SOUTH DAVIS SEWER DISTRICT

ADDENDUM NO. 4

NORTH PLANT UPGRADE PROJECT
May 21, 2024

This addendum changes and adds to contract documents as noted below. The bidder shall acknowledge this addendum on the bid form, certifying that the addendum was received in its entirety and that the Bidder accepts the conditions herein.

The contract documents are hereby revised as follows:

1.1 The cut off for questions has been moved from May 24th to May 23rd at noon.

1.2 Drawing 02G203-Asphalt Demolition Plan has been provided with this addendum to clarify which areas are currently paved that need to be demolished. The purpose of this drawing is to show the general location of existing asphalt to be removed and replaced. Additionally, as a cost-savings measure, some areas in the drawing indicate that the existing asphalt may be roto-milled and used as a base course for the new asphalt.

1.3 Drawing 01C201 – Overall Site Paving and Grading Plan has been changed to 01C200. Drawing 01C201 is now an Asphalt Paving Plan and is provided with this addendum. The intent of the Asphalt Paving Plan drawing is to clarify which areas will be paved and what pavement detail from the updated drawing 91C902 applies.

1.4 Drawing 91C902 has been updated to include three new pavement cross sections details: C108 – High Traffic Section, C109 – Roto-Mill Asphalt Section, and C110 – Typical Asphalt Section.

- C108 – This pavement detail will be used in areas with high traffic that may encounter heavy loads from delivery trucks. The Geotech Report has been updated to provide the pavement design for these areas (Section 8.9 – Pavement Section) and is included with this addendum.
- C109 – This detail allows for the existing asphalt to be roto-milled and be used as a base course for the new asphalt.
- C110 – This detail can be used in areas that will have light traffic.

1.5 Question: The Geotech only calls out for 6" fill under slabs, I could not find any other reference to the required structure fill requirements. Is the 6" of structure fill the only requirement for all new structures?

Answer: As indicated in the Geotech report slabs will only require 6" of fill. Conventional spread footings will need to be over-excavated 2ft as mentioned in the Geotech report in section 8.4.1. Mat Foundations will only require 6 inches as described in the Geotech Report section 8.4.2.

1.6 Specification 312000-EARTH MOVING had various changes to the document. A revised document has been attached to this Addendum. Please follow the over excavation and fill requirement under foundations outlined in the Geotechnical report.

1.7 Specification 231323 – ABOVE GROUND FUEL STORAGE TANK has a discrepancy between the UL requirements for the above ground storage tank. Section 2.1.A calls for a UL 2085 while Section 2.1.O calls for a UL-142 tank. The tank should be UL 2085 and the spec has been updated as shown below.

O. Acceptable Manufacturers

1. Double Wall UL-2085, 20,000 gallon diesel tank.
2. Or Equal

1.8 MFG has requested to be added as an equal on Specification Section 06 51 00 – Fiberglass Reinforced Plastic Weirs. The specification has been updated as follows.

PART 2 - PRODUCTS

2.1 MANUFACTURER

A. Warminster Fiberglass Company

B. MFG

C. Or Equal

1.9 Question: Specification 400533 HDPE Pipe and Fittings Section 2.3, A, 8 Color Identification – are the colored stripes necessary?

Answer: No, solid black pipe shall be acceptable, as long as it includes all the identifications listed in the specification.

1.10 Question: Does this project require Davis Bason Wages?

Answer: No there is no requirement.

1.11 Question: Specification 01 31 00 Project Management and Coordination Section 1.1, A, 3, there is reference to “project website”. Will the Contractor be responsible for setting this up? Is there going to be project management tracking software for the project?

Answer: there will be no website for the project. Specification will be updated for the

