

Cedar Street Pump Station Rehabilitation

ADDENDUM NO. 2

July 18, 2023

THIS IS AN ADDENDUM

TO PROSPECTIVE BIDDERS AND OTHERS CONCERNED:

This addendum amends or supplements the Procurement Section, Drawings and other provisions of the Contract Documents as indicated below. All provisions which are not so amended or supplemented remain in full force and effect.

The terms used in this Addendum have the meanings stated in the General Conditions. Additional terms used in this Addendum have the meanings stated below, which are applicable to both the singular and plural thereof.

I. DRAWINGS

- A. Replace the following plan sheets:
 - i. C-202, C-203, CD-102, and CD-103.
 - 1. Drawing scales were revised from 1" = 5' to 3/16" = 1' for scaling purposes.
 - ii. M.01 and M1.1
 - 1. Corrected errors in plotting.
 - iii. IC-002
 - 1. Corrected schematics.

II. CONTRACT DOCUMENTS

- A. Replace Table of Contents with attached updated Table of Contents
 - i. Added 07-22-00 Roof Deck and Insulation
 - ii. Added 07-55-00 Protected Membrane Roofing
 - iii. Removed 09-21-16 Gypsum Board
- B. The following specification sections have been added or revised:
 - i. Replace section 01-20-00 Price and Payment Procedures with revised section attached.
 - ii. Add 02-41-12 Pavement Removal & Disposal
 - iii. Replace 32-12-20 with revised specification section attached to remove irrelevant references .
- C. There were two specification sections duplicated within the bidding documents (07-55-01 & 07-62-00). Delete all copies of both sections and replace with the attached specification sections:
 - i. 07-55-00 Protected Membrane Roofing
 - ii. 07-62-00 Sheet Metal Flashing & Trim
- D. Power will be terminated to the building at some point to complete the electrical work. The contractor will be responsible for supplying temporary power to the site for their equipment until power is restored to the building. There is no bid item for temporary power. All costs associated with temporary power will be built into the bid amount.

Prospective bidders shall attach this Addendum page to their proposal and shall sign the Addendum and submit same with bid and shall enter Addendum Number and date on the Bid Form. Failure to include signed Addendum with bid proposal shall be cause for rejection of bid.

(Bidder)

By:

Date:

Title:

Cedar Street PS Rehabilitation

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A. General

Quantities of work completed under the contract will be measured by the Engineer according to United States standard measures unless otherwise noted.

Quantities of materials furnished and of work performed under the contract will be determined by methods of measurement and computations that are generally recognized as conforming to good engineering practice.

1. Aggregates furnished and measured by weight will paid including an allowance for moisture of up to six [6%] percent moisture. Where aggregate field tests indicate moisture content is greater than 6%, a payment adjustment shall be made. The excess weight above 6% moisture shall be deducted from the scale weights.
2. In-place cubic yard (ICY) shall be the volume based on field survey data and the "average end area" methods.
3. Truck cubic yard (TCY) shall be the volume of each specific truck bed by design. Based on the full volume of each truck bed level with the top rail.
 - a. Each truck removing material from the site shall:
 - 1) _____ mark designation
 - 2) _____ Owner
 - 3) _____ Bed volume struck
4. Tons (2,000 pounds) as recorded on weight scales having a "Department of Agriculture" certificate valid for one year at the time of weighing. Payment for this Work shall be made on the basis of weight tickets noting project, contractor, time, date, gross, tare and net weights.

All items of work for this contract will be measured in units as indicated on the Proposal and as noted herein. CF, cubic feet; CYD, cubic yard; EA, each; LS., lump sum; LF., linear feet; SYD, square yard; SF., square feet; T, Ton (2000 lb.); AC, acre 43560 sf; ICY, in-place cubic yard; TCY, truck cubic yard.

01 22 16

UNIT PRICE PAY ITEMS **01 22 16***Item No. 1 Remove and Replace Roof*

Payment for this item shall include all labor, material and equipment necessary to remove the existing roof and supports and construction of the new proposed roof that includes the support and painting of the roof.

Item No. 2 Remove and Replace Floor Hatch

Payment for this item shall include all labor, material and equipment necessary to remove the access hatch and replace them with new access hatch. This includes any gaskets and fasteners associated with the work.

Item No. 3 Demo interior piping, valves, fittings and pumps

Payment for this item shall include all labor, material and equipment necessary to complete the proposed demo of existing interior piping, valves, fittings and the three high service pumps. This includes any removal of the support bars, concrete, insulation, and proper disposal of the material.

Item No. 4 New Piping and Fittings

Payment for this item shall include all labor, material, cleaning and equipment to furnish and install the proposed piping, fittings and pipe supports This includes joints, lubricant, fasteners, and disposal of material during construction.

Item No. 5 New valves with operators

Payment for this item shall include all labor, material, cleaning and equipment to furnish and install the valves identified in the valve schedule with the operators called for in the schedule. This includes any joints, lubricant, and fasteners required for its installation.

Item No. 6 16 "Altitude Flow Control Valve

Payment for this item shall include all labor, material, cleaning and equipment to furnish and install the proposed 16" Altitude Flow Control valve including the valve controller. This includes any joints, lubricant, and fasteners required for its installation.

Item No. 7 12" Surge Valve

Payment for this item shall include all labor, material, cleaning and equipment to furnish and install the proposed 12" surge Valve. This includes any joints, lubricant, and fasteners required for its installation.

Item No. 8 Three Horizontal Split Case Pumps with Motors and Concrete Bases.

Payment for this item shall include all labor, material, cleaning and equipment necessary to install the three proposed horizontal split case pumps. This includes wiring, conduit, motor installation, couplings, joints, and fasteners.

Item No. 9 New Gas Boiler, Indirect Water Heater, Circulator Pumps, piping and valves

Payment for this item shall include all labor, material, cleaning and equipment necessary to furnish and install the new high efficiency gas boiler, indirect water heater and circulator pumps, piping, two unit heater in basement, infrared tube heaters in pump room, valves and fittings to complete the installation and connect to existing water piping.

Item No. 10 Chemical Storage and Feed System

Payment for this item shall include all labor, material, cleaning and equipment necessary to furnish and install the bulk storage tank, day tank with scale and platform, transfer pump, chemical feed pumps (3), controller for scale and transfer pump, chlorine residual analyzers (3), all piping, valves and fittings to complete the installation.

Item No. 11 Handrail and Steps/Platform

Payment for this item shall include all labor, material, cleaning and equipment necessary to furnish and install the proposed fiberglass handrail on the exterior concrete steps to the reservoir area and the two platform and steps for the basement piping cross overs.

Item No. 12 Masonry Repair

Payment for this item shall include all labor, material, cleaning and equipment necessary to repair masonry around the building. This item includes joints, removal and structural support to insure the proper masonry repair

Item No. 13 Concrete entry step and platform Repairs

Payment for this item shall include all labor, material, cleaning and equipment necessary to remove the concrete steps and platform and replace in kind at the exterior main building entrance.

Item No. 14 Lighting

Payment for this item shall include all labor, material, cleaning and equipment necessary to install the lighting fixtures. Payment for this item includes wiring, conduit, switches, and fasteners required to mount and operate the proposed fixtures.

Item No. 15 Electrical Equipment Demo

Payment for this item shall include all labor, material, cleaning and equipment necessary to complete the demolition of the electrical equipment and items shown on the plans.

Item No. 16 New MCC with 3 200HP VFD's and combination starters and Fused Disconnects

Payment for this item shall include all labor, material, cleaning and equipment necessary to furnish and install the MCC with VFD's for the three new pumps and combination starters and fused disconnects for other equipment as shown on the plans. This item shall include wiring, testing and equipment check out to complete the VFD installation as shown on the plans. The VFD's shall be coordinated with the pump motor supplier for compatibility.

Item No. 17 Rest Room Rehabilitation

Payment for this item shall include all labor, material, cleaning and equipment necessary to complete the rehabilitation of the rest room as shown on the plans.

Item No. 18 New 3-foot Door for Chlorine Room

Payment for this item shall include all labor, material, cleaning and equipment necessary to remove existing masonry, sills, door frames, hardware masonry work to complete the installation of the new door as shown on the plans.

Item No. 19 Painting

Payment for this item shall include all labor, material, cleaning and equipment necessary to paint all piping, concrete walls, ceilings, handrail, structural steel, doors and frames.

Item No. 20 Wiring, Conduit, Fittings

Payment for this item shall include all labor, material, cleaning, and equipment necessary to complete the power, instrumentation and control wiring as indicated on the plans.

Item No. 21 Remove trees, brush and stumps

Payment for this item shall include all labor, material, equipment to remove the trees, brush and stumps between the pump station and the reservoir. Any surface areas disturbed shall be seeded and mulched.

Item No. 22 Mobilization (not to exceed 10% of Bid)

Payment for this item shall include all labor, material, cleaning and equipment necessary to cover general project mobilization cost up to 10% of the contract amount.

Item No. 23 PLC Programming Allowance

Payment for this item shall include all labor, material, cleaning and equipment necessary to complete the programming of the existing PLC for the proposed operation of the new pumping scheme.

Item No. 24 Remove top and wall of existing Drain Structure and new top with grate

Payment for this item shall include all labor, material, equipment, to saw cut and remove the top slab and wall to within 3 inches of existing grade and place new support and grating in the existing structure.

Item No. 25 Emergency shower w/Tempering Valve

Payment for this item shall include all labor, material, cleaning and equipment necessary to complete the installation of the emergency eye/shower and tempering valve in the chlorine room. The shower is to have a flow switch to provide an alarm contact to the PLC should the shower or eye wash is activated.

Item No. 26 Exhaust Fans, Louvers and Dampers with Controls

Payment for this item shall include all labor, material, equipment to furnish and install the exhaust fans, louvers, dampers and ductwork as indicated on the plans.

Item No. 27 Camera Security System Allowance

Payment for this item shall include all labor, material, cleaning and equipment necessary to complete the furnishing and installation of a security camera system. The supplier of the camera equipment will be coordinated with the Owner to match installations planned at other locations.

Item No. 28 Arc Flash Analysis

Payment for this item shall include all labor, material, cleaning and equipment necessary to complete the arc flash analysis and provide the proper labeling for the equipment.

Item No. 29 Short Circuit Calculation

Payment for this item shall include all labor, material, cleaning and equipment necessary to complete the specified short circuit calculations and provide the report for the analysis.

Item #30 Building Permit Allowance

Payment for this item will be the actual cost to obtain the building permits from the City of Flint.

Item #31 & #32 Paving, Aggregate for Parking and for Drive

Payment for this item shall include all labor, material, equipment to grade, compact and place aggregate and asphalt as indicated on the plans. Asphalt shall be 4C mix per specification 32-12-20. Payment shall be based on the contract unit cost.

01 26 00**CONTRACT MODIFICATIONS****01 26 00****1.01 SUMMARY**

A. This Section includes forms/documents to be used for modifying/changing this Contract.

1. Forms shall be used by the Contractor or Engineer as needed.
2. Pay Application Forms should be submitted on EJCDC form C-620
3. Field Orders (FO) shall be submitted on EJCDC Form C-942
4. Change Order (CO) shall be submitted on EJCDC Form C-941

1.02 REFERENCES

A. Definitions:

RFI: Request for Interpretation

Initiated by Contractor and processed by the Engineer.

FO: Field Order (EJCDC Form C-942)

Initiated by Engineer for Contractor's immediate action (variance from contract, future actions, impacting this project)

Bulletin: Proposal Request

Initiated by Engineer requesting new/additional pricing for an anticipated/changing of the Contract Work

CO: Change Order (EJCDC Form C-941)

This document changes the Contract/Agreement Amount. All other forms can be supporting documents especially FO and Bulletins.

SMS: Stored Material Summary
Part of the Contractor's Pay application form EJCDC C-620

01 29 00
01 29 73

PAYMENT PROCEDURES

01 29 00
PAYMENT SUBDIVISIONS 01 29 73

- A. Payment application shall be supported by Work subdivisions:
1. Unit prices as noted in the proposal/ agreement or
 2. Schedule of Values. Shall be a subdivision of cost of Work, listed in the Proposal, and/or the further subdividing of the proposal cost by technical specifications categories; agreed between the Contractor and the Engineer.

01 29 76

PAYMENT PROCEDURES 01 29 76

- A. Payment Application shall be submitted on the "Contractor's Application for Payment" form EJCDC- C-620. The Application shall list the 'Unit Prices' or 'Schedule of Values'. The sum of the extended 'unit prices' or the 'schedule of values' shall equal the agreed "Contract Prices".
- B. Other Attachments to the "Contractors Application for Payment" shall be as listed"
1. Noted in the Supplementary Conditions art .SC- 6.00 'Contractors Responsibilities
 2. Required by Funding Agencies.
- C. Contractual Payment and Retainage Procedure are further delineated.

00 55 00 – Agreement, article (retainage)

00 72 13 – General Conditions, Article 14

00 73 16 – Supplementary Conditions: SC 14.02c (time)

PAVEMENT REMOVAL
AND DISPOSAL
Section 02-41-12

PART 1 - GENERAL

1.01 SUMMARY

- A. This section includes requirements for the removal of and disposal of pavement as noted on the drawings.

1.02 REFERENCES

- A. Definition:
1. HMA – Hot Mixed Asphalt surface five (5) inches thick or less overlaying concrete aggregate base.
 2. Conc. – 6” or 8” Concrete Pavement, reinforced or non-reinforced on an aggregate base.

1.03 INFORMATION SUBMITTAL

- A. Data:
1. Submit names of the disposal / dump site to be used. Submit one week before the disposal operation is conducted.
 2. Disposal Documents: Contractor shall provide copies of all manifests, chain of custody, delivery and/or receipts issued for the disposal of site debris.

PART 2 – PRODUCTS – NONE

PART 3 – EXECUTION

3.01 PREPARATION

- A. Site:
1. Designate haul routes for debris removal.
 2. Review truck tire cleaning plan.
- B. Saw-cut pavement/paved surfaces full depth where noted to “save” surfaces.

3.02 LOADING AND HAULING

- A. Inspect haul vehicles for soil adhesion to wheels and under carriage. These soils shall be removed and properly handled by the Contractor before leaving site.
1. No transport vehicles shall be allowed to leave the site which are leaking or spilling materials.
 2. All transport vehicles shall be in strict conformance with all the applicable federal, state and local laws.
- B. Truck-loaded volume shall be determined by the Owner’s Representative.

3.03 REMOVAL AND DEMOLITION

- A. Breaking Down and Removing: Remove entirely, or to the limits shown, all structures or portions thereof shown on the plans to be removed, including all attached parts and connections. Do not damage the retained portion of an existing structure.
1. Pavement, Curb, Sidewalk: Remove pavement, curb, gutter, curb and gutter, sidewalk, and similar structures to an existing joint or to a sawed joint. Saw concrete full depth unless otherwise allowed. Do not use a crane and ball pavement breaker. Provide for proper grades and connections.
 2. Partially or completely remove all structures, including utility structures, having a least dimension of 12 inches if constructed of masonry or non-reinforced concrete; 8 inches for reinforced concrete structures.
- B. Do not damage the retained portion of an existing structure or new work under construction by removal operations.

PAVEMENT REMOVAL
AND DISPOSAL
Section 02-41-12

Do not use explosives except with the written permission of the Engineer. Such permission does not relieve the Contractor of liability and or responsibility for damages resulting from the use of explosives.

3.04 DISPOSAL

- A. All disposal shall conform to Federal, State and local government regulations.
- B. For non-hazardous contaminated wastes the Contractor shall utilize a State of Michigan approved manifest system so that the waste can be tracked from generation to ultimate disposal. The manifest shall comply with all of the provisions of the transportation and disposal regulations.

3.05 SPILLS

- A. The Contractor is responsible for cleaning up all the leaks, spills from containers and other items on site or off site that occur because of the Contractor's negligence. Immediate containment actions shall be taken as necessary to minimize the effect of any spill or leak. The Contractor shall notify the Engineer and appropriate governmental authorities of the incident. Cleanup shall be in accordance with applicable Federal, State, and local laws and regulations.

3.06 CLEANING / CLOSEOUT

- A. All haul roads shall be bladed and leveled at project completion.

PROTECTED MEMBRANE ROOFING

Section 07 55 01

PART 1 GENERAL

1.01 SUMMARY

- A. Cold Applied 2-Ply Asphalt Roofing (StressPly, OptiMax, or Versiply). (2.2.)(3.4)

1.02 RELATED SECTIONS

- A. Section 06100 - Rough Carpentry.
- B. Section 06114 - Wood Blocking and Curbing: Wood nailers and cant strips.
- C. Section 07220 - Insulation Board: Insulation and fastening.
- D. Section 07620 - Sheet Metal Flashing and Trim: Weather protection for base flashings.
- E. Section 07710 - Manufactured Roof Specialties: Counter flashing gravel stops, and fascia.
- F. Section 08620 - Unit Skylights: Skylight frame and integral curb and counter flashing.
- G. Section 08630 - Metal-Framed Skylights: Skylight frame and integral curb and counter flashing.

