INCH HIGH BLACK LETTERING ON WIRING DEVICE OUTLETS DEFINING SOURCE (PANEL) AND CIRCUIT NUMBER IDENTIFICATION.
- C. PROVIDE AN ARC FLASH HAZARD LABEL FOR ALL ELECTRICAL EQUIPMENT INCLUDING BUT NOT LIMITED TO SWITCHBOARDS. PANELBOARDS, INDUSTRIAL CONTROL PANELS, METER SOCKET ENCLOSURES, DISCONNECTS AND MOTOR CONTROL CENTERS.
- D. PROVIDE TYPED PANEL DIRECTORIES FOR ALL EXISTING PANELBOARDS AFFECTED BY THIS WORK.
- E. CONDUCTOR IDENTIFICATION
- COMPLY WITH NFPA 70. COLOR-CODING FOR PHASE- AND VOLTAGE-LEVEL IDENTIFICATION, 600V OR LESS: USE COLORS LISTED BELOW FOR UNGROUNDED FEEDER AND BRANCH-CIRCUIT CONDUCTORS AND SHALL BE FACTORY APPLIED.

LABELING TO BE IN ACCORDANCE WITH NEC ARTICLE 110.16

(FLASH PROTECTION). LABELS TO BE BRADY #99452 OR EQUAL

- a. COLORS FOR 208/120-V CIRCUITS:
- PHASE A: BLACK. PHASE B: RED. PHASE C: BLUE.
- b. COLOR FOR NEUTRAL: WHITE. c. COLOR FOR EQUIPMENT GROUNDS: GREEN.

## 1.14 DEMOLITION, REMOVALS, CLEAN-UP, PROTECTION AND TOUCH-

- REMOVE ALL EXISTING RACEWAY, WIRING, FIXTURES, DEVICES, CONTROLLERS, ETC., SCHEDULED FOR REMOVAL OR NOT REQUIRED TO REMAIN IN SERVICE. CONTRACTOR SHALL COORDINATE REMOVAL WITH OWNER AND ALL OTHER TRADES ON THE PROJECT. ALL RACEWAY AND WIRE SHALL BE REMOVED BACK TO THE POINT OF SERVICE. PROVIDE ADDITIONAL MAKE-UP RACEWAY, JUNCTION BOXES, WIRING, ETC., TO MAINTAIN RACEWAY AND CIRCUIT CONTINUITY FOR FUNCTIONAL CIRCUITS.
- B. THIS CONTRACTOR SHALL DISPOSE OF ALL MATERIALS GENERATED FROM REMOVAL AND INSTALLATION OF THIS WORK. DEBRIS SHALL BE REMOVED FROM THE PROJECT SITE WEEKLY. THIS CONTRACTOR SHALL PROVIDE TO THE OWNER ANY SALVAGEABLE MATERIALS AS DIRECTED BY THE OWNER OR ENGINEER.
- C. ALL EQUIPMENT, ITEMS, DEVICES AND APPURTENANCES SHALL BE PROTECTED FROM DEBRIS AND DAMAGE WHILE STORED AT THE SITE AND DURING AND AFTER INSTALLATION.
- D. UPON COMPLETION OF WORK THIS CONTRACTOR SHALL THOROUGHLY CLEAN ALL APPARATUS FURNISHED BY THIS CONTRACT.
- E. SCARRED FACTORY-FINISHED ELECTRICAL EQUIPMENT SHALL BE TOUCHED UP WITH FACTORY FURNISHED PAINT. RUSTED OR MARRED SURFACES OF ELECTRICAL EQUIPMENT SHALL BE CLEANED AND PRIMED BEFORE PAINTING.
- F. PATCH FINISHED SURFACES AND BUILDING COMPONENTS USING NEW MATERIALS MATCHING EXISTING MATERIALS AND EXPERIENCED INSTALLERS.