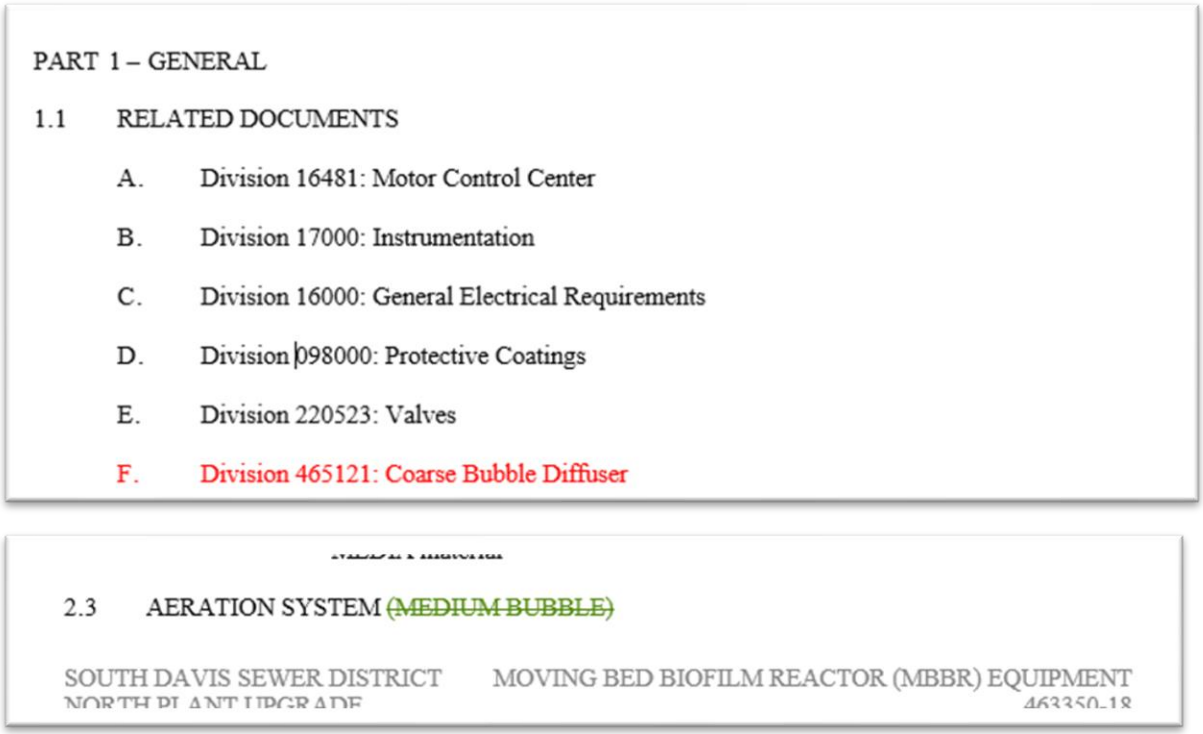
conformed set. There is no current plan to use project management software such as Procore.

1.12 Question: Specification 01 75 00 Commissioning Section 1.2, G there is a reference to a Registered Engineer in New Mexico License. Is this an error?

Answer: It should be a Registered Engineer in Utah. Specification will be updated for the conformed set.

1.13 Clarification: Specification 08 36 73 Sectional Doors has been created for the project. And is part of this Addendum.

1.14 Clarification: Specification 46 33 50 MBBR Equipment, and Specification 46 51 21 have been updated to reflect the relationship with the two specifications.



PART 1 – GENERAL

1.1 RELATED DOCUMENTS

A. Division 16481: Motor Control Center

B. Division 17000: Instrumentation

C. Division 16000: General Electrical Requirements

D. Division 098000: Protective Coatings

E. Division 220523: Valves

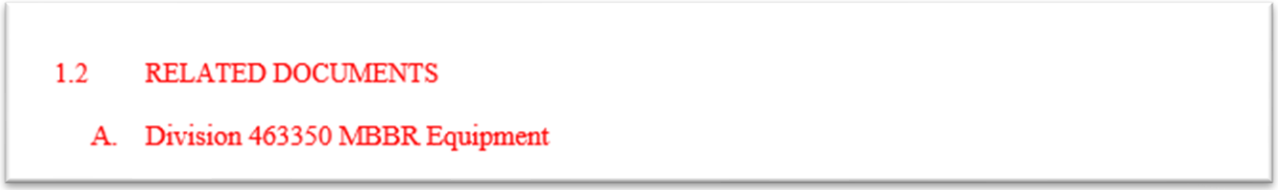
F. Division 465121: Coarse Bubble Diffuser

2.3 AERATION SYSTEM ~~(MEDIUM BUBBLE)~~

SOUTH DAVIS SEWER DISTRICT MOVING BED BIOFILM REACTOR (MBBR) EQUIPMENT

NORTH PLANT UPGRADE 463350-18

Figure 1 Updated 463350



1.2 RELATED DOCUMENTS

A. Division 463350 MBBR Equipment

Figure 2 Updated 465121

1.15 Question: There is some information in the contract regarding Builders risk insurance.

Please confirm if the contractor will be required to provide this for this project.