1.03 REFERENCES

- A. ASTM D 312 - Standard Specification for Asphalt used in Roofing.
- B. ASTM D 451 - Standard Test Method for Sieve Analysis of Granular Mineral Surfacing for Asphalt Roofing Products.
- C. ASTM D 1079 Standard Terminology Relating to Roofing, Waterproofing and Bituminous Materials.
- D. ASTM D 1227 Standard Specification for Emulsified Asphalt Used as a Protective Coating for Roofing.
- E. ASTM D 1863 Standard Specification for Mineral Aggregate Used as a Protective Coating for Roofing.
- F. ASTM D 2178 Standard Specification for Asphalt Glass Felt Used in Roofing and Waterproofing.
- G. ASTM D 2824 Standard Specification for Aluminum-Pigmented Asphalt Roof Coating.
- H. ASTM D 4586 Standard Specification for Asphalt Roof Cement, Asbestos-Free.
- I. ASTM D 4601 Standard Specification for Asphalt Coated Glass Fiber Base Sheet Used in Roofing.
- J. ASTM D 5147 Standard Test Method for Sampling and Testing Modified Bituminous Sheet Materials.
- K. ASTM D 6162 Standard Specification for Styrene Butadiene Styrene (SBS) Modified Bituminous Sheet Materials Using a Combination of Polyester and Glass Fiber Reinforcements.
- L. ASTM E 108 - Standard Test Methods for Fire Test of Roof Coverings
- M. Factory Mutual Research (FM): Roof Assembly Classifications.
- N. National Roofing Contractors Association (NRCA): Roofing and Waterproofing Manual.
- O. Sheet Metal and Air Conditioning Contractors National Association, Inc. (SMACNA) - Architectural Sheet Metal Manual.
- P. Underwriters Laboratories, Inc. (UL): Fire Hazard Classifications.
- Q. Warnock Hersey (WH): Fire Hazard Classifications.
- R. ANSI-SPRI ES-1 Wind Design Standard for Edge Systems used with Low Slope Roofing Systems.
- S. ASCE 7, Minimum Design Loads for Buildings and Other Structures
- T. UL - Fire Resistance Directory.
- U. FM Approvals - Roof Coverings and/or RoofNav assembly database.

1.04 SUBMITTALS

- A. Submit under provisions of Section 01300.
- B. Product Data: Manufacturer's data sheets on each product to be used, including:
 - 1. Preparation instructions and recommendations.
 - 2. Storage and handling requirements and recommendations.
 - 3. Installation instructions.

PROTECTED MEMBRANE ROOFING

Section 07 55 01

- C. Shop Drawings: Submit shop drawings including installation details of roofing, flashing, fastening, insulation and vapor barrier, including notation of roof slopes and fastening patterns of insulation and base modified bitumen membrane, prior to job start.
- D. Design Pressure Calculations: Submit design pressure calculations for the roof area in accordance with ASCE 7 and local Building Code requirements. Include a roof system attachment analysis report, certifying the system's compliance with applicable wind load requirements before Work begins.
- E. Recycled or Bio-Based Materials: Provide third party certification through UL Environment of roof System membranes containing recycled or bio based materials.
- F. Verification Samples: For each modified bituminous membrane ply product specified, two samples, minimum size 6 inches (150 mm) square, representing actual product, color, and patterns.
- G. Manufacturer's Certificates: Provide to certify products meet or exceed specified requirements.
- H. Test Reports: Submit test reports, prepared by an independent testing agency, for all modified bituminous sheet roofing, indicating compliance with ASTM D5147. Testing must be performed at 77 deg. F. Tests at 0 deg. F will not be considered.
- I. Test Reports: Submit test reports, prepared by an independent testing agency, for all modified bituminous sheet roofing, indicating compliance with ASTM D5147.

1.05 CLOSEOUT SUBMITTALS

- A. Provide manufacturer's maintenance instructions that include recommendations for periodic inspection and maintenance of all completed roofing work. Provide product warranty executed by the manufacturer. Assist Owner in preparation and submittal of roof installation acceptance certification as may be necessary in connection with fire and extended coverage insurance on roofing and associated work

1.06 DESIGN / PERFORMANCE REQUIREMENTS

- A. Perform work in accordance with all federal, state and local codes.
- B. Exterior Fire Test Exposure: Roof system shall achieve a UL, FM or WH Class rating for roof slopes indicated on the Drawings as follows:
 - 1. Factory Mutual Class A Rating.
- C. Design Requirements:
 - 1. Uniform Wind Uplift Load Capacity
 - a. Installed roof system shall withstand negative (uplift) design wind loading pressures complying with the following criteria.
 - 1) Design Code: ASCE 7, Method 2 for Components and Cladding.
 - 2) Importance Category:
 - a) IV
 - 3) Importance Factor of:
 - a) 2.0
 - 4) Wind Speed: 120 mph
 - 5) Ultimate Pullout Value: Adhered
 - 6) Exposure Category:
 - a) B.
 - 7) Design Roof Height: 20 feet.
 - 8) Minimum Building Width: 30 feet.
 - 9) Roof Pitch: 1/4 :12.
 - 2. Snow Load: 25 psf.
 - 3. Live Load: 20 psf, or not to exceed original building design.
 - 4. Dead Load:
 - a. Installation of new roofing materials shall not exceed the dead load capacity of the existing roof structure.

PROTECTED MEMBRANE ROOFING

Section 07 55 01

- D. Roof System membranes containing recycled or bio-based materials shall be third party certified through UL Environment.

1.07 QUALITY ASSURANCE

- A. Perform Work in accordance with NRCA Roofing and Waterproofing Manual.
- B. Manufacturer Qualifications: Company specializing in manufacturing products specified with documented ISO 9001 certification and minimum of twelve years of documented experience and must not have been in Chapter 11 bankruptcy during the last five years.
- C. Installer Qualifications: Company specializing in performing Work of this section with minimum five years documented experience and a certified Pre-Approved Garland Contractor.
- D. Installer's Field Supervision: Maintain a full-time Supervisor/Foreman on job site during all phases of roofing work while roofing work is in progress.
- E. Product Certification: Provide manufacturer's certification that materials are manufactured in the United States and conform to requirements specified herein, are chemically and physically compatible with each other, and are suitable for inclusion within the total roof system specified herein.
- F. Source Limitations: Obtain all components of roof system from a single manufacturer. Secondary products that are required shall be recommended and approved in writing by the roofing system Manufacturer. Upon request of the Architect or Owner, submit Manufacturer's written approval of secondary components in list form, signed by an authorized agent of the Manufacturer.

1.08 PRE-INSTALLATION MEETINGS

- A. Convene minimum two weeks prior to commencing Work of this section.
- B. Review installation procedures and coordination required with related Work.
- C. Inspect and make notes of job conditions prior to installation:
 - 1. Record minutes of the conference and provide copies to all parties present.
 - 2. Identify all outstanding issues in writing designating the responsible party for follow-up action and the timetable for completion.
 - 3. Installation of roofing system shall not begin until all outstanding issues are resolved to the satisfaction of the Architect.

1.09 DELIVERY, STORAGE, AND HANDLING

- A. Deliver and store products in manufacturer's unopened packaging with labels intact until ready for installation.
- B. Store all roofing materials in a dry place, on pallets or raised platforms, out of direct exposure to the elements until time of application. Store materials at least 4 inches above ground level and covered with "breathable" tarpaulins.
- C. Stored in accordance with the instructions of the manufacturer prior to their application or installation. Store roll goods on end on a clean flat surface except store KEE-Stone FB 60 rolls flat on a clean flat surface. No wet or damaged materials will be used in the application.
- D. Store at room temperature wherever possible, until immediately prior to installing the roll. During winter, store materials in a heated location with a 50 degree F (10 degree C) minimum temperature, removed only as needed for immediate use. Keep materials away from open flame or welding sparks.
- E. Avoid stockpiling of materials on roofs without first obtaining acceptance from the Architect/Engineer.
- F. Adhesive storage shall be between the range of above 50 degree F (10 degree C) and below 80 degree F (27 degree C). Area of storage shall be constructed for flammable storage.

1.010 COORDINATION

- A. Coordinate Work with installing associated metal flashings as work of this section proceeds.

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1.011 PROJECT CONDITIONS

- A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.

1.012 WARRANTY

- A. Upon completion of the work, provide the Manufacturer's written and signed Edge-To-Edge NDL System Warranty, warranting that, if a leak develops in the roof during the term of this warranty, due either to defective material or defective workmanship by the installer, the manufacturer shall provide the Owner, at the Manufacturer's expense, with the labor and material necessary to return the defective area to a watertight condition including Garland Metal Components.
 - 1. Warranty Period:
 - a. 30 + 10 years from date of acceptance. Requires mid period inspection.
- B. Installer is to guarantee all work against defects in materials and workmanship for a period indicated following final acceptance of the Work.
 - 1. Warranty Period:
 - a. 2 years from date of acceptance.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Acceptable Manufacturers:
 - 1. Garland Company, Inc. (The)
 - 2. SR Products
 - 3. Ecology
 - 4. Firestone
 - 5. Viking Products Group
- B. Or approved equal provided all sections of the specifications are met.
- C. The Products specified are intended and the Standard of Quality for the products required for this project. If other products are proposed the bidder must disclose in the bid the manufacturer and the products that they intend to use on the Project. If no manufacturer and products are listed, the bid may be accepted only with the use of products specified.
 - 1. Bidder will not be allowed to change materials after the bid opening date.
 - 2. If alternate products are included in the bid, the products must be equal to or exceed the products specified. Supporting technical data shall be submitted to the Architect/ Owner for approval prior to acceptance.
 - 3. Substitution request must:
 - a. Be submitted no less than (7) days prior to bid due date.
 - b. Include a list of nearby installations more than (2) years old.
 - c. Include sample warranty.
 - d. Be accompanied by third-party testing reports which indicate equal or great performance characteristics.
 - 4. In making a request for substitution, the General Contractor, Bidder/Roofing Contractor represents that it has:
 - a. Personally investigated the proposed product or method, and determined that it is equal or superior in all respects to that specified.
 - b. Will provide the same guarantee for substitution as for the product and method specified.
 - c. Will coordinate installation of accepted substitution in work, making such changes as may be required for work to be completed in all respects.

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- d. Will waive all claims for additional cost related to substitution, which consequently become apparent.
 - e. Cost data is complete and includes all related cost under his/her contract or other contracts, which may be affected by the substitution.
 - f. Will reimburse the Owner for all redesign cost by the Architect for accommodation of the substitution.
5. Architect/ Owner reserves the right to be the final authority on the acceptance or rejection of any or all bids, proposed alternate roofing systems or materials that has met ALL specified requirement criteria.
6. Failure to submit substitution package, or any portion thereof requested, will result in immediate disqualification and consideration for that particular contractors' request for manufacturer substitution.

2.02 COLD APPLIED 2-PLY ROOF SYSTEM – BASIS OF DESIGN

- A. Base (Ply) Sheet: One ply bonded to the prepared substrate with Interply Adhesive:
 - 1. StressBase 80:
- B. Modified Cap (Ply) Sheet: One ply bonded to the prepared substrate with Interply Adhesive:
 - 1. OptiMax FR Mineral:
- C. Interply Adhesive: (1 and 2)
 - 1. Weatherking :
- D. Flashing Base Ply: One ply bonded to the prepared substrate with Interply Adhesive:
 - 1. HPR Tri-Base Premium:
- E. Flashing Cap (Ply) Sheet: One ply bonded to the prepared substrate with Interply Adhesive:
 - 1. OptiMax FR Mineral:
- F. Flashing Ply Adhesive:
 - 1. Flashing Bond:
- G. Surfacing: Requires 30 day wait before applying.
 - 1. Surface Coatings:
 - a. Garla-Brite:

PART 3 EXECUTION

3.01 EXAMINATION

- A. Do not begin installation until substrates have been properly prepared.
- B. Inspect and approve the deck condition, slopes and fastener backing if applicable, parapet walls, expansion joints, roof drains, stack vents, vent outlets, nailers and surfaces and elements.
- C. Verify that work penetrating the roof deck, or which may otherwise affect the roofing, has been properly completed.
- D. If substrate preparation and other conditions are the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.02 PREPARATION

- A. General: Clean surfaces thoroughly prior to installation.
 - 1. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.
 - 2. Fill substrate surface voids that are greater than 1/4 inch wide with an acceptable fill material.

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3. Roof surface to receive roofing system shall be smooth, clean, free from loose gravel, dirt and debris, dry and structurally sound.
4. Wherever necessary, all surfaces to receive roofing materials shall be power broom and vacuumed to remove debris and loose matter prior to starting work.
5. Do not apply roofing during inclement weather. Do not apply roofing membrane to damp, frozen, dirty, or dusty surfaces.
6. Fasteners and plates for fastening components mechanically to the substrate shall provide a minimum pull-out capacity of 300 lbs. (136 k) per fastener. Base or ply sheets attached with cap nails require a minimum pullout capacity of 40 lb. per nail.
7. Prime decks where required, in accordance with requirements and recommendations of the primer and deck manufacturer.

3.03 INSTALLATION - GENERAL

- A. Install modified bitumen membranes and flashings in accordance with manufacturer's instructions and with the recommendations provided by the National Roofing Contractors Association's Roofing & Waterproofing Manual, the Asphalt Roofing Manufacturers Association, and applicable codes.
- B. General: Avoid installation of modified bitumen membranes at temperatures lower than 40-45 degrees F. When work at such temperatures unavoidable use the following precautions:
 1. Take extra care during cold weather installation and when ambient temperatures are affected by wind or humidity, to ensure adequate bonding is achieved between the surfaces to be joined. Use extra care at material seam welds and where adhesion of the applied product to the appropriately prepared substrate as the substrate can be affected by such temperature constraints as well.
 2. Unrolling of cold materials, under low ambient conditions must be avoided to prevent the likelihood of unnecessary stress cracking. Rolls must be at least 40 degrees F at the time of application. If the membrane roll becomes stiff or difficult to install, it must be replaced with roll from a heated storage area.
- C. Summary: The scope includes the removal of the existing roof built-up roofing components and insulation down to the concrete decking, prime concrete decking at specified rate, install 2.6" of polyisocyanurate insulation, staggering joints, throughout in insulation adhesive. Tapered insulation to achieve a minimum slope of 1/4:12 may be required to promote positive drainage throughout. 1/2" gypsum recovery board shall be adhered using insulation adhesive applied at specified rate keeping gaps to less than 1/8". Sumps will be installed to 8' diameter surrounding each internal drain. Two-ply SBS reinforced modified roofing assembly shall be adhered in adhesive at specified rate. Heat-weld mineral-surface modified cap sheet; allow 30 days to properly cure prior to the application of the aluminized coating.
- D. Commence installation of the roofing system at the lowest point of the roof (or roof area), working up the slope toward the highest point. Lap sheets shingle fashion so as to constantly shed water
- E. All slopes greater than 2:12 require back-nailing to prevent slippage of the ply sheets. Use ring or spiral-shank 1 inch cap nails, or screws and plates at a rate of 1 fastener per ply (including the membrane) at each insulation stop. Place insulation stops at 16 ft o.c. for slopes less than 3:12 and 4 feet o.c. for slopes greater than 3:12. On non-insulated systems, nail each ply directly into the deck at the rate specified above. When slope exceeds 2:12, install all plies parallel to the slope (strapping) to facilitate backnailing. Install 4 additional fasteners at the upper edge of the membrane when strapping the plies.

3.04 INSTALLATION COLD APPLIED ROOF SYSTEM

- A. Base Ply: Cut base ply sheets into 18 foot lengths and allow plies to relax before installing. Install base sheet in Interply Adhesive: applied at the rate required by the manufacturer. Shingle base sheets uniformly to achieve one ply throughout over the prepared substrate. Shingle in proper direction to shed water on each large area of roofing.