# 1.15 MAINTENANCE MANUALS

A. COMPLY WITH SPECIFICATION SECTION 017823 "OPERATION AND MAINTENANCE DATA".

## 1.16 ELECTRONIC FILES

- A. IF THE CONTRACTOR REQUESTS, MDA ENGINEERING, INC. WILL PROVIDE ELECTRONIC FILES FOR THE CONTRACTORS SOLE CONVENIENCE AND USE IN PREPARATION OF SHOP DRAWINGS RELATED TO THE PROJECT SUBJECT TO THE FOLLOWING TERMS AND CONDITIONS:
- MDA ENGINEERING, INC. WILL PROVIDE ELECTRONIC FILES OF DRAWING SHEETS SPECIFICALLY REQUESTED IN WRITING BY THE CONTRACTOR. THE REFERENCE BACKGROUND FILES OR PERMISSION TO DISTRIBUTE SUCH MUST BE OBTAINED FROM THE ARCHITECT OR OTHER APPLICABLE PARTY.
- A CADD CONTRACT PROVIDED BY MDA ENGINEERING, INC. SHALL BE SIGNED BY AN OFFICER OF THE CONTRACTING COMPANY PRIOR TO DELIVERY OF THE ELECTRONIC FILES.
- THE CONTRACTORS' SHALL, TO THE FULLEST EXTENT PERMITTED BY LAW, INDEMNIFY AND HOLD HARMLESS MDA ENGINEERING, INC., FROM ALL CLAIMS, DAMAGES, LOSSES AND EXPENSES. INCLUDING ATTORNEY'S FEES ARISING OUT OF OR RESULTING FROM THE USE OF THESE ELECTRONIC FILES.

- 4. MDA ENGINEERING, INC. RESERVES THE RIGHT TO REMOVE 2.5 GROUNDING
- ALL INDICATIONS OF OWNERSHIP AND/OR INVOLVEMENT FROM EACH ELECTRONIC DISPLAY. ANY OTHER USE OR RE-USE BY THE CONTRACTOR OR BY OTHERS WILL BE AT THE CONTRACTOR'S SOLE RISK AND WITHOUT LIABILITY OR LEGAL EXPOSURE TO MDA

## PART 2 - BASIC MATERIALS AND METHODS

## 2.1 FASTENING AND SUPPORTS

A. ALL CONDUITS AND EQUIPMENT SHALL BE ADEQUATELY SUPPORTED, EITHER SUSPENDED FROM THE CONSTRUCTION ABOVE OR BY MEANS OF STRUTS TO THE CONSTRUCTION BELOW. CONDUIT, TRAY, FIXTURES, ETC., SHALL NOT SPAN FLEXIBLE CONNECTIONS OF AIR HANDLING EQUIPMENT, ETC. AND SHALL NOT BE SUPPORTED FROM DUCTWORK OR OTHER TRADES' SUPPORTS.

## RACEWAYS

ALL SERVICE ENTRANCE, FEEDER AND BRANCH CIRCUIT CONDUCTORS SHALL BE INSTALLED IN RACEWAY. ANY/ALL CONTROL CONDUCTORS REQUIRED BY THESE DOCUMENTS SHALL BE INSTALLED IN RACEWAY.

ENGINEERING, INC. AND OWNER.

- B. UNLESS OTHERWISE NOTED, CONDUIT SHALL BE ELECTRICAL METALLIC TUBING (EMT) WITH STEEL COMPRESSION OR SET SCREW FITTINGS 3/4 INCH TRADE SIZE MINIMUM. CAST METAL FITTINGS ARE NOT ACCEPTABLE.
- RIGID GALVANIZED STEEL (RGS) CONDUIT SHALL BE USED FOR CONDUITS RISING THRU CONCRETE FLOOR APPLICATIONS WITH THREADED AND CAST FITTINGS, MINIMUM 3/4 INCH TRADE SIZE.
- STEEL ELBOWS (GREATER THAN 30 DEGREES) AND RISERS, CONCRETE ENCASED WHERE INDICATED. BURY THE GREATER OF 18 INCHES BELOW GRADE OR PER NEC MINIMUM DEPTH AND INSTALL RED MARKER WARNING TAPE 6" BELOW FINISHED
- RACEWAYS SHALL BE CAPPED UNTIL CONDUCTORS ARE INSTALLED. EMPTY RACEWAYS SHALL EACH BE TAGGED AND INCLUDE PULL WIRE.
- RACEWAYS 1 ½ INCH TRADE SIZE AND SMALLER SHALL BE SECURED WITH ONE HOLE MALLEABLE STRAPS OR WALL BRACKETS. TRAPEZE SUPPORTS SHALL BE USED FOR GROUPS OF PARALLEL RACEWAYS WITH EACH SECURED TO TRAPEZE WITH PROPER CLAMPS. INDIVIDUAL RUNS OF RACEWAY 2 INCHES AND LARGER SHALL BE SUPPORTED WITH MALLEABLE IRON HANGERS. USE OF "MINERALLACS" FOR SUPPORTS ARE PROHIBITED.
- G. ALL FEEDER AND BRANCH CIRCUIT RACEWAYS SHALL INCLUDE AN INSULATED EQUIPMENT GROUNDING CONDUCTOR. REFER TO GROUNDING SECTION.
- H. INSTALL FIRE STOPPING WHERE REQUIRED BY THE BUILDING CONSTRUCTION.
  - FINAL CONNECTIONS TO VIBRATING EQUIPMENT (MOTORS, TRANSFORMERS, ETC.), PROCESS MACHINERY AND INSTRUMENTATION DEVICES SHALL BE VIA FLEXIBLE METALLIC. "SEAL TITE" CONDUIT, A MAXIMUM OF 12 INCHES IN LENGTH.