Answer: the supplementary conditions state the Owner shall purchase builders risk insurance as follows:

SC-6.05 Property Insurance

A. Owner shall purchase and maintain builder's risk insurance upon the Work on a completed value basis, in the amount of the full insurable replacement cost thereof (subject to such deductible amounts as may be provided in the Supplementary Conditions or required by Laws and Regulations).

B. Builder's Risk—Supplemental Insureds: Paragraph 6.05.A.1 of the General Conditions refers to other individuals or entities (in addition to the Owner, Contractor, and all Subcontractors) that are to be identified in the Supplementary Conditions as being entitled to protection as insureds under the builder's risk insurance on the Work. In such cases use the following:

C. floater to supplement property insurance provided by Owner.) If, after consultation with its risk managers, Owner elects to require purchase of an installation floater rather than a builder's risk policy, the following requirements may be included as a Supplementary Condition:

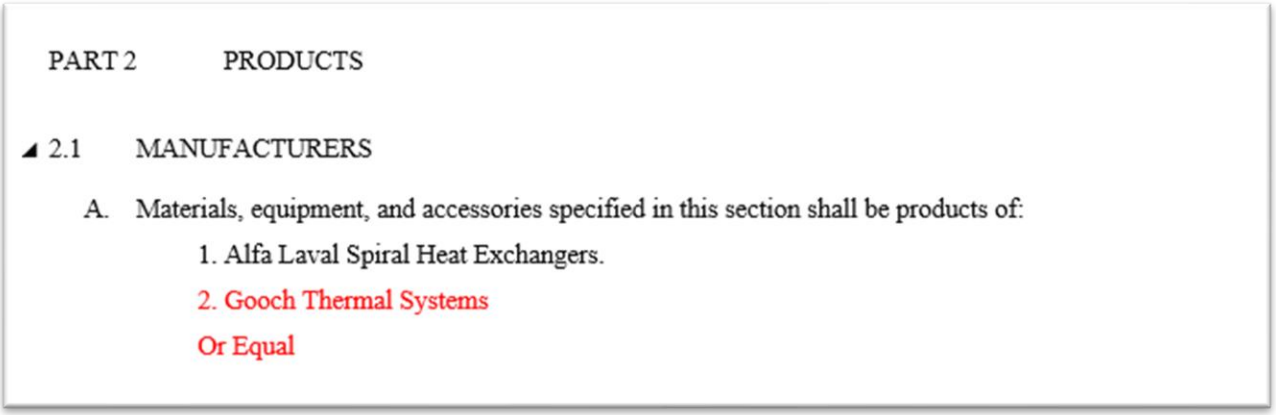
1.16 Specification 43 43 00 – Circular Spiral Scraper Clarifier Section 1.3 Supplier has been updated as follows:

1.3 SUPPLIER

A. Acceptable Manufactures:

1. WesTech
2. OVIVO
3. Clearstream
4. Envirodyne
5. Or equal

1.17 Specification 46 78 00 Heat Exchangers Section 2.1 Manufactures has been updated as follows:



PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Materials, equipment, and accessories specified in this section shall be products of:

1. Alfa Laval Spiral Heat Exchangers.
2. Gooch Thermal Systems
Or Equal

1.18 There are no metal panel walls in this project. Specification 074213 – METAL WALL PANELS has been removed. Specification 066400 – FIBERLASS REINFORCED WALLS has been added.

1.19 Clarifier #4 mechanism will not be provided by the owner. The note on sheet 21M401 stating such has been removed. Updated drawing is included with this addendum.

1.20 Diffuser and Grille Schedule was added to sheet 85H804. The previous drawing had omitted that schedule. An updated drawing is included with this addendum.

1.21 Some sections of the specifications call for a "Delegated-Design Submittal," anywhere in the specifications that calls for a "Delegated-Design Submittal" should be designed and sealed by an engineer in the State of Utah.

1.22 The first exhaust fan schedule on sheet 69H201 was updated. Tag was changed to "H-69814" to "H-69813." An updated drawing is included with this addendum.