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1. Lap ply sheet ends 8 inches. Stagger end laps 12 inches minimum.
 2. Solidly bond to the substrate and adjacent ply with specified cold adhesive at the rate of 2 to 2-1/2 gallons per 100 square feet.
 3. Roll must push a puddle of adhesive in front of it with adhesive slightly visible at all side laps. Use care to eliminate air entrapment under the membrane.
 4. Install subsequent rolls of modified across the roof as above with a minimum of 4 inch side laps and 8 inch staggered end laps. Lay modified membrane in the same direction as the underlayers but the laps shall not coincide with the laps of the base layers.
 5. Extend plies 2 inches beyond top edges of cants at wall and projection bases.
 6. Install base flashing ply to all perimeter and projection details.
 7. Allow the one ply of base sheet to cure at least 30 minutes before installing the modified membrane. However, the modified membrane must be installed the same day as the base plies.
- B. Modified Cap Ply(s): Cut cap ply sheets into 18 foot lengths and allow plies to relax before installing. Install in interplay adhesive applied at the rate required by the manufacturer. Shingle sheets uniformly over the prepared substrate to achieve the number of plies specified. Shingle in proper direction to shed water on each large area of roofing.
1. Lap ply sheet ends 8 inches. Stagger end laps 12 inches minimum.
 2. Solidly bond to the base layers with specified cold adhesive at the rate of 2 to 2-1/2 gallons per 100 square feet.
 3. Roll must push a puddle of adhesive in front of it with adhesive slightly visible at all side laps. Care should be taken to eliminate air entrapment under the membrane.
 4. Install subsequent rolls of modified across the roof as above with a minimum of 4 inch side laps and 8 inch staggered end laps. Lay modified membrane in the same direction as the underlayers but the laps shall not coincide with the laps of the base layers.
 5. Allow cold adhesive to set for 5 to 10 minutes before installing the top layer of modified membrane.
 6. Extend membrane 2 inches beyond top edge of all cants in full moppings of the cold adhesive as shown on the Drawings.
- C. Fibrous Cant Strips: Provide non-combustible perlite or glass fiber cant strips at all wall/curb detail treatments where angle changes are greater than 45 degrees. Cant may be set in approved cold adhesives, hot asphalt or mechanically attached with approved plates and fasteners.
- D. Wood Blocking, Nailers and Cant Strips: Provide wood blocking, nailers and cant strips as specified in Section 06114.
1. Provide nailers at all roof perimeters and penetrations for fastening membrane flashings and sheet metal components.
 2. Wood nailers should match the height of any insulation, providing a smooth and even transition between flashing and insulation areas.
 3. Nailer lengths should be spaced with a minimum 1/8 inch gap for expansion and contraction between each length or change of direction.
 4. Nailers and flashings should be fastened in accordance with Factory Mutual "Loss Prevention Data Sheet 1- 49, Perimeter Flashing" and be designed to be capable of resisting a minimum force of 200 lbs/lineal foot in any direction.
- E. Metal Work: Provide metal flashings, counter flashings, parapet coping caps and thru-wall flashings as specified in Section 07620 or Section 07710. Install in accordance with the SMACNA "Architectural Sheet Metal Manual" or the NRCA Roofing Waterproofing manual.
- F. Termination Bar: Provide a metal termination bar or approved top edge securement at the terminus of all flashing sheets at walls and curbs. Fasten the bar a minimum of 8 inches (203 mm) o/c to achieve constant compression. Provide suitable sealant at the top edge if required.
- G. Flashing Base Ply: Install flashing sheets by the same application method used for the base ply.
1. Seal curb, wall and parapet flashings with an application of mastic and mesh on a daily basis. Do not permit conditions to exist that will allow moisture to enter behind, around or under the

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- roof or flashing membrane.
 2. Prepare all walls, penetrations, expansion joints and where shown on the Drawings to be flashed with required primer at the rate of 100 square feet per gallon. Allow primer to dry tack free.
 3. Adhere to the underlying base ply with specified flashing ply adhesive unless otherwise specified. Nail off at a minimum of 8 inches (203 mm) o.c. from the finished roof at all vertical surfaces.
 4. Solidly adhere the entire flashing ply to the substrate. Secure the tops of all flashings that are not run up and over curb through termination bar fastened at 6 inches (152 mm) O.C. and sealed at top.
 5. Seal all vertical laps of flashing ply with a three-course application of trowel-grade mastic and fiberglass mesh.
 6. Coordinate counter flashing, cap flashings, expansion joints and similar work with modified bitumen roofing work as specified.
 7. Coordinate roof accessories, miscellaneous sheet metal accessory items, including piping vents and other devices with the roofing system work.
 8. Secure the top edge of the flashing sheet using a termination bar only when the wall surface above is waterproofed, or nailed 4 inches on center and covered with an acceptable counter flashing.
- H. Flashing Cap Ply:
1. Seal curb, wall and parapet flashings with an application of mastic and mesh on a daily basis. Do not permit conditions to exist that will allow moisture to enter behind, around or under the roof or flashing membrane.
 2. Prepare all walls, penetrations, expansion joints and where shown on the Drawings to be flashed with required primer at the rate of 100 square feet per gallon. Allow primer to dry tack free.
 3. Adhere to the underlying base flashing ply with specified flashing ply adhesive unless otherwise specified. Nail off at a minimum of 8 inches (203 mm) o.c. from the finished roof at all vertical surfaces.
 4. Coordinate counter flashing, cap flashings, expansion joints and similar work with modified bitumen roofing work as specified.
 5. Coordinate roof accessories, miscellaneous sheet metal accessory items with the roofing system work.
 6. All stripping shall be installed prior to flashing cap sheet installation.
 7. Heat and scrape granules when welding or adhering at cut areas and seams to granular surfaces at all flashings.
 8. Secure the top edge of the flashing sheet using a termination bar only when the wall surface above is waterproofed, or nailed 4 inches on center and covered with an acceptable counter flashing.
- I. Surface Coatings: Apply roof coatings in strict conformance with the manufacturer's recommended procedures.
- J. Roof Walkways: Provide walkways in areas indicated on the Drawings.

3.05 CLEANING

- A. Clean-up and remove daily from the site all wrappings, empty containers, paper, loose particles and other debris resulting from these operations.
- B. Remove asphalt markings from finished surfaces.
- C. Repair or replace defaced or disfigured finishes caused by Work of this section.

3.06 PROTECTION

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- A. Provide traffic ways, erect barriers, fences, guards, rails, enclosures, chutes and the like to protect personnel, roofs and structures, vehicles and utilities.
- B. Protect exposed surfaces of finished walls with tarps to prevent damage.
- C. Plywood for traffic ways required for material movement over existing roofs shall be not less than 5/8 inch (16 mm) thick.
- D. In addition to the plywood listed above, an underlayment of minimum 1/2 inch (13 mm) recover board is required on new roofing.
- E. Special permission shall be obtained from the Manufacturer before any traffic shall be permitted over new roofing.

3.07 FIELD QUALITY CONTROL

- A. Inspection: Provide manufacturer's field observations at start-up and at intervals of approximately 30 percent, 60 percent and 90 percent completion. Provide a final inspection upon completion of the Work.
 - 1. Warranty shall be issued upon manufacturer's acceptance of the installation.
 - 2. Field observations shall be performed by Primary Manufacturers Representative employed full-time by the manufacturer and whose primary job description is to assist, inspect and approve membrane installations for the manufacturer.
 - 3. Provide observation reports from Primary Manufacturers Representative indicating procedures followed, weather conditions and any discrepancies found during inspection.
 - 4. Provide a final report from Primary Manufacturers Representative, certifying that the roofing system has been satisfactorily installed according to the project specifications, approved details and good general roofing practice.

3.08 SCHEDULES

- A. Base (Ply) Sheet:
 - 1. StressBase 80: 80 mil SBS (Styrene-Butadiene-Styrene) rubber modified roofing base sheet reinforced with a fiberglass scrim, performance requirements according to ASTM D 5147.
 - a. Tensile Strength, ASTM D 5147
 - 1) 2 in/min. @ 0 +/- 3.6 deg. F MD 100 lbf/in XD 100 lbf/in
 - 2) 50mm/min. @ -17.78 +/- 2 deg. C MD 17.5 kN/m XD 17.5 kN/m
 - b. Tear Strength, ASTM D 5147
 - 1) 2 in/min. @ 73.4 +/- 3.6 deg. F MD 110 lbf XD 100 lbf
 - 2) 50mm/min. @ 23 +/- 2 deg. C MD 489 N XD 444 N
 - c. Elongation at Maximum Tensile, ASTM D 5147
 - 1) 2 in/min. @ 0 +/- 3.6 deg. F MD 4 % XD 4 %
 - 2) 50mm/min@ -17.78 +/- 2 deg. C MD 4 % XD 4 %
 - d. Low Temperature Flexibility, ASTM D 5147, Passes -40 deg. F (-40 deg. C)
- B. Thermoplastic/Modified Cap (Ply) Sheet:
 - 1. OptiMax FR Mineral: 145 mil mineral surfaced, polyurethane modified roofing membrane with fire retardant characteristics, and dual fiberglass reinforced scrim. ASTM D 6163, Type III Grade G
 - a. Tensile Strength, ASTM D 5147
 - 1) 2 in/min. @ 73.4 +/- 3.6 deg. F MD 205 lbf/in XD 215 lbf/in
 - 2) 50 mm/min. @ 23 +/- 2 deg. C MD 36.0 kN/m XD 38 kN/m
 - b. Tear Strength, ASTM D 5147
 - 1) 2 in/min. @ 73.4 +/- 3.6 deg. F MD 300 lbf XD 300 lbf
 - 2) 50 mm/min. @ 23 +/- 2 deg. C MD 1334 N XD 1334 N
 - c. Elongation at Maximum Tensile, ASTM D 5147
 - 1) 2 in/min. @ 73.4 +/- 3.6 deg. F MD 4.7% XD 5.0%
 - 2) 50 mm/min. @ 23 +/- 2 deg. C MD 4.7% XD 5.0%

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- d. Low Temperature Flexibility, ASTM D 5147, Passes 0 deg. F (-18 deg. C)
- C. Interply Adhesive:
 - 1. Weathering: Rubberized, polymer modified cold process asphalt roofing bitumen V.O.C. compliant ASTM D 3019. Performance Requirements:
 - a. Non-Volatile Content ASTM D 4479 70%
 - b. Density ASTM D1475 8.9 lbs./gal.
 - c. Viscosity Stormer ASTM D562 400-500 grams
 - d. Flash Point ASTM D 93 100 deg. F min. (37 deg. C)
 - e. Slope: up to 3:12
- D. Flashing Base Ply:
 - 1. HPR Tri-Base Premium: 60 mil SBS (Styrene-Butadiene-Styrene) rubber modified roofing base sheet reinforced with a fiberglass and polyester composite scrim, performance requirements according to ASTM D 5147.
 - a. Tensile Strength, ASTM D 5147:
 - 1) 2 in/min. @ 73.4 +/- 3.6 deg. F: MD 330 lbf/in XD 330 lbf/in
 - 2) 50 mm/min. @ 23 +/- 2 deg. C MD 57.5 kN/m XD 57.5 kN/m
 - b. Tear Strength, ASTM D5147:
 - 1) 2 in/min. @ 73.4 +/- 3.6 deg. F MD 550 lbf XD 550 lbf
 - 2) 50 mm/min. @ 23 +/- 2 deg. C MD 2446 N XD 2446 N
 - c. Elongation at Maximum Tensile, ASTM D 5147:
 - 1) 2 in/min. @ 73.4 +/- 3.6 deg. F MD 7% XD 9%
 - 2) 50 mm/min. @ 23 +/- 2 deg. C MD 7% XD 9%
- E. Flashing Ply Adhesive:
 - 1. Flashing Bond: Asphalt roofing mastic V.O.C. compliant, ASTM D 4586, Type II trowel grade flashing adhesive.
 - a. Non-Volatile Content ASTM D 4479 70 min.
 - b. Density ASTM D 1475 8.3 lbs./gal. (1kg/l)
 - c. Flash Point ASTM D 93 103 deg. F (39 deg. C)
- F. Surfacing:
 - 1. Flashing Cap (Ply) Sheet:
 - a. OptiMax FR Mineral: 145 mil mineral surfaced, polyurethane modified roofing membrane with fire retardant characteristics, and dual fiberglass reinforced scrim. ASTM D 6163, Type III Grade G
 - 1) Tensile Strength, ASTM D 5147
 - a) 2 in/min. @ 73.4 +/- 3.6 deg. F MD 205 lbf/in XD 215 lbf/in
 - b) 50 mm/min. @ 23 +/- 2 deg. C MD 36.0 kN/m XD 39 kN/m
 - 2) Tear Strength, ASTM D 5147
 - a) 2 in/min. @ 73.4 +/- 3.6 deg. F MD 300 lbf XD 300 lbf
 - b) 50 mm/min. @ 23 +/- 2 deg. C MD 1334 N XD 1334 N
 - 3) Elongation at Maximum Tensile, ASTM D 5147
 - a) 2 in/min. @ 73.4 +/- 3.6 deg. F MD 4.7% XD 5.0%
 - b) 50 mm/min. @ 23 +/- 2 deg. C MD 4.7% XD 5.0%
 - 4) Low Temperature Flexibility, ASTM D 5147, Passes 0 deg. F (-18 deg. C)
 - 2. Surface Coatings:
 - a. Surfacing:
 - 1) Garla-Brite: ASTM D 2824 aluminum coating non-fiberglass aluminum roof coating non-fiberglass aluminum roof coating having the following characteristics:
 - a) Flash Point 103 deg. F (39 deg. C) min.
 - b) Weight/Gallon 7.9 lbs./gal. (1.0 g/cm³)

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PART 4 END OF SECTION

THERMAL MOISTURE PROTECTION
SHEET METAL FLASHING & TRIM
Section 07-62-00

PART 1 – GENERAL

1.01 SUMMARY

- A. This Section includes custom-site fabricated sheet metal flashing trim and appurtenances.
- B. Related Requirements:
 - 1. Sheet Membrane Waterproofing 07-13-53
 - 2. Board Insulation 07-21-13
 - 3. Thermal Insulation 07-21-00
 - 4. Protected Membrane Roofing 07-55-01

1.02 REFERENCES

- A. Abbreviations:
 - 1. ASTM – American Society of Testing Materials.
 - 2. SMACNA – Sheet Metal and Air Conditioning Contractors National Association
- B. Reference Standards:
 - 1. Architectural Sheet Metal Manual “SMACNA”.
 - 2. ASTM B209-14 Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate.
 - 3. ASTM A240 Standard Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications.
 - 4. ASTM A792 Standard Specification for Steel Sheet, 55% Aluminum-Zinc Alloy-Coated by the Hot-Dip Process.
 - 5. ASTM A653 Standard Specification for Steel Sheet, Zinc-Iron Alloy-Coated (Galvanized) by the Hot-Dip Process.

1.03 ADMINISTRATIVE REQUIREMENT

- A. Pre-installation project meeting.
 - 1. Measure and verify the existing downspout arrangement.

1.04 ACTION SUBMITTAL

- A. Product Data: For each product indicated.
- B. Shop Drawings: Show layouts, profiles, shapes, seams, dimensions, and details for fastening, joining, supporting, and anchoring sheet metal flashing and trim.
- C. Samples: For each type of sheet metal flashing and trim finish and profile.

1.05 CLOSEOUT SUBMITTAL

- A. Guaranty: The guaranty period for all items covered by this Section shall be for one [1] year from date of Owner equipment acceptance, as specified in the General Conditions.

PART 2 – PRODUCTS

2.01 MATERIALS

- A. Sheet Metals:
 - 1. Aluminum Sheet: ASTM B 209, Alloy 3003, 3004, 3105, or 5005, Temper suitable for forming and structural performance required, but not less than H14, finished as follows:
 - a. Clear Anodic Finish: Class II, AA-M12C22A31, complying with AAMA 611.
 - 2. Stainless-Steel Sheet: ASTM A 240, Type 304, No. 2D finish.

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3. Prepainted, Metallic-Coated Steel Sheet: Steel sheet metallic coated by the hot-dip process and prepainted by the coil-coating process to comply with ASTM A 755.
 - a. Zinc-Coated (Galvanized) Steel Sheet: ASTM A 653, G90 coating designation; structural quality.
 - b. Aluminum-Zinc Alloy-Coated Steel Sheet: ASTM A 792/A 792M, Class AZ50 coating designation, Grade 40; structural quality.
 - c. Exposed Finishes: Apply the following coil coating:
 - 1) High-Performance Organic Finish: As specified in Division 5 Section "Shop-Applied Metal Coatings."
- B. Miscellaneous Materials:
 1. General: Provide materials and types of fasteners, solder, welding rods, protective coatings, separators, sealants, and other miscellaneous items as required for complete sheet metal flashing and trim installation.
 2. Gutter Accessories: Wire ball downspout strainer.
 3. Polyethylene Sheet: 6-mil-thick polyethylene sheet complying with ASTM D 4397.
 4. Fasteners: Wood screws, annular threaded nails, self-tapping screws, self-locking rivets and bolts, and other suitable fasteners designed to withstand design loads.
 - a. Fastener Length: Use fasteners of sizes that will penetrate substrate not less than 1-1/4 inches for nails and not less than 3/4 inch for wood screws.
 - b. Fastener Material:
 - 1) Galvanized or Prepainted, Metallic-Coated Steel: Use stainless-steel fasteners.
 - 2) Aluminum: Use aluminum or stainless-steel fasteners.
 - 3) Stainless Steel: Use stainless-steel fasteners.
 6. Fasteners for Flashing and Trim: Blind fasteners or self-drilling screws, gasketed, with hex washer head.
 - a. Blind Fasteners: High-strength aluminum or stainless-steel rivets.
 7. Sealing Tape: Pressure-sensitive, 100 percent solids, polyisobutylene compound sealing tape with release-paper backing. Provide permanently elastic, nonsag, nontoxic, nonstaining tape.
 8. Sealants: As specified in Division 7 Section "Joint Sealants".

2.02 FABRICATION

- A. Custom fabricate sheet metal flashing and trim to comply with recommendations in SMACNA's "Architectural Sheet Metal Manual" that apply to design, dimensions, metal, and other characteristics of item indicated. Shop fabricate items where practicable. Obtain field measurements for accurate fit before shop fabrication.
- B. Fabricate sheet metal flashing and trim without excessive oil canning, buckling, and tool marks and true to line and levels indicated, with exposed edges folded back to form hems.
- C. Conceal fasteners and expansion provisions where possible on exposed-to-view sheet metal flashing and trim, unless otherwise indicated.
- D. Fabricate cleats and attachment devices from same material as accessory being anchored or from compatible, noncorrosive metal, and in thickness not less than that of metal being secured.
- E. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim. Space movement joints and seams at maximum of 10 feet with no joints allowed within 24 inches of corner or intersection.