## 2.3 OUTLET AND JUNCTION BOXES

- ALL BOXES SHALL BE APPROPRIATELY SIZED AND CONFIGURED FOR THE APPLICATION AND BUILDING FINISHES.
- B. OUTLET AND DEVICE BOXES FOR EXPOSED APPLICATIONS AND USE WITH EMT CONDUIT SHALL BE ROUNDED EDGE PRESS-FORMED GALVANIZED STEEL WITH KNOCK-OUTS AND SIZED TO MATCH SPECIFIED DEVICE COVER PLATES WITHOUT OVER-HANG. WITH THREADED FITTINGS AND MATCHING GALVANIZED. STAMPED STEEL COVER PLATES.
- C. OUTLET AND DEVICE BOXES FOR EXPOSED APPLICATIONS AND USE WITH RGS CONDUIT SHALL BE CAST FS/FD WITH THREADED FITTINGS AND MATCHING GALVANIZED, STAMPED STEEL COVER
- SURFACE MOUNTED OUTLET DEVICE BOXES AND JUNCTION BOXES IN UTILITY ROOMS AND SERVICE AREAS SHALL BE ROUNDED EDGE PRESS FORMED GALVANIZED STEEL WITH KNOCK-OUTS AND MATCHING GALVANIZED STAMPED STEEL COVER PLATES.
- EXPOSED JUNCTION BOXES GREATER THAN 96 INCHES A.F.F. AND/OR IN THE STRUCTURAL SPACE SHALL BE GALVANIZED STEEL WITH KNOCK-OUTS.
- SURFACE TYPE BOXES FOR SPECIAL SYSTEMS SUCH AS FIRE ALARM, PAGING, SECURITY, ETC., SHALL BE PROPERLY SIZED BACKBOXES FOR THE DEVICE AS PROVIDED BY THE SYSTEM VENDOR.

## FEEDER AND BRANCH CIRCUIT CONDUCTORS

- A. UNDERGROUND FEEDER CONDUCTORS SHALL BE WET LOCATION LISTED AND LABELED TYPE XHHW-2.
- STRANDED COPPER WITH 600V THHY/THWN INSULATION. MINIMUM WIRE SIZE FOR BRANCH CIRCUIT CONDUCTORS SHALL

B. FEEDER AND BRANCH CIRCUIT CONDUCTORS SHALL BE

BE #12 AWG, STRANDED, COPPER. D. ALL CONDUCTORS SHALL BE PROTECTED IN ACCORDANCE WITH NEC ART 240.4 AND AMPACITY SHALL BE IN ACCORDANCE WITH NEC 310.15 BASED ON 60 DEGREES C RATING FOR SIZES #2 AND

SMALLER AND 75 DEGREES C FOR SIZES #1 AWG AND LARGER.

ALL SINGLE-POLE AND MULTI-POLE BRANCH CIRCUITS WITH NEUTRAL WIRE REQUIREMENT SHALL HAVE INDIVIDUAL NEUTRAL CONDUCTORS TO COMPLY WITH NEC 210.4. EACH NEUTRAL SHALL BE IDENTIFIED AT ALL JUNCTION BOXES AND TERMINALS THE SAME AS ITS CORRESPONDING BRANCH CIRCUIT NUMBER.

- BOND MECHANICAL METAL PIPING AND DUCT SYSTEMS PER NEC ARTICLE 250.104.
- BOND AND GROUND ALL NON-CURRENT CARRYING METAL PARTS OF THE BUILDING AND ELECTRICAL SYSTEM AS REQUIRED.
- INSTALL INSULATED EQUIPMENT GROUNDING CONDUCTOR IN ALL RACEWAYS WITH CONDUCTORS FOR ALL FEEDER AND BRANCH CIRCUITS SIZED IN ACCORDANCE WITH NEC ARTICLE 250.122.