1.23 The second exhaust fan schedule on sheet 85H804 was updated. "H-31801" was added. The previous drawing had omitted that schedule. An updated drawing is included with this addendum.

1.24 Specification **46731 – FIXED DIGESTER COVER** Section 2.3.A has been updated to call for a 4-inch diameter flanged nozzle instead of a 6-inch for the gas safety equipment. Also, the two (2) 36 inch diameter manholes and the one (1) 42 inch diameter manhole has been removed from the spec. Lastly, the two (2) 8 inch diameter sample tubes has been removed from the spec as shown below.

A. The cover shall be designed to include the following appurtenances. Where applicable (for flanges of pipes/ports/nozzles up to 24" diameter), appurtenance flange bolt patterns shall match the bolt patterns of ANSI B16.5 Class 150 flanges:

1. One (1) 102 in minimum diameter gastight center compression ring with cover plate, neoprene gasket, and Type 304/316 stainless steel flange bolts and hardware.
2. ~~Two (2) 36 in diameter manhole nozzles with Type 304 stainless steel flange bolts, hardware, and neoprene gaskets. The manhole covers shall meet the requirements of and be supplied as specified in Section 437600, Digester Gas Safety Equipment.~~
3. ~~One (1) 42 in diameter manhole nozzle with Type 304 stainless steel flange bolts, hardware, and neoprene gasket. The manhole covers shall meet the requirements of and be supplied as specified in Section 437600, Digester Gas Safety Equipment.~~
4. One (1) 4 in diameter flanged nozzle for the gas safety equipment (flame arrestor and emergency pressure relief/vacuum breaker), Type 304 stainless steel flange bolts and hardware, and neoprene gasket. The gas safety equipment shall meet the requirements of and be supplied as specified in Section 437600, Digester Gas Safety Equipment.
5. ~~Two (2) 8 in diameter sample tubes, extending below minimum operational liquid level; Type 304 stainless steel flange bolts and hardware; and neoprene gasket. The sample tube nozzle cover shall meet the requirements of and be supplied as specified in Section 437600, Digester Gas Safety Equipment.~~

1.25 Specification 437600 – DIGESTER GAS SAFETY EQUIPMENT has been updated to include more detail on the drip traps, condensate traps, and insulating jackets. Attached to this addendum is an updated specification.

1.26 Specification 437720 – DIGESTER GAS WASTE GAS BURNER has had various changes. Please see the attached updated spec to this addendum.

1.27 The mechanical schedule drawing 81M802 has been updated to reflect a 6" WGB. Drawing has been included with this addendum.

1.28 Specification 400574 – PINCH VALVES has been added.

1.29 Auxiliary information illustrating Digester Building and Digester Tank loads for use aggregate pier design has been added for reference. To be used in conjunction with Specification 316613 - AGGREGATE PIERS. See pages 20-23 of this document.

1.30 Mechanical Schedule 81M803 has been updated to show the following tag numbers: ME-80100, ME-80300A, ME-80300B, ME-80320. The updated drawing is included with this addendum.

1.31 Valve Schedule 81M806 has been updated to show missing valve HV-68534A. The updated drawing is included with this addendum.

Electrical, Instrumentation and Controls Items:

Answers to Questions:
Note that some **Question**s were duplicated, and similar **Question**s are only **Answered** once.

2.1 The following drawings have been updated in this addendum:
999-E216 – the panel equipment immediately outside to the North of the Digester Building was relocated West along that wall. This was done to move it out of the classified envelope that expands slightly when the outside doors to the gas handling room are opened

2.2 **Question:** Drawing E101, Keynote #3 states "Trickling Filter Mechanism to be removed and replaced, conduit & wire to remain in place and re-used if possible. What conduit and wire is feeding the trickling filter mechanism and where is it fed from in the case it needs to be replaced?

Answer: The only electrical for the tricking filter is existing area lights and receptacles. The trickling filter mechanism is non-powered.

2.3 **Question:** It appears there is a spare 200A breaker in existing MCC-Main. Is this breaker available to use for temporary power purposes? Are there any other locations on site that have spare breakers or room to add a spare breaker for temp power? Does the owner have any preference where we might get power from for temporary power during construction?

Answer: The referenced 200A breaker can indeed be used for temporary power. This is the only location on site with sufficient spare capacity. The current plan for construction trailers is to have a temporary drop on one of the poles along the access road. This 200A breaker could be used to add flexibility in providing another power source for additional equipment/tasks as needed.