2.03 ROOF DRAINAGE SHEET METAL FABRICATIONS

- A. Hanging Gutters: Fabricate to cross section indicated, complete with end pieces, outlet tubes, and other accessories as required. Fabricate in minimum 96-inch long sections. Furnish flat-stock gutter spacers and gutter brackets fabricated from same metal as gutters, of size recommended by SMACNA but not less than twice the gutter thickness. Fabricate expansion joints, expansion-joint covers, and gutter accessories from same metal as gutters.
- B. Downspouts: Provide downspouts complete with mitered elbows. Furnish with metal hangers, from same material as downspouts, and anchors.
 1. Downspout Style: Rectangular SMACNA Figure 1-32B.
 2. Hanger Style: U-shaped with concealed fasteners SMACNA Figure 1-35A.

THERMAL MOISTURE PROTECTION
SHEET METAL FLASHING & TRIM
Section 07-62-00

PART 3 – EXECUTION

3.01 INSTALLATION, GENERAL

- A. General: Anchor sheet metal flashing and trim and other components of the Work securely in place, with provisions for thermal and structural movement. Use fasteners, solder, welding rods, protective coatings, separators, sealants, and other miscellaneous items as required to complete sheet metal flashing and trim system.
 - 1. Torch cutting of sheet metal flashing and trim is not permitted.
- B. Metal Protection: Where dissimilar metals will contact each other or corrosive substrates, protect against galvanic action by painting contact surfaces with bituminous manufacturers of dissimilar metals.
 - 1. Coat side of uncoated aluminum and stainless-steel sheet metal flashing and trim with bituminous coating where flashing and trim will contact wood, ferrous metal, or cementitious construction.
 - 2. Underlayment: Where installing metal flashing directly on cementitious or wood substrates, install a course of felt underlayment and cover with a slip sheet or install a course of polyethylene underlayment.
 - 3. Bed flanges in thick coat of asphalt roofing cement where required for waterproof performance.
- C. Install exposed sheet metal flashing and trim without excessive oil canning, buckling, and tool marks.
- D. Install sheet metal flashing and trim true to line and levels indicated. Provide uniform, neat seams with minimum exposure of solder, welds, and sealant.
- E. Install sheet metal flashing and trim to fit substrates and to result in watertight performance. Verify shapes and dimensions of surfaces to be covered before fabricating sheet metal.
 - 1. Space cleats not more than 12 inches apart. Anchor each cleat with two fasteners. Bend tabs over fasteners.
- F. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim. Space movement joints and seams at a maximum of 10 feet with no joints allowed within 24 inches of corner or intersection.
- G. Seams and Joints: As specified under Seams and Joints Article in Part 2 above.
- H. Seal joints with sealants as specified in Division 7 Section “Joint Sealants” as required for watertight construction.

3.02 ROOF DRAINAGE SYSTEM INSTALLATION

- A. General: Install sheet metal roof drainage items to produce complete roof drainage system according to SMACNA recommendations and as indicated. Coordinate installation of roof perimeter flashing with installation of roof drainage system.
- B. Hanging Gutters: Join sections with riveted and soldered joints or with lapped joints sealed with butyl sealant. Provide for thermal expansion. Attach gutters at eave or fascia to firmly anchored gutter brackets spaced not more than 36 inches apart. Provide end closures and seal watertight with sealant. Slope to downspouts.
 - 1. Install gutter with expansion joints at locations indicated but not exceeding 50 feet apart. Install expansion joint caps.
- C. Downspouts: Join sections with 1-1/2-inch telescoping joints. Provide fasteners designed to hold downspouts securely 1 inch away from walls; locate fasteners at top and bottom and at approximately 60 inches o.c. in between.

END OF SECTION

PART 1 – GENERAL

1.01 SUMMARY

- A. This Section includes basic materials, mixes and placement criteria for Hot Mixed Asphalt paving.
- B. Related Requirements:
 - 1. Aggregate Base Course 32-11-23.
 - 2. Paving and Surface Restoration 32-01-10.
 - 3. Common Materials for Bases and Paving 32-05-16.

1.02 REFERENCES

- A. Abbreviations:
 - 1. HMA – Hot Mixed Asphalt.
 - 2. RAP – Reclaimed Asphalt Pavement.
 - 3. MDOT – Michigan Department of Transportation.
 - 5. Mixture Parameters:
 - a. VMA – Voids in Mineral Aggregate.
 - b. VFA -
 - c. JMF – Job-Mix-Formula.
 - d. GMB – Bulk Specific Gravity.
 - e. GMM - Maximum Specific Gravity.
- B. Reference Standards:
 - 1. Standard Specification for Construction: “Michigan Department of Transportation 2003”.

1.03 ACTION SUBMITTALS 01-33-00

- A. Product Data:
 - 1. Source of Materials: Submit source of bituminous paving materials proposed for the work giving the name and address of the supplier.
 - 2. Job Mix Formula: Submit proposed job mix formula and the testing results for each bituminous mixture to the Engineer one week (7 days) prior to paving.
 - 3. Delivery Tickets: Submit one copy of each delivery ticket, indicating delivered weights for bituminous mixtures to Engineer Inspector.

1.04 CLOSEOUT SUBMITTAL

- A. Density Testing Correlation: Submit one HMA in place core for density test correlation as described in Paragraph 3.03.E2.
- B. Pay Weight Adjustments: When blast furnace slag or steel furnace is used in the production of HMA mixtures, the pay weight of the HMA mixture will be the product obtained by multiplying the actual tons of HMA mixture used by the factor of 150 divided by the maximum field density (in pounds per cubic foot) for the HMA mixture.

1.05 SITE CONDITIONS

- A. Environmental Conditions:
 - 1. Do not apply bituminous materials on wet surfaces, when weather is rainy or threatening rain, or when surface temperature is below 40°F.
 - 2. Target placement temperatures per MDOT Section 502.03.E Table 502-1.

Surface Temp. of °F	Rate of Application Lb/Syd	
	120-200	200+
40-49	330	315
50-59	315	300
60-69	300	285
70-79	285	270

- 3. Allowable placement tolerance shall be +/- 20°F. All loads having temperature below 250°F or above 350°F at time of discharge from hauling unit will be rejected.
- 4. Grade Control: Establish and maintain the required lines and grades for each course during construction operations. Reestablish cross slopes as shown on the drawings.

PART 2 – PRODUCTS

2.01 MATERIALS

- A. Bituminous Materials: MDOT Standard Specifications, Section 904, and as follows:
1. Bond Coat: Asphalt Emulsion SS1h.
 2. Asphalt binder usually PG 64-22 for leveling and top courses and PG 58-22 for base course unless polymer modified binder is necessary.
- B. Aggregates: MDOT Standard Specifications
- C. Recycled Asphalt (RAP): Recycled Asphalt shall “reclaimed asphalt pavement” free of “cold patch” and other deleterious materials.
1. Processed RAP shall be a size that will be compatible with the specified HMA mixture.
 2. Binder adjustments may be made according to MDOT special provision 03SP501(G) “Recycled Hot Mix Asphalt Mixture”.

2.02 MIXES

- A. Composition of Hot Mixed Asphalt: MDOT Standard Specifications, Section 501. and Table 904 using aggregates specified in this Paragraph.

1. **Table 1: Mix Design Criteria and Volumetric Properties**

	Mixture No.				
	2C	3C	4C	13A	36A
Target Air Void, % (a)	3.00	4.00	4.00	3.0	4.00
VMA (min) (b)	11.00	13.00	14.00	14.00	15.00
VFA	65-78	65-78	65-78	65-78	65-78
Fines to Binder Ratio (max) (c)	1.2	1.2	1.2	1.2	1.2
Flow (0.01 inch)	8-16	8-16	8-16	8-16	8-16
Stability (min), lbs	1200	1200	1200	900	900
a. Lower target air voids by 1.00% if used in a separate shoulder paving operation. Air void targets to 3.00% for lower traffic volume roadways when designing 13A and 36A and mixtures for local agency use. b. VMA calculated using Gsb of the combined aggregates. c. Ratio of the weight of aggregate passing the No. 200 sieve to total asphalt binder content by weight; including fines and binder contributed by RAP.					

2. **Table 2: Aggregate Properties**

	Mixture No.				
	2C	3C	4C	13A	36A
Percent Passing indicated Sieve or Property Limit					
1 ½ inch	100				
1 inch	91-100	100			
¾ inch	90 max.	91-100	100	100	
½ inch	78 max.	90 max.	91-100	75-95	100
5/8 inch	70 max.	77 max.	90 max.	60-90	92-100
No. 4	52 max.	57 max.	67 max.	45-80	65-90
No. 8	15-40	15-45	15-52	30-65	55-75
No. 16	30 max.	33 max.	37 max.	20-50	
No. 30	22 max.	25 max.	27 max.	15-40	25-45
No. 50	17 max.	19 max.	20 max.	10-25	
No. 100	15 max.	15 max.	15 max.	5-15	
No. 200	3-6	3-6	3-6	3-6	3-10
Crushed (min), % (MTM 117)	90	90	90	25	60
Soft Particle (max), % (a)	12.0	12.0	4.0	8.0	8.0
Angularity Index (min) (b)	4.0	4.0	40	2.5	3.0
L.A. Abrasion (max), % loss (c)	40	40		40	40
Sand Ratio (max) (d)	-	-	-	50	50

- a. The sum of the shale, siltstone, structurally weak, and clay-ironstone particles must not exceed 8.0 percent for aggregates used in top course. The sum of the shale, siltstone, structurally weak, and clay-ironstone particles must not exceed 12.0 percent for aggregates used in base and leveling courses.
- b. The fine aggregate angularity of blended aggregates, determined by MTM 118, must meet the minimum requirement. In mixtures containing RAP, the required minimum fine aggregate angularity must be met by the virgin material. NAA fine aggregate angularity must be reported for information only and must include the fine material contributed by RAP if present in the mixture.
- c. Los Angeles abrasion maximum loss must be met for the composite mixture, however, each individual aggregate must be less than 50.
- d. Sand ratio for 13A and 36A no more than 50% of the material passing the No. 4 sieve is allowed to pass the No. 30 Sieve.

B. Mixes shall be designated as Mixture Number.

1. HMA mixes for leveling courses and wearing courses shall be as shown on the drawings.

2.03 QUALITY CONTROL

- A. Material acceptance testing: Acceptance sampling and testing will be performed by the Road Commission using the sampling method and testing options selected by the Engineer. Each day of production, the Road Commission will determine the number of samples to be taken for each mix type. Acceptance testing will be performed at minimum frequency of one per 1000 tons. Quality Control measures to ensure job control are the responsibility of the Contractor.
- B. Pavement density will be measured for acceptance with a Nuclear Density Gauge using the Bulk Specific Gravity (GMB) from the job-mix-formula (JMF) for the density control target.

PART 3 – EXECUTION

3.01 PREPARATION

A. Bond Coating:

1. Treat bituminous or portland cement concrete, or both, base course surfaces with bond coat applied at a uniform rate of 0.10 gallon per sq. yd. and in accordance with MDOT Standard Specifications, Section 502.03.D.
2. Where paving existing bituminous surface, remove all loose materials from paving surface, then treat surface with bond coat. Bond coat application shall be:
 - a. 0.10 gal/yd² on ex. pavement.
 - b. 0.05 gal/yd² between HMA course.

3.02 INSTALLATION

A. General:

1. Equipment, transportation of mixtures, placing hot mixed asphalt mixture, and rolling shall be as specified in MDOT Standard Specifications, Section 502 “Hot-Mixed Asphalt Construction Practices”.
2. Application temperature for bituminous materials shall be as specified in Paragraph 1.05.A.2.
3. Application Schedule: Hot mixed asphalt shall be placed at the application rates as noted on the plan section details.
4. Cleaning Pavement: Before the bond coat is applied, the HMA surface shall be cleaned as directed by the Engineer with a mechanical sweeper that does not throw or emit dust.

B. Hot Mixed Asphalt Pavement: Mix designations shall be as shown on the drawings.

1. Over Aggregate Base Course:
 - a. Construct hot mixed asphalt leveling course over aggregate base in one lift having compacted nominal thickness as specified on the drawings. Note: If noted on the drawings 2C base course shall be placed in two (2) lifts.
 - b. Treat hot mixed asphalt leveling course surface with bond coat applied at a uniform rate of 0.05 gallon per sq. yd.
 - c. Construct hot mixed asphalt wearing course over bond coat treated leveling course in one lift having compacted nominal thickness of 1” or greater as required to provide the total bituminous pavement thickness as specified on the drawings.

2. Over Other Bases: Construct hot mixed asphalt wearing course over bond coat treated bituminous base course or Portland cement concrete base course or existing bituminous paving, as applicable, in one lift having compacted nominal thickness as specified on the drawings.
- C. Placing and Spreading:
 1. On aggregate base course or bond treated leveling course, as applicable, place hot mixed asphalt mixture using self-propelled spreading and finishing equipment, at a uniform rate avoiding intermittent operation.
 2. After spreading and before compaction, adjust any surface inequalities by hand, adding or removing bituminous mixture as required.
 3. Coat portion of concrete curbs, catch basins and the like against hot mixed asphalt is placed with bond coat (asphalt emulsion). Protect all other surfaces.
 4. Adjust irregularities in outside edges before rolling. Edge each course straight following initial rolling.
 5. "Set up" longitudinal joints at proper height above adjacent construction to receive maximum compaction, coat with bond coat (asphalt emulsion), hand rake, and broom to provide dense, smooth connection.
 6. Don't hand rake edges. Proper height should be adjusted on paver.
 7. Compact from hot side with roller hanging 6" over unsupported edge or cold joint.
- D. Compaction:
 1. Roll each course as soon after spreading as the mixture will bear the roller without undue displacement or hair cracking. Continue until all roller marks are eliminated and no further compaction is possible.
 2. Roll longitudinally; from edges toward center, overlapping on successive trips with alternate trips terminated at least 3 feet from preceding stops.
 3. Compact areas inaccessible to the roller with hot hand tampers.
 4. Remove defective bituminous mixture or mixture contaminated with foreign material, replace with fresh bituminous mixture, and compact to the density of the surrounding area.
- E. Finish: Surfaces of each finished course shall be smooth, and constructed true to line, grade and cross-section to the tolerance tests under Article 3.03.

3.03 FIELD QUALITY CONTROL

- A. Visual Test: Surface of finished hot mixed asphalt paving shall be free from depressions, ridges, cracks, soft areas, roller marks, and other irregularities.
- B. Smoothness Test:
 1. The surface of finished hot mixed asphalt paving shall not show any deviation in excess of 3/16" when tested with a 10-foot straightedge applied both parallel with and at right angles to the centerline of the paved area.
 2. The average allowable deviation shall be not more than 1/8"
 3. Measurements shall be made at random locations as directed by the Engineer and on the basis of 3 tests for each 500 square yards of completed hot mixed asphalt paving.
- C. Cross-Section Test:
 1. The cross-section of finished hot mixed asphalt paving shall not show any deviation in excess of 1/4" when tested with a crown template centered on and at right angles to the centerline of the crown.
 2. Measurements shall be made as specified under Paragraph 3.03.B.3.
- D. Thickness Control:
 1. The average thickness of each hot mixed asphalt course shall be within 1/4" of that shown on the drawings.
 2. Measurements shall be made at random locations as directed by the Engineer on the basis of one measurement for each 500 square yards of completed hot mixed asphalt.
- E. Density Compaction:
 1. The required in-place Density for the HMA mixture shall be based on the (JMF) Air Voids. A minimum of 97% in-place Density of the (GMB) for 3% Air Void mixes, and a minimum of 96% in-place Density for 4% Air Void mixes. The Contractor shall be responsible for establishing a rolling pattern that will achieve the required in-place Density.
 2. At least one core per Job-Mix-Formula shall be obtained after final rolling is completed. The asphalt cores shall be tested to correlate the actual density with Nuclear Density Gauge(s) according to the MDOT Procedure for Determining Pavement Density as described in MTM 315. The engineer will mark the core location with a two-inch diameter paint dot which represents the center of the core.
 - a. The Contractor shall drill a 6-inch core sample at the core location. The Contractor shall notify the Engineer sufficiently in advance of coring to ensure that the Owner has a representative to witness the coring operation and take immediate possession of the cores.

- b. The minimum thickness of the core shall comply with MTM 315. If it is insufficient, or if the core is damaged, the Engineer shall document the problem and select another location for coring if necessary.