## 2.6 DISCONNECTS AND STARTERS

- PROVIDE DISCONNECTS FOR ALL EQUIPMENT AS SHOWN ON THE PLANS AND STARTERS FOR ALL EQUIPMENT NOT PROVIDED WITH BUILT-IN CONTROL PANELS.
- DISCONNECTS SHALL BE HEAVY DUTY, MULTIPLE POLE, QUICK-MAKE, QUICK-BREAK, H.P. RATED, 250 VOLT OR 600 VOLT IN NEMA 1 ENCLOSURE (INDOORS) OR NEMA 3R ENCLOSURES (OUTDOORS).
- DISCONNECTS SHALL BE FUSIBLE OR NON-FUSED AS NOTED AND SHALL INCLUDE CLASS R REJECTION STYLE FUSE HOLDERS.
- STARTERS FOR MOTORS 1/2 HP AND LESS SHALL BE MANUAL STARTERS, 120 VOLTS, WITH BUILT-IN OVERLOADS AND PILOT LIGHT. INSTALL FLUSH IN FINISHED AREAS. SQUARE D. CO., CLASS 2510 OR EQUAL BY ALLEN BRADLEY. CONTRACTOR TO DETERMINE FINAL O.L. THERMAL ELEMENT SIZED BASED UPON FINAL MOTOR F.L.A.
- COORDINATE ALL STARTERS, DISCONNECTS, OVERLOADS, ETC., WITH FINAL MOTOR AND EQUIPMENT ITEMS. LOCATE TO MAINTAIN PROPER CLEARANCES.

## CONDUIT BELOW GRADE SHALL BE SCHEDULE 40 PVC WITH RIGID 2.7

- ALL LOW VOLTAGE FUSES SHALL BE TIME DELAY, DUAL ELEMENT, RK-1 REJECTION STYLE 250 V OR 600 V AS APPROPRIATE AND ARRANGED IN A COORDINATED SELECTIVE SYSTEM FOR OVERCURRENT PROTECTION.
- B. ALL FUSES SHALL HOLD A 500 PERCENT OVERLOAD FOR 10 SECONDS AND BE RATED 300KA.I.C. MINIMUM. FUSE SIZES FOR INDIVIDUAL MOTOR LOADS SHALL BE PROPERLY SIZED TO ACTUAL MOTOR LABEL FOR MOTOR BRANCH CIRCUIT AND SHORT CIRCUIT PROTECTION PER NEC 430.52.
- FUSES SHALL BE REJECTION STYLE, DUAL ELEMENT BUSSMAN LOW PEAK, 300 K OR EQUAL BY LITTLE FUSE OR MERSEN.

## PART 3 - PRODUCTS AND EXECUTION

## FIRE ALARM SYSTEM (ADDRESSABLE)

- FURNISH AND INSTALL A COMPLETE AND OPERABLE EXTENSION TO THE EXISTING LOCAL ADDRESSABLE FIRE PROTECTIVE SIGNALING SYSTEM AS SHOWN ON THE PLANS. SYSTEM TO INCLUDE THE FOLLOWING: 1. ADDRESSABLE MONITORING MODULES AND REQUIRED CONNECTIONS TO FIRE PUMP MONITORING POINTS AND FIRE PROTECTION PIPING SYSTEM INCLUDING FLOW AND TAMPER SWITCHES.
- B. ALL FIRE ALARM WIRING SHALL BE COLOR-CODED, INSTALLED IN METAL RACEWAY AND INSTALLED BY PROPERLY CERTIFIED AND LICENSED INSTALLERS. RACEWAY/CABLING SYSTEM TO BE A LISTED 2-HOUR FIRE RESISTIVE CABLING SYSTEM.
- CONTRACTOR SHALL OBTAIN NECESSARY PERMIT(S) FROM THE APPROPRIATE AGENCY. UPON COMPLETION OF PROJECT, FIRE ALARM SYSTEM SHALL BE COMPLETELY TESTED AND DOCUMENTED, IN THE PRESENCE OF THE AUTHORITY HAVING JURISDICTION AND THE PROJECT ENGINEER. PROVIDE 7 DAYS ADVANCE NOTICE OF ANY TESTS.
- D. FIRE ALARM SYSTEM SHALL BE AN EXTENSION OF THE EXISTING BUILDING INSTALLED SIMPLEX 4100ES SYSTEM.

# END OF SPECIFICATIONS

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