2.4 **Question:** For the existing Headworks, Pump Station #2, Chemical Tanks and Cogen buildings, we will include demo only for the electrical items as called out on the electrical drawings and mentioned in the G series drawings. Please confirm all other electrical is to remain and does not need to be disconnected or demolished.

Answer: Confirmed. Unless specifically marked for demolition, all items and the buildings themselves are to be abandoned in place.

2.5 **Question:** Please clarify if the existing MCB on sheet E202 is part of MCC-Main gear or a separate piece of equipment. Will MCB be demolished? If so, will all Conduit and wire connected to the existing MCB need to be demolished?

Answer: MCB is a separate piece of gear from the existing MCC-Main, both located in the electrical equipment room of the existing electrical control building. All connected conduit and wire to/from MCB should also be demolished.

2.6 **Question:** Keynote #6 on sheet E101 says that the Main Duct Banks running East to West are to remain in place and all branching off duct banks are to be demolished. Most of the North and South running branch duct banks are marked with keynote #6 and have been hashed for demolition. There are several runs found on the 1988 conduit and conductor schedule that are routed along hashed-out duct banks that are not found on the one-line demolition sheets E501, E502, & E503. Please clarify if All of the runs found in the old schedule that follow hashed out duct banks will need to be demolished.

Answer: This is confirmed. A previous site visit noted that the East/West ductbanks conduit is in presumably good condition and can be re-used. The branches off of the main duct bank (east / west runs) needed to be completely replaced.

2.7 **Question:** Spec section 260526 Part 3.1B specifies Tinned 4/0 Copper for underground installations. Please clarify where tinned copper will be required. Does this apply to direct-bury conductors as well as conductors that are concrete encased in duct banks and in structural concrete as ufer grounds?

Answer: This is referring to the ground rods and duct bank bare grounding conductors included in ductbanks. Please refer to 999-E902, Detail 202 graphic and also Note 7. Conductors inside of the conduit for power feeders may be non-tinned copper.

2.8 **Question:** Spec section 260526 Part 3.3B specifies installing at least (3) ground rods for each grounding electrode system. The Plan Sheet drawings are noted for (2) at each location. Please clarify how many rods are needed for each grounding electrode system.

Answer: Minimum of 2 ground rods should be at each location as shown on the drawings.

2.9 **Question:** Spec section 260526 Part 3.3C specifies installing (2) ground test wells for each service. The Plan Sheet drawings are noted for (1) at each location. Please clarify how many test wells are needed for each service.

Answer: One test well is required as shown on the plan sheet drawings.

2.10 **Question:** Referencing Question and Answer 2.22 from Addendum #3. The answer states "All light poles will be removed and NOT replaced as part of the project along with the wire/ducts feeding them." Keynote 5 on E101 states to "Remove and dispose of existing site light. Remove wire back to source and cap any unused conduit." Please confirm that we are only to remove the wire and cap the conduits as stated on E101 and that we do not need to remove the existing conduits/ducts or demo existing pole bases.

Answer: Pole bases should be demolished. Conduit should be removed back to the source or the main Duct bank that is to remain.

2.11 **Question:** Other than instruments supplied with vendor packages, please confirm that all

instruments, PLC's, loop drawings, programming, calibration, submittals, shop drawings, O&M's, owner training and any required manufacturer's services will all be provided under the scope of the owner/SKM and that the Electrical contractor will only be responsible for the installation and field wiring of PLC's and instruments, as well as participation in startup and commissioning. Also, please confirm that SKM's pricing will be direct to the owner and not carried by the contractor.

Answer: Confirmed with the exception of terminations and wire labels are also in the contractor's scope.

2.12 **Question:** On sheet E512 there is a panel schedule for a 120/208V panel 'LP-CB'. Please clarify where this panel is located. Is this panel new or existing? Where is this panel being fed from and does it need to be refed? Where are Chemical Pumps P-10411, P-10431, P-10451, & P-10471 located? These pumps show up on sheet I201 Scada Network in the Headworks Building. Please clarify if these pumps need VFD's as shown. There are circuits for lighting and receptacles on the LP-CB panel schedule please clarify where these circuits are located.