END OF SECTION



VALVE SCHEDULE

Number	Size (in)	Type	Operator
1	24	Butterfly	Hand Wheel
3	16	Butterfly	Motor Operated *
5	16	Altitude	Electronic Flow Control
7	16	Butterfly	Right Angle Hand Wheel
9	20	Gate	Hand Wheel
11	12	Gate	Hand Wheel
13	12	Gate	Hand Wheel
15	12	Gate	Hand Wheel
17	18	Butterfly	Right Angle Hand Wheel
19	10	Swing Check	Outside Lever & Weight
21	10	Butterfly	Motor Operated *
23	20	Gate	Hand Wheel
25	18	Butterfly	Right Angle Hand Wheel
27	10	Swing Check	Outside Lever & Weight
29	10	Butterfly	Motor Operated *
31	18	Gate	Hand Wheel
33	18	Butterfly	Right Angle Hand Wheel
35	10	Swing Check	Outside Lever & Weight
37	10	Butterfly	Motor Operated *
39	18	Gate	Hand Wheel
41	12	Surge	Hydraulic

* Motor Operators to be Rotzelm Model IQT Type 2 3 phase
480 volt with Battery Fail-safe

* Motor Operators to be Rotork Model IQT Type 2 3 phase 480 volt with Battery Failsafe

WARNING

UTILITY LOCATIONS ARE NOT
CONFIRMED, THOSE SHOWN
WERE OBTAINED FROM
UTILITY OWNERS OR PLANS
THREE FULL WORKING DAYS
PRIOR TO BEGINNING WORK
THE CONTRACTOR SHALL
NOTIFY UTILITY OWNERS TO
HAVE WORK AREA STAKED
AND HE SHALL PROTECT OR
HAVE RELOCATED, AS NOTED
IN THE SPECIFICATIONS, ALL
UTILITIES THAT MIGHT
INTERFERE WITH
CONSTRUCTION.



City of Flint
1101 S. Saginaw Street
Flint, Michigan 48502

PROPOSED FLOOR PLAN
Cedar Pump Station Rehabilitation
Bearing Support & Access



SCALE 3/16" = 1'

MARK	ISSUED FOR	DATE
	-	-
	-	-
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	-	-
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	-	-
	ADDENDUM 2	7/17/23
	ISSUE FOR BID	7/5/23
	PERMITTING	6/7/23
	OWNER REVIEW	5/17/23

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DESIGN BY: -
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DLZ JOB NUMBER: 1949-0188-00

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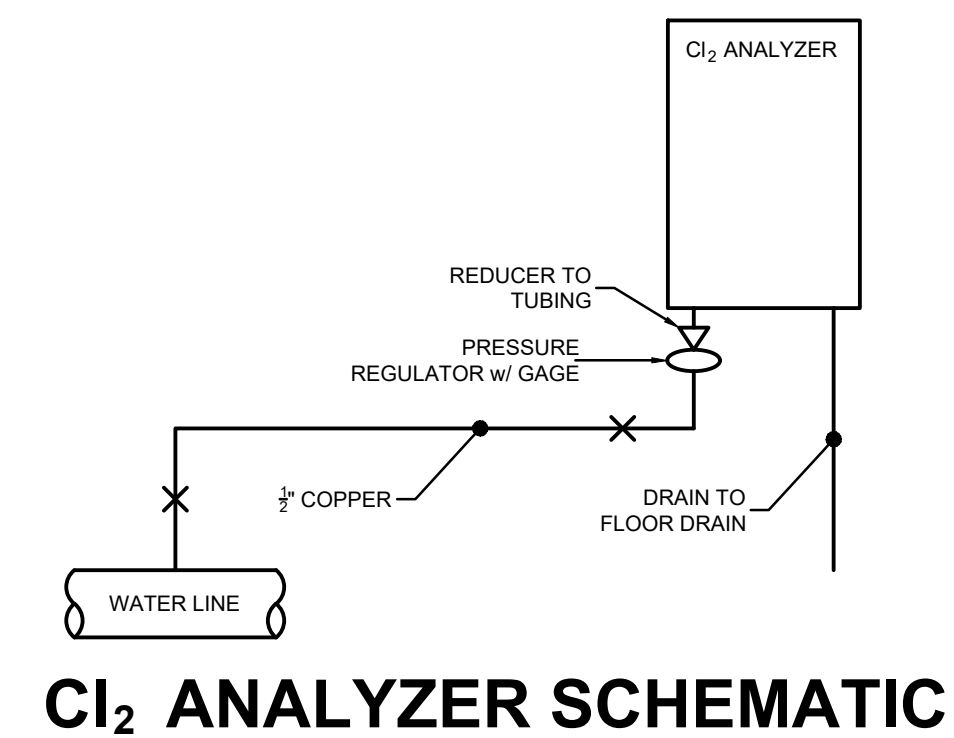
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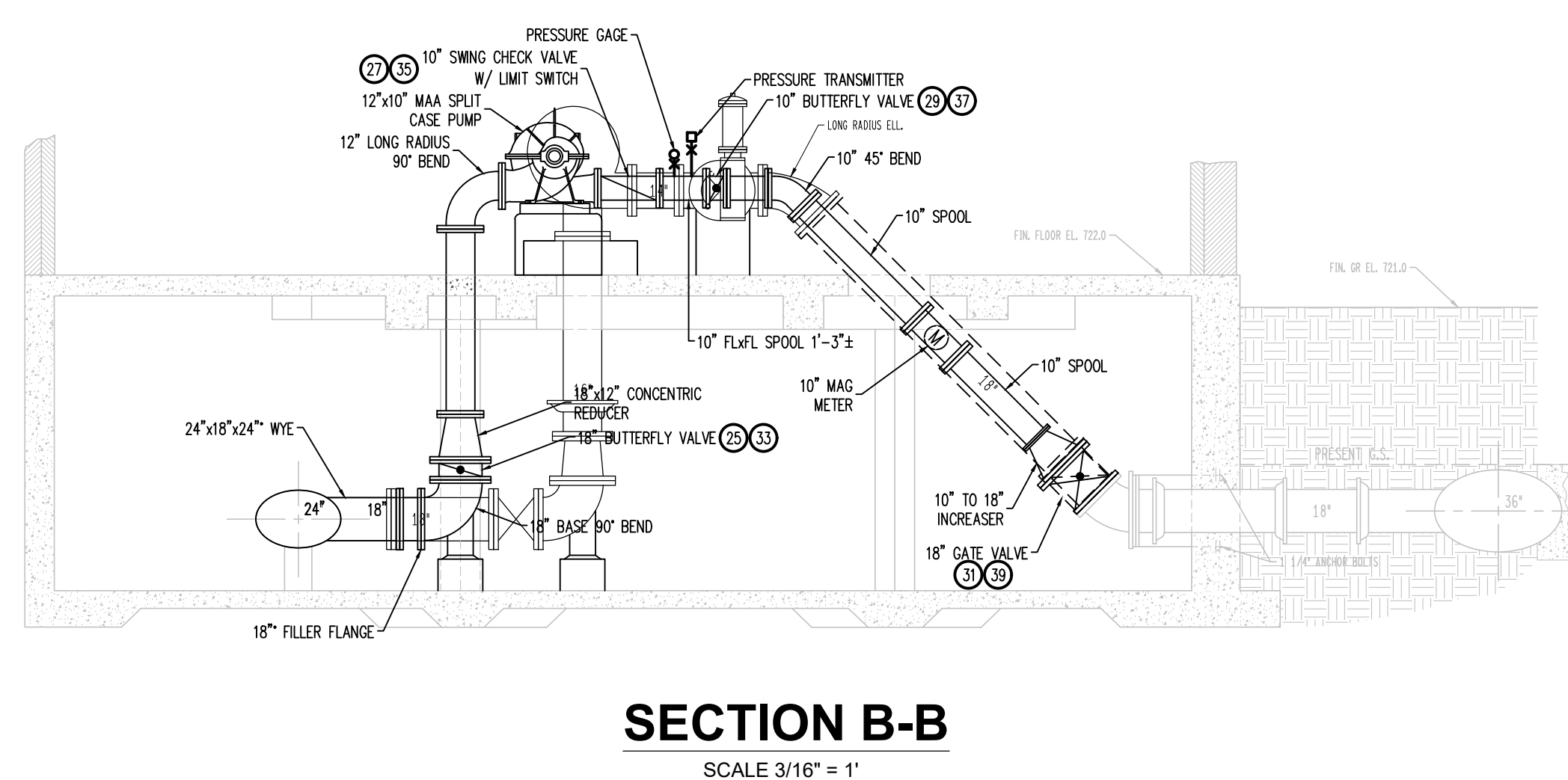
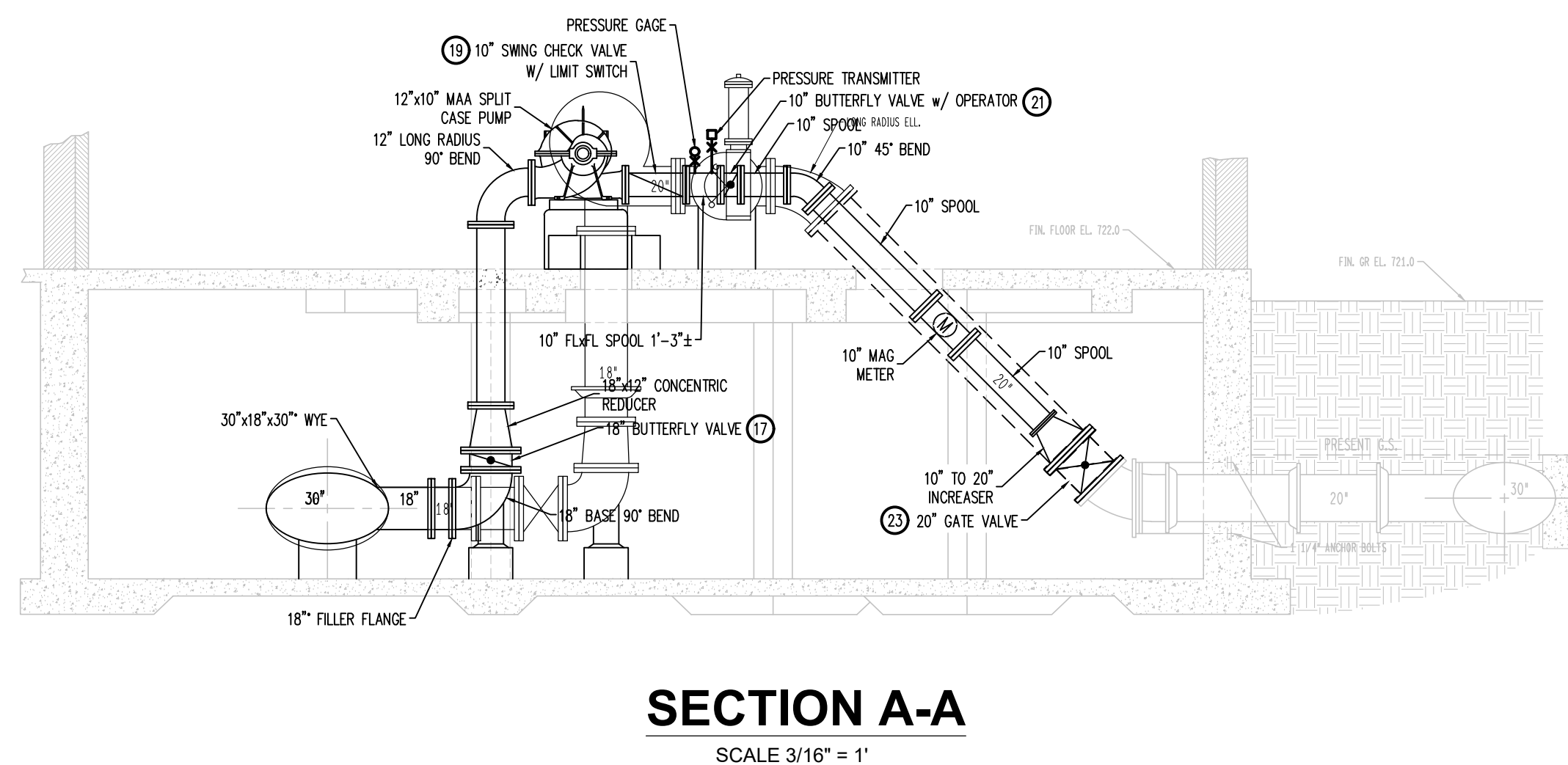
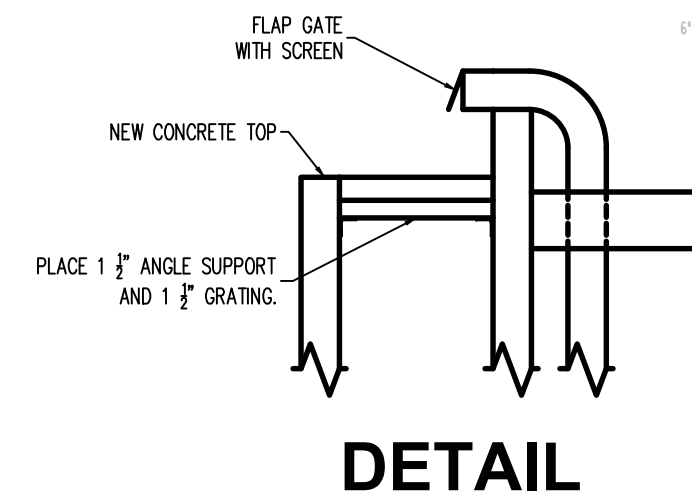
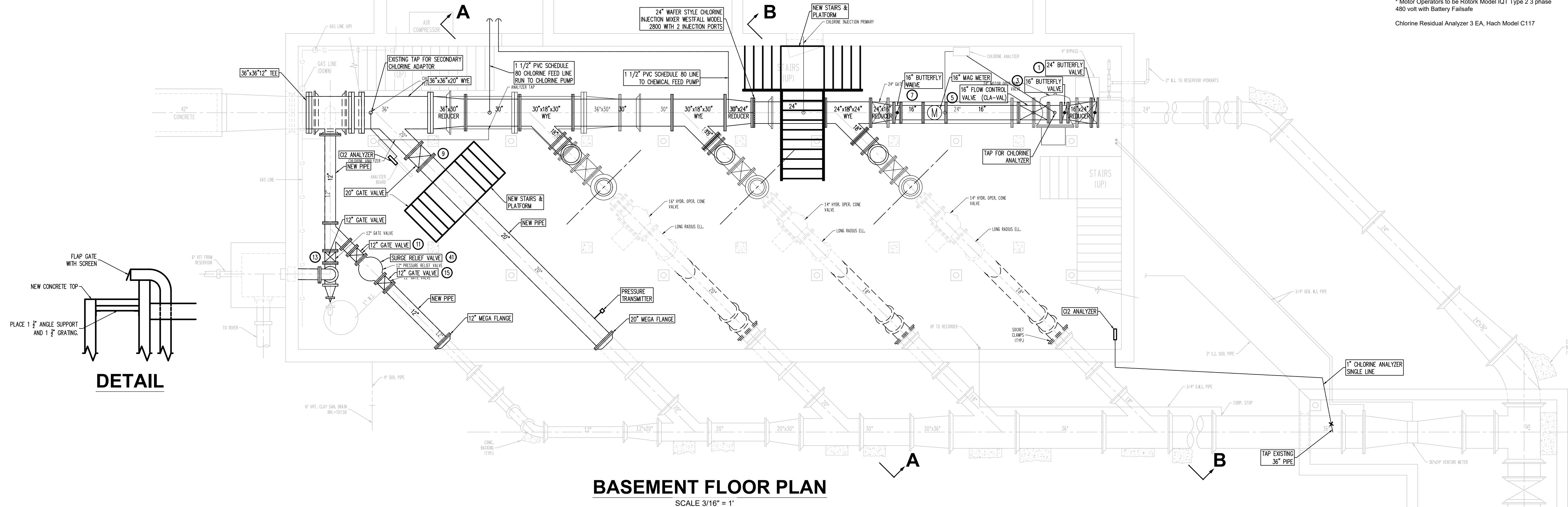


VALVE SCHEDULE

Number	Size (in)	Type	Operator
1	24	Butterfly	Hand Wheel
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5	16	Altitude	Electronic Flow Control
7	16	Butterfly	Right Angle Hand Wheel
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27	10	Swing Check	Outside Lever & Weight
29	10	Butterfly	Motor Operated *
31	18	Gate	Hand Wheel
33	18	Butterfly	Right Angle Hand Wheel
35	10	Swing Check	Outside Lever & Weight
37	10	Butterfly	Motor Operated *
39	18	Gate	Hand Wheel
41	12	Surge	Hydraulic

* Motor Operators to be Rotork Model IQT Type 2.3 phase 480 volt with Battery Fail-safe


Chlorine Residual Analyzers 3 EA, Hach Model C117



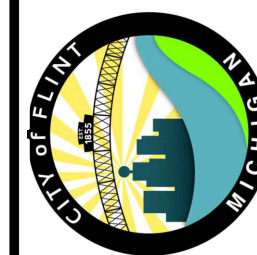
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City of Flint
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The logo of the City of Flint, Michigan, is a circular emblem. It features a stylized bridge spanning a river, with a city skyline in the background. The words "FLINT" and "MICHIGAN" are written around the perimeter of the circle.