Answer: This panel and these pumps were originally planned for the chemical building. The chemical building items were relocated to HW and BB; therefore, this panel is no longer needed, and the items are accounted for elsewhere with different tags. The chemical pumps are shown on I103. Specifically, P-10411 and P-10431 are now in HW and are tagged as P-10321 and P-10331, and P-10451 and P-10471 are now in BB and are tagged as P-38101 and P-38201. The chemical pumps on I103 are peristaltic Blue White, and speed controls are included as part of the pump.

2.13 **Question:** Drawing E-501, Key Note 1 states to demo and salvage to owner the utility transformer, SES, ATS and Standby Generator. Is the intent to remove the existing generator from the building or to disconnect and leave in place? If the generator needs to be removed from the building, are there existing roll-up doors that will allow for the generator to be removed? Where does this equipment need to be transported to for salvage to the owner? Please provide approximate weight and dimensions of existing generator.

Answer: The generator is to be disconnected and left in place.

2.14 **Question:** Do the existing cogen and electrical bldg. need to be included in the fire alarm design? There is no information in the drawings regarding the retention of these buildings, and it is assumed they will eventually be abandoned. Please clarify.

Answer: Contrary to previous answers regarding the fire alarm system design and what buildings are to be integrated, it is the current position of the district that the only building to be integrated into the fire alarm system is the new administration building.

REMOVE EXISTING ASPHALT. REPLACE WITH NEW ROADWAY SECTION AS SHOWN ON DETAIL C108

ROTO-MILL EXISTING ASPHALT. RE-PAVE WITH NEW ASPHALT AS SHOWN ON DETAIL C109

NOTES:

1- DRAWING IS PROVIDED TO SHOW GENERAL LOCATION OF EXISTING ASPHALT TO BE REMOVED AND REPLACED.

KEYNOTES:

1- SAW CUT EXISTING ASPHALT.

EXISTING SLUDGE DRYING BEDS

EXISTING FUELING STATION

EXISTING CHEMICAL BUILDING

EXISTING CHLORINE CONTACT BASIN

EXISTING CHLORINE CONTACT BASIN DISTRIBUTION BOX

EXISTING CLARIFIER DISTRIBUTION BOX

EXISTING SLUDGE DRYING BEDS

EXISTING NPW BOOSTER PUMP STATION

EXISTING GRAVITY THICKENER

EXISTING FINAL CLARIFIER 4

EXISTING FINAL CLARIFIER 3

EXISTING ELECTRICAL BUILDING

EXISTING DIGESTER BUILDING 2

EX. DIGESTER 1

EX. DIGESTER 2

EXISTING FINAL CLARIFIER 2

EXISTING FINAL CLARIFIER 1

EXISTING MAINTENANCE BUILDING

EXISTING OPERATOR SHOP

EXISTING DIGESTER BUILDING

EXISTING RAW SLUDGE PUMP STATION

EXISTING DEGRITER

EXISTING TRICKLING FILTER 3

EXISTING TRICKLING FILTER 2

EXISTING PRIMARY CLARIFIER 1

EXISTING PRIMARY CLARIFIER 2

EXISTING PRIMARY CLARIFIER DISTRIBUTION BOX

EXISTING TRICKLING FILTER 4

EXISTING TRICKLING FILTER 1

EXISTING PRIMARY CLARIFIER 3

FRONTAGE ROAD

LEGACY PARKWAY

OVERALL SITE

SCALE: 1"=70'-0"

0 70 140

Scale in Feet

DRAWING IS TO SCALE IF BAR MEASURES: 1" = FULL SCALE 1/2" = HALF SCALE

0 1/2 1

ORIGINAL

NO.	DATE	DESIGN	DRAWN	CHECKED
B	04/01/2024	EIT	DCH	BMR

REVISIONS

SOUTH DAVIS SEWER DISTRICT

NORTH PLANT UPGRADE

CIVIL

ASPHALT DEMOLITION PLAN

AQUA ENGINEERING

533 W 2600 S, SUITE 275, BOUNTIFUL, UT 84010
PHONE (801) 299-1327 FAX (801) 299-0153

DRAWING NO.