PROPOSED FLOOR PLAN (BASEMENT)
Cedar Pump Station Rehabilitation
Bearing Support & Access
Cedar Street
Flint, Michigan 48503



SCALE 3/16" = 1'

MARK	ISSUED FOR	DATE
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	ISSUE FOR BID	7/5/23
	PERMITTING	6/7/23
	OWNER REVIEW	5/17/23

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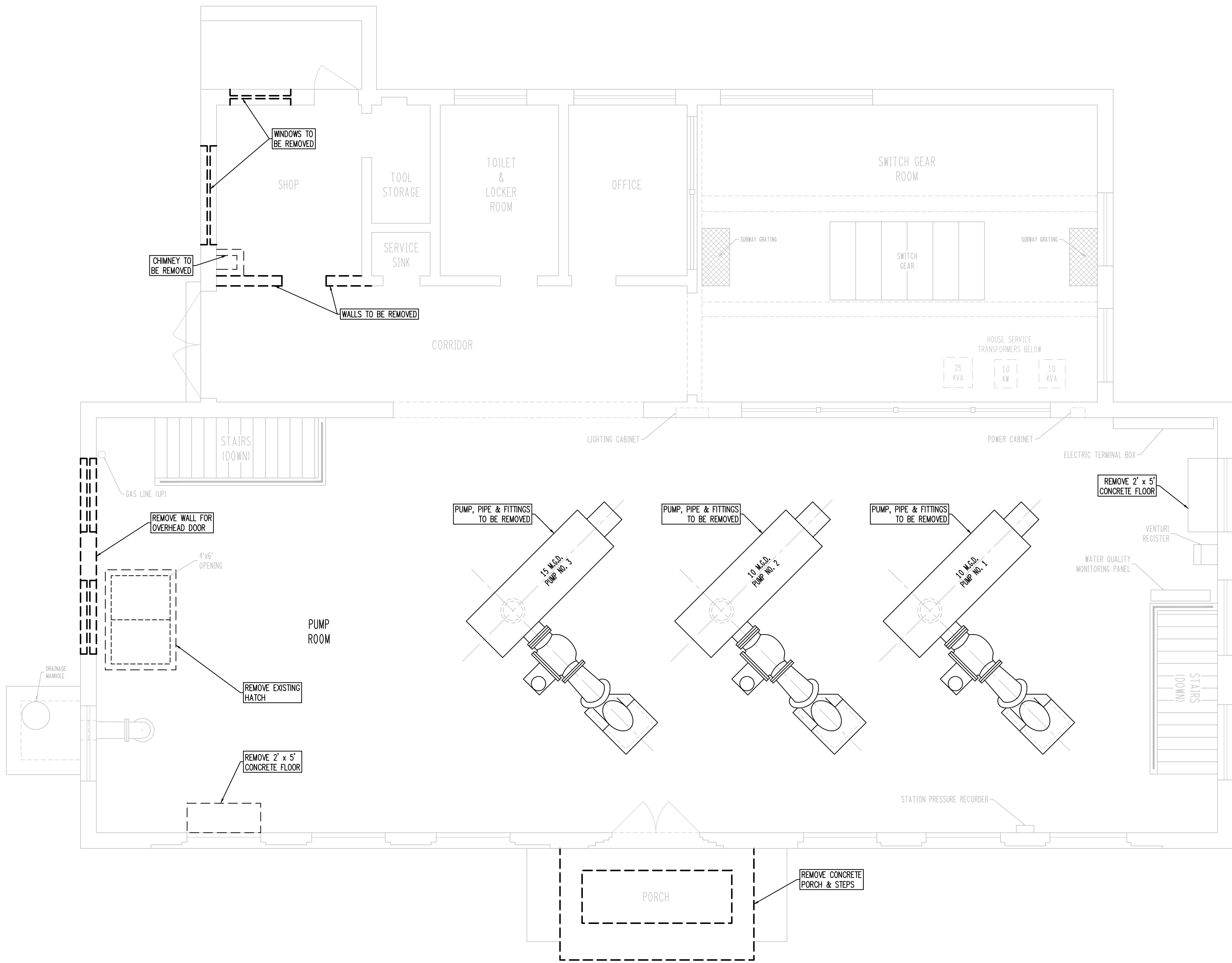
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ANALYSIS

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EXPIRATION DATE: 7/17/2023 11:22:52 AM



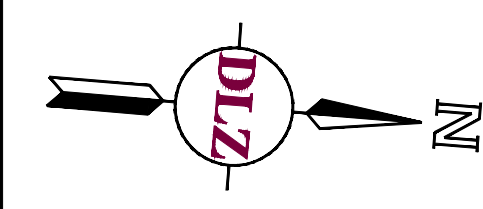
FLOOR PLAN

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City of Flint
1101 S. Saginaw Street
Flint, Michigan 48502

DEMOLITION PLAN (FIRST FLOOR)
Cedar Pump Station Rehabilitation
Bearing Support & Access
Cedar Street
Flint, Michigan 48503



SCALE 3/16" = 1'

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ADDENDUM 2	7/17/23	
ISSUE FOR BID	7/5/23	
PERMITTING	6/7/23	
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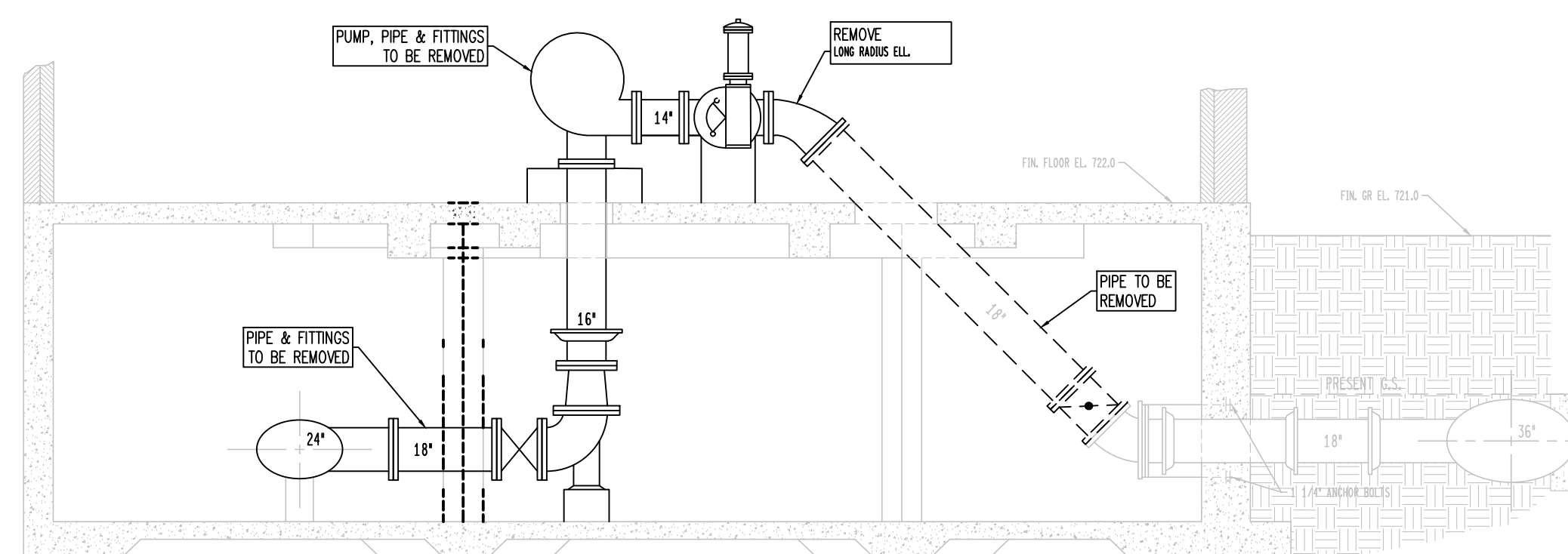
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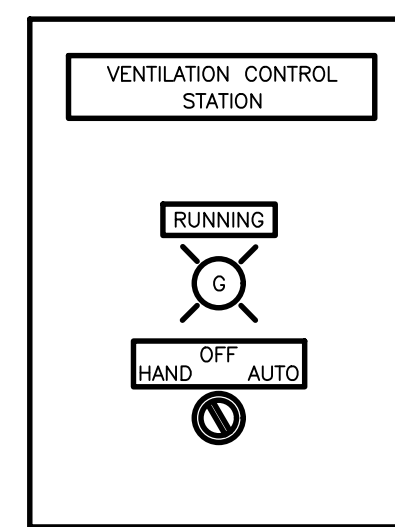
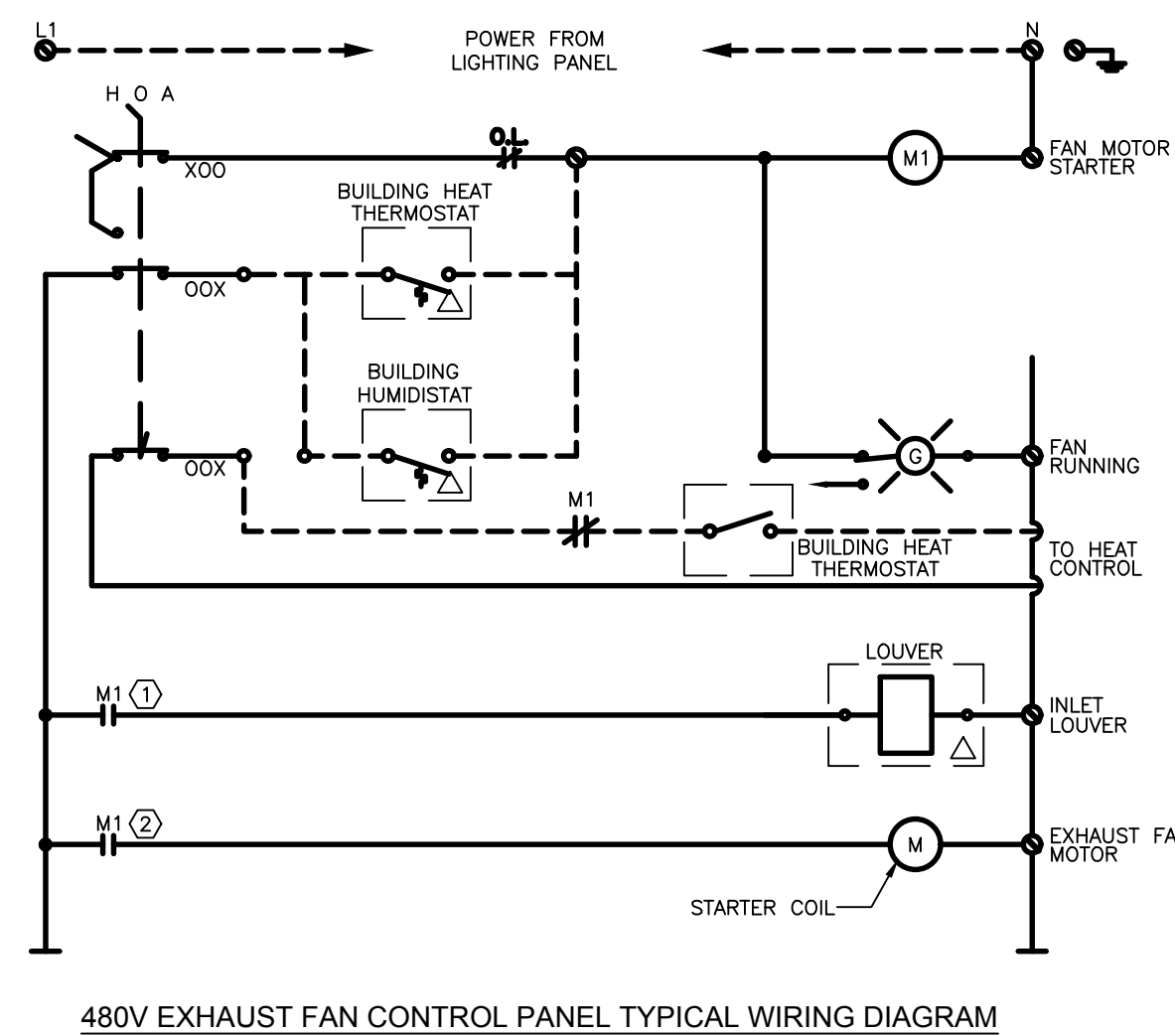
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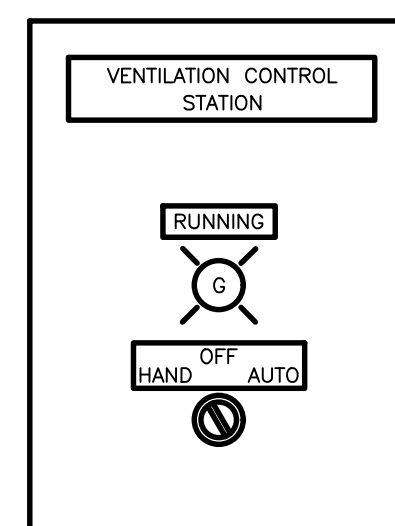
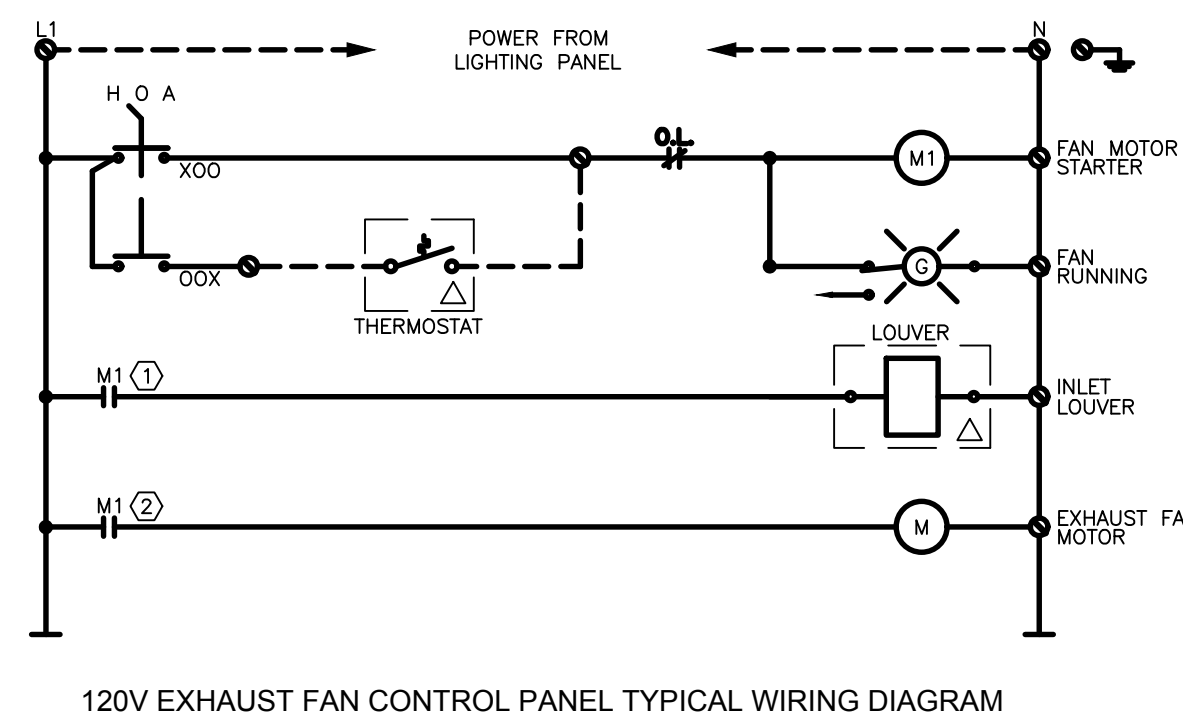
SECTION B-B

CD-103



NOTE:

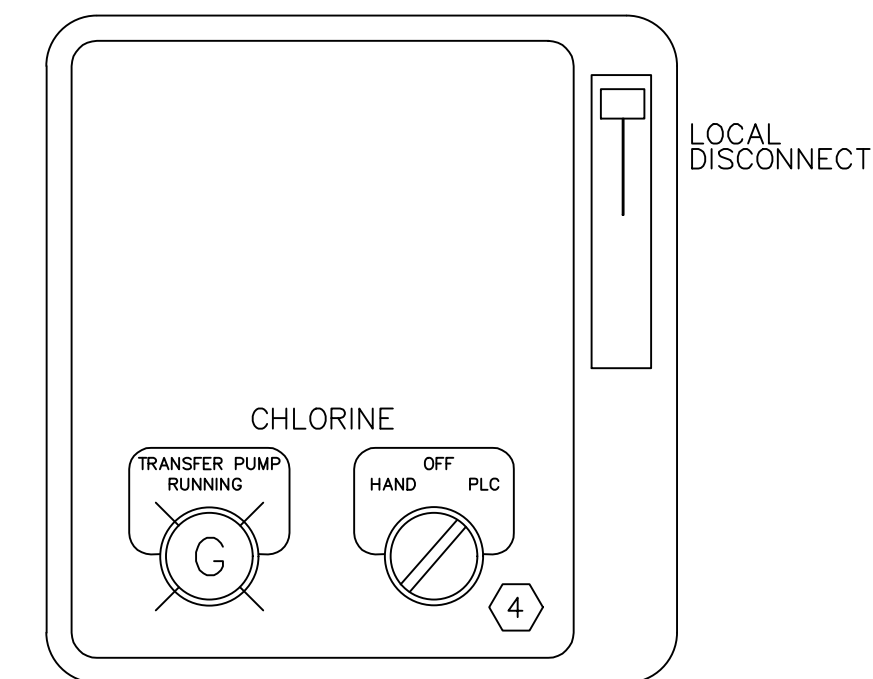
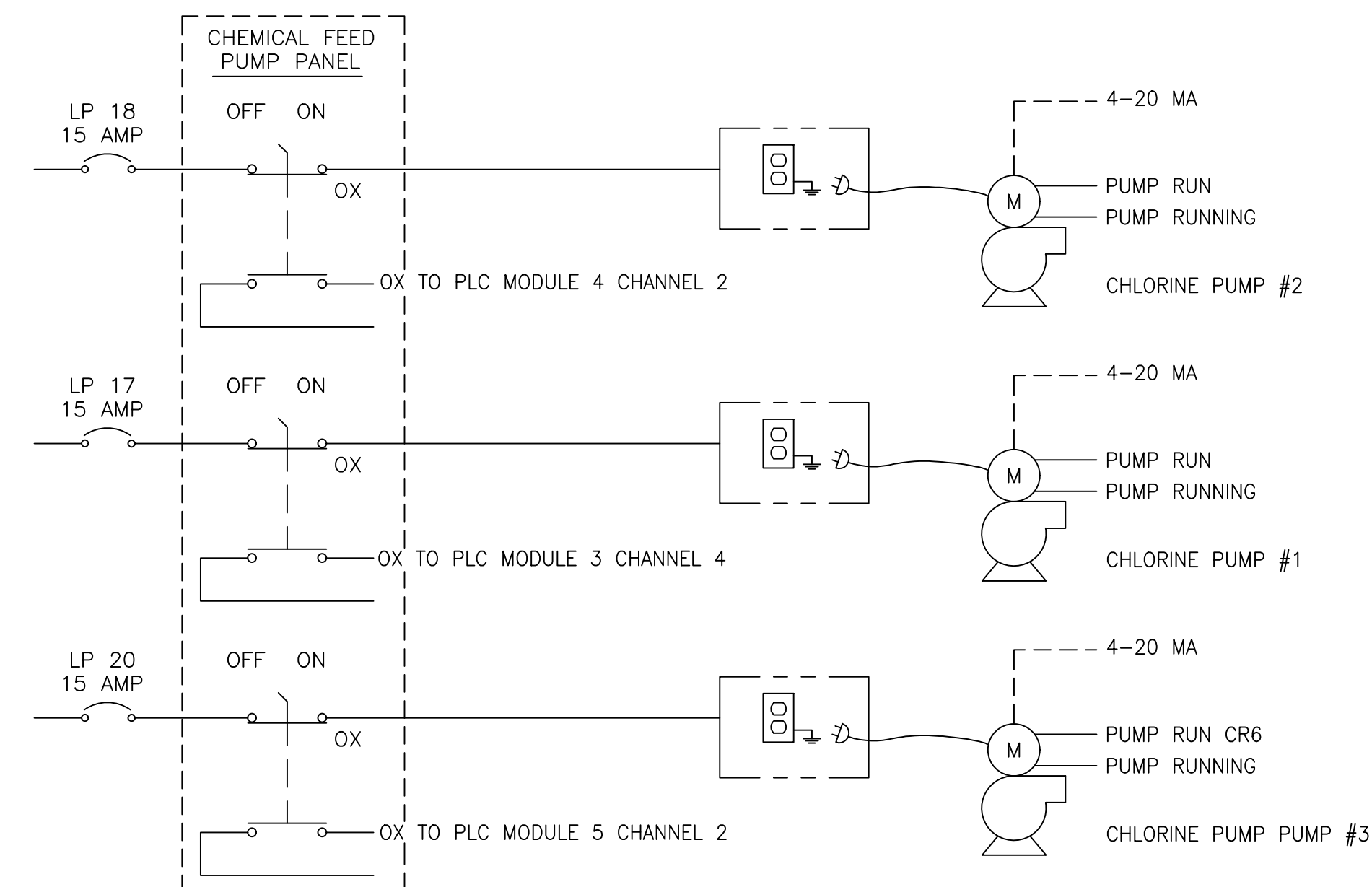
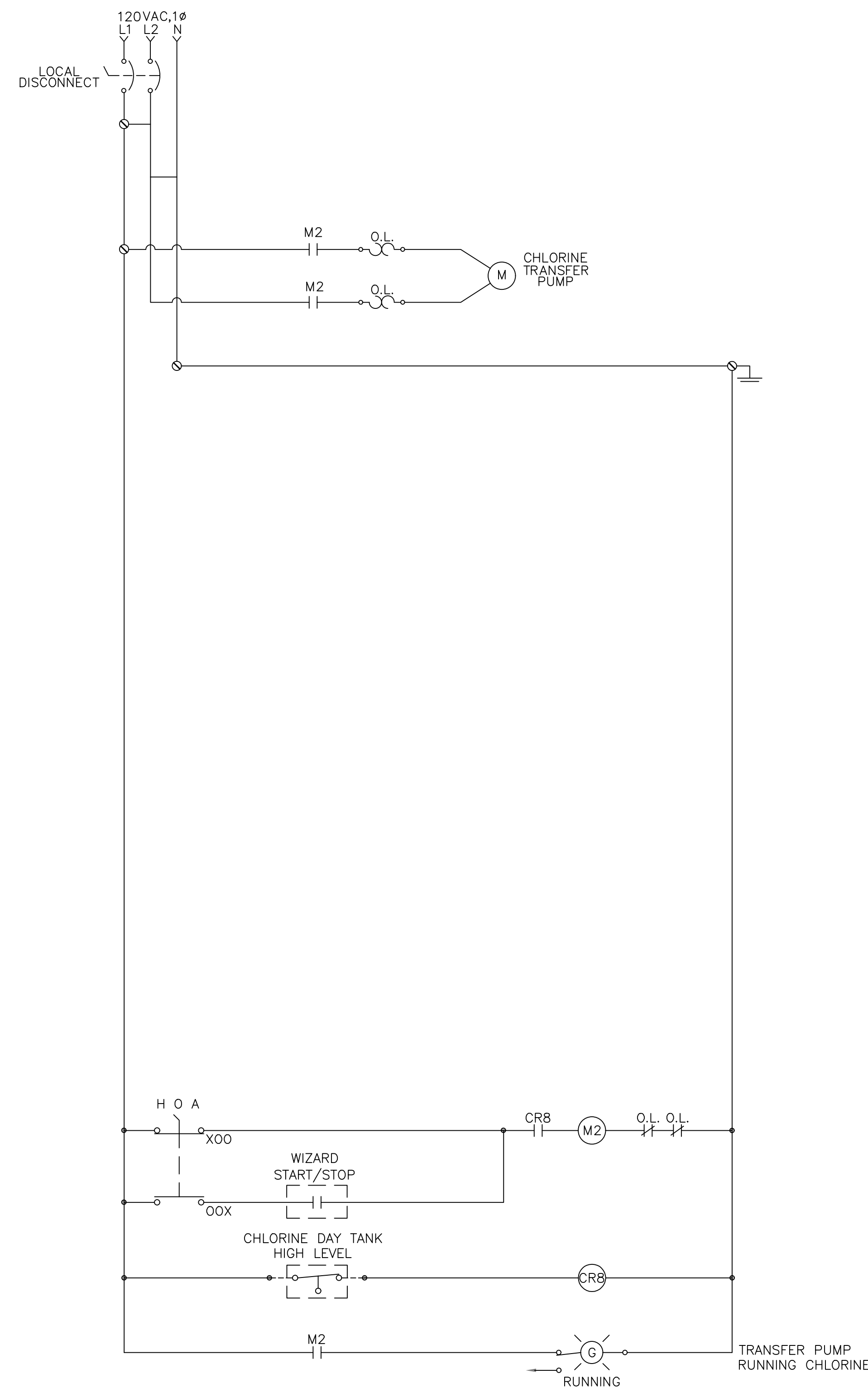
1. CONTRACTOR TO PROVIDE & SIZE VENTILATION CONTROL STATION. VENTILATION CONTROL STATION TO BE A NEMA 12 PUSHBUTTON HOFFMAN ENCLOSURE.



120V EXHAUST FAN CONTROL PANEL DOOR LAYOUT
CHEMICAL ROOM

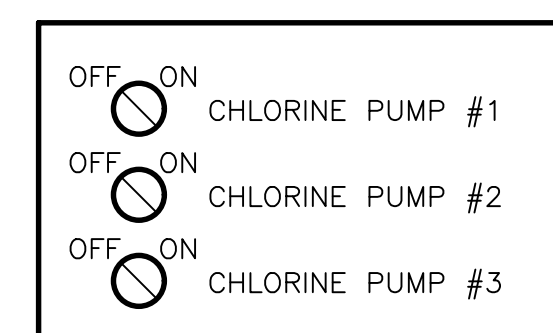
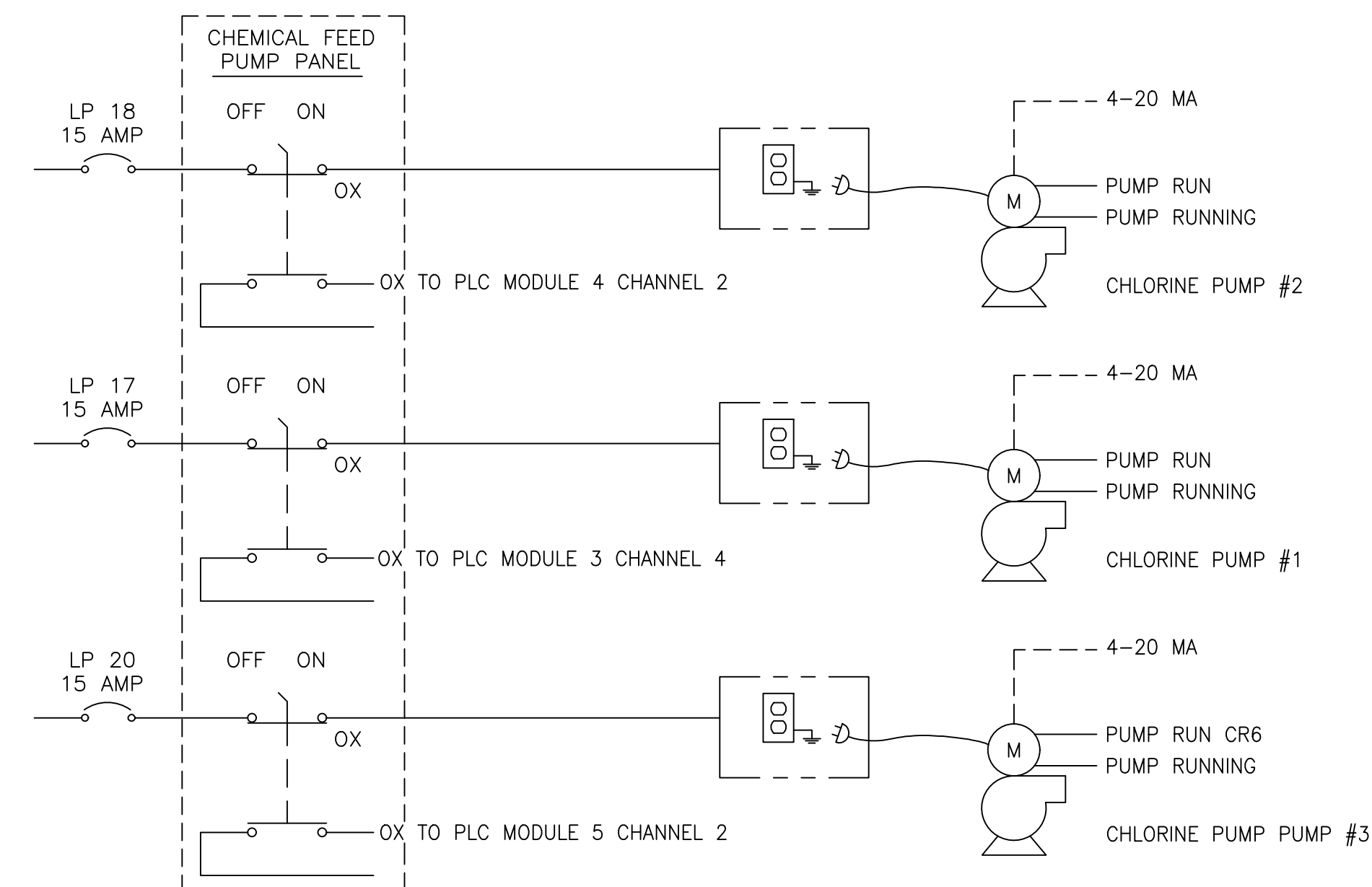
NOTE:

1. CONTRACTOR TO PROVIDE & SIZE VENTILATION CONTROL STATION. VENTILATION CONTROL STATION TO BE A NEMA 12 PUSHBUTTON HOFFMAN ENCLOSURE.



CODED NOTES:

1. LOCAL CONTROL STATION
2. CONTRACTOR TO SIZE ENCLOSURES ACCORDINGLY.
3. AUTO INDICATION TO I/O SHALL BE AN AUX CONTACT OFF THE HOA SWITCH. (TYPICAL)
4. PROVIDE AR-FLASH WARNING AND ELECTRICAL HAZARD LABELS PER NEC CODE AND UL508. (TYPICAL)
5. PROVIDE LAMACOID LABELS WITH APPROPRIATE CONTROL PANEL NAMES.



NOTE: AC POWER CONDUCTORS-RED, 16 AWG TFFN.
 NEUTRAL-WHITE, 16 AWG TFFN.
 FIELD SUPPLIED POWER CONDUCTOR (RELAYED)-YELLOW, 16 AWG TFFN.
 DC POWER CONDUCTORS-BLUE, 16 AWG TFFN.
 ANALOG SIGNALS 18 GA TWISTED SHIELDED PAIR.
 GROUND-GREEN, 14 AWG THHN.

△ FIELD LOCATED DEVICES

1. CONTRACTOR SHALL SIZE MOTOR STARTER, FUSES, & O.L.s PER ACTUAL PUMP NAME PLATE DATA.

811 **3 FULL WORKING DAYS**
BEFORE YOU DIG CALL

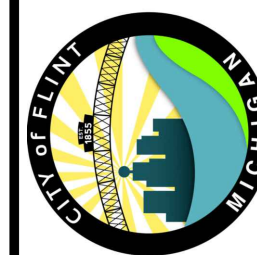
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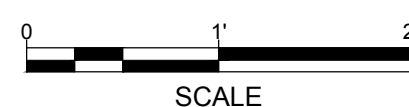
WARNING

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City of Flint
1101 S. Saginaw Street
Flint, Michigan 48502

INSTRUMENTATION & CONTROL DIAGRAMS
Cedar Pump Station Rehabilitation
Bearing Support & Access
 Cedar Street
 Flint Michigan 48507



MARK	ISSUED FOR	DATE
-	-	-
-	-	-
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	ADDENDUM 2	7/17/23
	ISSUE FOR BID	7/5/23
	PERMITTING	6/7/23
	OWNER REVIEW	5/17/23

DRAWN BY: DLZ
DESIGN BY: -
CHECKED BY: -

DLZ JOB NUMBER: 1949-0188-00

SHEET NO.

IC-002

<u>HVAC BASIS OF DESIGN</u>	
SUMMER	
OUTDOOR	89°FDB, 74°F WB
INDOOR	75°FDB, 50% WB
WINTER	
OUTDOOR	-2°F DB
INDOOR	75°FDB, 50% WB

ABBREVIATIONS

AMPS AMPERES
ADJ ADJUSTABLE
ATC AUTOMATIC TEMPERATURE CONTROL
A.P. AIR PRESSURE DROP
A.F.F. ABOVE FINISHED FLOOR
CFM CUBIC FEET PER MINUTE
CO. COMPANY
COND. CONDENSATE
D DRAIN
DSP DUCT STATIC PRESSURE
EA EXHAUST AIR
EAT EXTERIOR AIR TEMPERATURE
EDB ENTERING DRY BULB
EF EXHAUST FAN
EFF EFFICIENCY
ELECT. ELECTRICAL
ESP EXTERNAL STATIC PRESSURE
EWB ENTERING WET BULB
EWC ELECTRIC WATER COOLER
F FIRE DAMPER
FPM FEET PER MINUTE
FD FLOOR DRAIN
FT FEET
GAL GALLON
GPM GALLONS PER MINUTE
GC GENERAL CONTRACTOR
HC HEATING COIL
HP HORSEPOWER
HR HOUR
HTG. HEATING
ID. IDENTIFICATION
IH INTAKE HOOD
IN INCH
L LOUVER
LAT LEAVING AIR TEMPERATURE
LBS POUNDS
LDB LEAVING DRY BULB
LVB LEAVING WET BULB
MAX MAXIMUM
MBH 1000 BRITISH THERMAL UNITS PER HOUR
MIN. MINIMUM
NO. NUMBER
OA OUTSIDE AIR
P.C. PLUMBING CONTRACTOR
P. PHASE
PSI POUNDS PER SQUARE INCH
RA RETURN AIR
RF RELIEF AIR FAN
RH RELIEF AIR HOOD
RM ROOM
RU ROOF TOP UNIT
SA SUPPLY AIR
SE SMOKE EXHAUST
SD SMOKE DAMPER
SENS SENSIBLE
TSP TOTAL STATIC PRESSURE
V VENT
VAV VARIABLE AIR VOLUME BOX
VOLT VOLTAGE
VFD VOLTAGE-FREQUENCY DRIVE
W.C. WATER COLUMN
W.O. WALL OPENING
WPD WATER PRESSURE DROP

PIPE ABBREVIATIONS

CF	COMBUSTION FLUE
CI	COMBUSTION AIR INTAKE
C	CONDENSATE
RS	REFRIGERANT SUCTION
RL	REFRIGERANT LIQUID

MECHANICAL GENERAL INSTALLATION NOTES

- ALL MECHANICAL WORK SHALL BE IN ACCORDANCE WITH INDIANA MECHANICAL CODE, LATEST APPLICABLE EDITION, THE AUTHORITY HAVING JURISDICTION AND AS SPECIFIED (WHICHEVER IS MORE STRINGENT).
2. IF NON-DESIGN BASE EQUIPMENT IS SELECTED, THIS CONTRACTOR SHALL BEAR ANY ADDITIONAL COSTS FOR MODIFICATION TO THE PROPOSED BUILDING SYSTEM CAUSED BY SELECTION OF THE NON-DESIGN BASE EQUIPMENT. DEVIATIONS FROM BASIS OF DESIGN THAT AFFECT OTHER TRADES ARE THE RESPONSIBILITY OF THIS CONTRACTOR. ADDITIONAL COSTS TO PROVIDE LARGER ELECTRICAL CIRCUITS, MORE FLOOR SPACE, ADDITIONAL SUPPORTS, ADDITIONAL MATERIALS, ETC. SHALL BE BORNE BY THIS CONTRACTOR. COORDINATE ALL WORK WITH OTHER TRADES.
3. DO NOT SCALE DRAWINGS FOR DIMENSIONS. REFER TO DIMENSIONED DRAWINGS. IF DIMENSIONS CANNOT BE ACCURATELY DETERMINED, REQUEST THE INFORMATION FROM THE ARCHITECT/ENGINEER.
4. KEY NOTES ARE MEANT AS A GENERAL GUIDE FOR TYPICAL LOCATIONS. CONTRACTOR TO PERFORM FULL EXTENT OF WORK REQUIRED TO ACCOMPLISH DESIGN INTENT.
5. CONTRACTOR IS RESPONSIBLE FOR ALL WORK IDENTIFIED ON ALL DRAWINGS AND INFORMATION IN THE PROJECT MANUAL, AS A COMPLETE PROJECT. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO DETERMINE THE SPECIFIC SCOPE OF WORK FOR ANY SUBCONTRACTORS FOR THIS PROJECT EXCEPT AS SPECIFICALLY NOTED.
6. CONTRACTOR SHALL PROVIDE ACCESS DOORS IN ALL WALLS AND CEILINGS WHERE SERVICE OR ADJUSTMENT TO MECHANICAL, PLUMBING, OR FIRE PROTECTION ITEMS MAY BE REQUIRED. ACCESS DOORS SHALL BE OF AN APPROPRIATE SIZE REQUIRED FOR EACH APPLICATION. WHERE APPLICABLE, ACCESS DOORS SHALL MATCH THE FIRE RATING OF THE WALL ASSEMBLY.
7. DUCT AND PIPING LAYOUTS ARE SCHEMATIC IN NATURE. PROVIDE ADDITIONAL TRANSITIONS, ELBOWS, OFFSETS, AS NECESSARY AND COORDINATE ANY STRUCTURAL SUPPORTS FOR OPENINGS WITH STRUCTURAL TRADES.
8. DUCTWORK:
- A. ALL LISTED DUCTWORK DIMENSIONS ARE CLEAR AIR FLOW DIMENSIONS.
 - B. ALL DUCTS IN FINISHED ROOMS AND SPACES SHALL BE CONCEALED IN CHASES OR ABOVE THE CEILINGS, UNLESS OTHERWISE NOTED.
 - C. FIELD VERIFY LOCATION OF BEAMS, GENERAL STRUCTURE, LIGHTING, PIPING, ETC., BEFORE FABRICATION AND INSTALLATION OF DUCTWORK COORDINATE ELEVATIONS, OFFSETS, AND TRANSITIONS AS REQUIRED.
 - D. MAXIMUM LENGTH OF FLEX DUCT SHALL BE 5'-0". FLEX DUCT SHALL NOT BE USED WHERE DUCTWORK IS EXPOSED. THE LAST ELBOW BEFORE CONNECTION TO AN AIR DEVICE SHALL BE A HARD DUCT.
 - E. VOLUME DAMPERS SHALL BE INSTALLED IN ALL BRANCH DUCTS.
 - F. THE ELBOWS FOR DUCTWORK SHALL HAVE TURNING VANES UNLESS NOTED OTHERWISE.
 - G. REFER TO ARCHITECTURAL REFLECTED CEILING PLAN FOR AIR DEVICE LOCATIONS.
 - H. ALL AIR DEVICES IN CMU WALLS SHALL MATCH BLOCK COURSING.
 - I. CONTRACTOR SHALL REFER TO ARCHITECTURAL PLANS FOR LOCATIONS OF FIRE RATED WALLS, SMOKE BARRIERS, AND SECURITY WALLS. CONTRACTOR SHALL PROVIDE FIRE DAMPERS, SMOKE DAMPERS, OR SECURITY BARS IN ALL DUCTS PENETRATING SAID WALLS, WHETHER INDICATED ON THE MECHANICAL PLANS OR NOT.
9. ALL STRUCTURAL OPENINGS SHALL BE COORDINATED WITH THE STRUCTURAL DRAWING. COORDINATE ANY STRUCTURAL SUPPORTS FOR OPENINGS WITH STRUCTURAL TRADES.
10. ALL HANGER SYSTEMS FOR PIPING AND EQUIPMENT SHALL BE SECURED TO BUILDING STRUCTURAL SYSTEM. HANGERS AND SUPPORTS SHALL BE CONSTRUCTED OF CORROSION RESISTANT MATERIALS.
11. COORDINATE ALL WORK WITH EXISTING WORK TO PERMIT ACCESS AND SERVICE CLEARANCES TO ALL SYSTEMS. COORDINATE DUCT WITH ELECTRICAL J-BOXES TO PREVENT OBSTRUCTIONS.
12. CONNECTION TO EQUIPMENT SHALL CONFORM TO MANUFACTURER'S SPECIFICATION.
13. ALL MECHANICAL EQUIPMENT REQUIRING NATURAL GAS SHALL BE FURNISHED WITH PRESSURE REGULATOR. THE GAS PRESSURE REGULATOR SHALL REGULATE THE GAS PRESSURE BETWEEN THE INLET AND OPERATING PRESSURE OF THE EQUIPMENT. PROVIDE VENT TO OUTDOOR FROM EACH REGULATOR.
14. ALL HVAC CONTROL WIRING SHALL BE PROVIDED BY DIVISION 23 CONTRACTOR UNLESS OTHERWISE NOTED. EXPOSED CONTROL WIRING SHALL BE IN CONDUIT. TEMPERATURE CONTROL CONTRACTOR IS RESPONSIBLE FOR PROVIDING AND LOCATING 240V TRANSFORMERS REQUIRED FOR CONTROL COMPONENTS. COORDINATE WITH DIV 26 CONTRACTOR FOR POWER WIRING.
15. HVAC EQUIPMENT SHALL BE CONNECTED TO A BUILDING MANAGEMENT SYSTEM.
16. REFER TO DETAIL SHEETS FOR ADDITIONAL INFORMATION ON INSTALLMENT METHODS.
17. TRADE CONTRACTOR SHALL COORDINATE LOCATIONS OF ALL PENETRATIONS WITH STRUCTURAL DRAWING REQUIREMENTS. ADDITIONALLY, THE TRADE CONTRACTORS SHALL COORDINATE ALL PENETRATIONS THROUGH PRECAST CONCRETE UNITS WITH THE PRECAST MANUFACTURER TO PRODUCE A SHOP DRAWING SUBMITTAL NOTING ALL PENETRATIONS AND THEIR SIZES. TRADE CONTRACTORS AND PRECAST MANUFACTURE SHALL PROVIDE DOCUMENTATION WITH THE PRECAST SHOP DRAWING SUBMITTAL INDICATING THAT ALL TRADES HAVE SIGNED OFF ON ALL AFOREMENTIONED COORDINATION.
18. FOR DRAWINGS ASSOCIATED WITH THE CHEMICAL STORAGE ROOMS AND LABORATORY:
- ALL HANGERS, SUPPORTS, FASTENERS, HARDWARE, MISCELLANEOUS MATERIALS, APPURTENANCES, ETC SHALL BE NON-METALLIC OR PVC COATED. IN APPLICATIONS WHERE NON-METALLIC OR PVC COATED MATERIALS ARE NOT AVAILABLE, THE CONTRACTOR SHALL SUBMIT SUBSTITUTION TO THE ENGINEER FOR APPROVAL. APPROVED SUBSTITUTIONS SHALL BE AT NO ADDITIONAL COST TO THE OWNER. THE GENERAL CONTRACTOR SHALL COORDINATE THE MATERIALS USED BY EACH BUILDING TRADE TO ENSURE UNIFORMITY AND COMPATIBILITY. ADDITIONAL REQUIREMENTS IDENTIFIED WITH THE SPECIFICATIONS SHALL BE COORDINATED WITH THIS REQUIREMENT.
19. FOR DRAWINGS ASSOCIATED WITH THE FILTER ROOM, MAINTENANCE AREA, MEZZANINE, BREAK ROOM, OFFICE/CONTROLS, TOILET, AND LOCKER ROOM:
- ALL HANGERS, SUPPORTS, FASTENERS, HARDWARE, MISCELLANEOUS MATERIALS, APPURTENANCES, ETC SHALL BE NON-METALLIC, PVC COATED, OR GALVANIZED STEEL. IN APPLICATIONS WHERE NON-METALLIC, PVC COATED, OR GALVANIZED STEEL MATERIALS ARE NOT AVAILABLE, THE CONTRACTOR SHALL SUBMIT SUBSTITUTION TO THE ENGINEER FOR APPROVAL. APPROVED SUBSTITUTIONS SHALL BE AT NO ADDITIONAL COST TO THE OWNER. THE GENERAL CONTRACTOR SHALL COORDINATE THE MATERIALS USED BY EACH BUILDING TRADE TO ENSURE UNIFORMITY AND COMPATIBILITY. ADDITIONAL REQUIREMENTS IDENTIFIED WITHIN THE SPECIFICATIONS SHALL BE COORDINATED WITH THIS REQUIREMENT.

MECHANICAL REMOVAL NOTES

1. DEMOLITION PLANS ARE PROVIDED AS A GUIDE. COORDINATE DEMOLITION WITH NEW CONSTRUCTION DRAWING SHEETS, SPECIFICATIONS AND FINAL DESIGN INTENTION. ANY DEMOLITION INDICATED ON THESE DRAWINGS IS SHOWN IN GENERAL TO INDICATE THE EXTENT OF MAJOR DEMOLITION AND IS NOT TO BE CONSIDERED A RECORD DRAWING OF EXISTING CONDITIONS OR THE COMPLETE EXTENT OF REQUIRED DEMOLITION ACTIVITIES. DEMOLITION INCLUDES PROVISION OF TEMPORARY BRACING, SHORING AND SUPPORT TO ASSURE SAFE OPERATIONS AND TO MAINTAIN THE INTEGRITY OF THE BUILDING, PROVIDE LIFELINES, ETC. AT NEW OPENINGS ACCORDINGLY. THE CONTRACTOR SHALL BE RESPONSIBLE FOR COMPLETE REMOVAL AND DISPOSAL OF ALL MATERIALS NECESSARY TO ACHIEVE THE DESIGN INTENT, WHETHER EXPRESSLY SHOWN OR NOT.
2. THE CONTRACTOR SHALL VISIT THE SITE PRIOR TO BID AND VERIFY ALL EXISTING MECHANICAL SYSTEMS TO DETERMINE EXTENT OF REMOVAL WORK. ANY ITEMS NOT SPECIFICALLY INDICATED ON DRAWING OR IN SPECIFICATION THAT ARE IN CONFLICT WITH CONTRACT WORK SHALL BE BROUGHT TO THE ATTENTION OF THE OWNER'S REPRESENTATIVE PRIOR TO BID FOR CLARIFICATION.
3. ALL DEMOLITION WORK SHALL BE PERFORMED IN STRICT ACCORDANCE WITH ALL APPLICABLE SECTIONS OF THE STATE OF KENTUCKY CODE STANDARDS, OSHA AND NFPA.
4. CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING AND PAYING FOR ALL PERMITS AND INSPECTIONS.
5. ALL DEMOLITION WORK SHALL BE COMPLETED WITH DEMOLITION WORK SHOWN ON OTHER CONTRACT DRAWINGS.
6. THE CONTRACTOR SHALL FIELD VERIFY EXISTING CONDITIONS, DIMENSIONS, LOCATIONS AND QUANTITIES PRIOR TO BEGINNING WORK.
7. OWNER RESERVES THE RIGHT TO SALVAGE ANY EQUIPMENT OR MATERIAL INDICATED TO BE DEMOLISHED.
8. PATCH, REPAIR, RESTORE AND REFINISH ALL ADJACENT MATERIALS AND CONSTRUCTION INTENDED TO REMAIN TO LIKE-NEW CONDITION AS WELL AS CORRECTION OF DAMAGE RESULTING FROM DEMOLITION WORK. COMPLY WITH ALL APPLICABLE CODES AND REGULATIONS. PATCH AND REPAIR EXISTING SURFACES LEFT EXPOSED AFTER DEMOLITION, AND PREPARE THEM FOR NEW CONSTRUCTION. INFILL VOIDS LEFT BY DEMOLITION TO MATCH SURROUNDING.

INFRARED HEATER SCHEDULE										
TAG	MANUF.	MODEL NO.	CAPACITY HI/LOW (MBH)	LENGTH (FT.)	FLUE SIZE	DEFLECTION	ELECTRICAL		MOUNTING HEIGHT (A.F.F.)	NOTES
							VOLT/PH	AMPS		
IR-1	SUPERIOR RADIANT	LTX-40	40/30	40	4"	45	120/1	1	11'0"	1.2

1. PROVIDE FLUE AND INTAKE CAPS.
2. PROVIDE SINGLE THERMOSTAT TO CONTROL INFRARED HEATERS

BOILER SCHEDULE													
TAG	MANUF.	MODEL	INPUT (MBH)	OUTPUT (MBH)	EWT	LWT	FLOW	MAX W/PD (FT. HD)	ELECTRICAL			WEIGHT (LB)	NOTES
									VOLTS	PHASE	MCA		
B-1	WEIL MCALAIN	EVG-220	220	179	*E.T.R.	*E.T.R.	12 GPM		120 V	1	2.0	145	1

1. PROVIDE CONCENTRIC VENT BY MFG.
2. "E.T.R. - CONTACTOR SHALL CONDUCT PRE-CONSTRUCTION TESTING AND BALANCING. FIELD VERIFY EXISTING CONDITIONS AND INSTALL NEW BOILER TO MATCH EXISTING CONDITIONS.
3. INDIRECT HOT WATER HEATER EQUAL TO WEIL McLAIN AQUA-PLUS 45.
4. HOT WATER UNIT HEATERS TWO REQUIRE EQUAL TO MODINE HSB/HC 47L 2400 BTU 1/25 HP 150 VOLT.
5. CIRCULATOR PUMP FOUR REQUIRED EQUAL TO TACO 008 EAST IRON 1/25 HP 115 VOLT.

EXHAUST FAN SCHEDULE				
EF1	DAYTON 71A091	2700 CFM @ 0.125" SP	120 VOLT 2-2 AMP	CROSION RESISTANT
EF2	DAYTON 100963	1050 CFM @ 0.375" SP	120 VOLT 1/4 HP	
EF3	DAYTON 7M890	2475 CFM @ 0.625" SP	1 HP 460V 3 PHASE	
EF4	DAYTON 7M890	2475 CFM @ 0.625" SP	1 HP 460V 3 PHASE	

Drawing1.dwg

IAN BLAIR

SAVE DATE: ----

PLOT DATE: 7/17/2023 4:44:48 PM

3/29/2021 9:53:34 AM

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City of Flint
1101 S. Saginaw Street
Flint, Michigan 48502

GENERAL INFORMATION, DETAILS & SCHEDULES
Cedar Pump Station Rehabilitation
Bearing Support & Access
Cedar Street
Flint, Michigan 48503



MARK	ISSUED FOR	DATE
	"	"
	"	"
	"	"
	"	"
	"	"
	"	"
	ADDENDUM 2	7/17/23
	ISSUE FOR BID	7/5/23
	PERMITTING	6/7/23
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DRAWN BY: DLZ
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