02G203

SHEET

C:\USERS\DANIEL.SANDOVAL\DC\ACCDOCS\AQUA ENGINEERING\001709.C SDSD NORTH PLANT UPGRADE\PROJECT FILES\001 SITE CIVIL\010-020203 - DEMOLITION SITE PLAN.DWG

5/20/2024

EXISTING ASPHALT PAVEMENT

SEE DETAIL: C108/91C902

SEE DETAIL: C109/91C902

SEE DETAIL: C110/91C902

EX SLUDGE DRYING BEDS

C108 91C902

C109 91C902

EX FUELING STATION

EX CHEMICAL BUILDING

EX SLUDGE DRYING BEDS

DEWATERING BUILDING

EX SLUDGE DRYING BEDS

EX MAINTENANCE BUILDING

EX OPERATOR SHOP

EX NPW BOOSTER PUMP STATION

FLARE

EX DIGESTER BUILDING 2

DIGESTER BUILDING 3

C108 91C902 HIGH TRAFFIC SECTION

EX CHLORINE CONTACT BASIN

EX FINAL CLARIFIER 4

EX FINAL CLARIFIER 3

EX CHLORINE CONTACT BASIN DISTRIBUTION BOX

FINAL CLARIFIER DISTRIBUTION BOX

EX FINAL CLARIFIER 2

EX FINAL CLARIFIER 1

EX ELECTRICAL BUILDING

EX GRAVITY THICKENER

EX DIGESTER 1

EX DIGESTER 2

DIGESTER

WES TECH LEASE AREA

BLOWER BUILDING

MBBR TANK 1

MBBR TANK 2

EX DIGESTER BUILDING 1

EX RAW SLUDGE PUMP STATION

EX TRICKLING FILTER 3

EX TRICKLING FILTER 2

EX DEGRITER

EX PRIMARY CLARIFIER 1

HEADWORKS

FRONTAGE ROAD

LEGACY PARKWAY

EXISTING FENCE

TYPICAL ASPHALT C110 91C902

EX TRICKLING FILTER 4

EX TRICKLING FILTER 1

EX PRIMARY CLARIFIER 2

EX PRIMARY CLARIFIER 3

EX PRIMARY CLARIFIER DISTRIBUTION BOX

ROTO-MILLED ASPHALT C109 91C902

PRIMARY CLARIFIER #4

EX TRICKLING FILTER DISTRIBUTION BOX

EXISTING FENCE

OVERALL SITE

SCALE: 1"=70'-0"

0 70 140

Scale in Feet

DRAWING IS TO SCALE IF BAR MEASURES: 1" = FULL SCALE 1/2" = HALF SCALE

0 1/2 1

ORIGINAL

NO.	DATE	DESIGN	DRAWN	CHECKED
B	04/01/2024	EIT	DCH	BMR

REVISIONS

SOUTH DAVIS SEWER DISTRICT

NORTH PLANT UPGRADE

CIVIL

ASPHALT PAVING PLAN

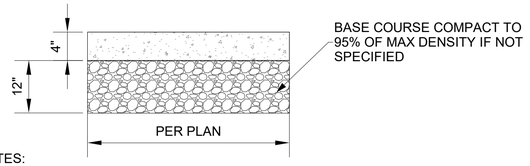
AQUA ENGINEERING

533 W 2600 S, SUITE 275, BOUNTIFUL, UT 84010
PHONE (801) 299-1327 FAX (801) 299-0153

DRAWING NO.

01C201

SHEET



NOTES:

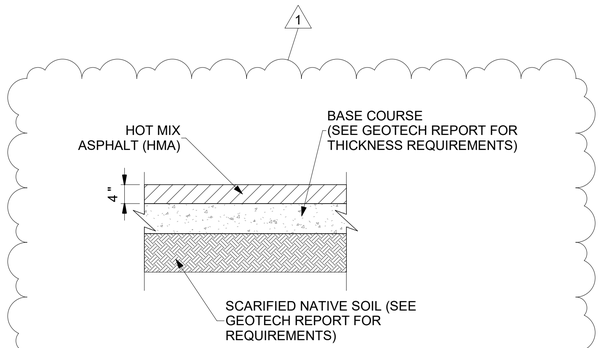
1- CONTRACTOR SHALL PROVIDE CONTROL JOINTS EVERY 5 FEEET AND EXPANSION JOINTS EVERY 20 FEET.

2- SIDEWALK ADJACENT TO STRUCTURES SHALL HAVE 2% CROSS SLOPE AWAY FROM STRUCTURE UNLESS OTHERWISE NOTED.

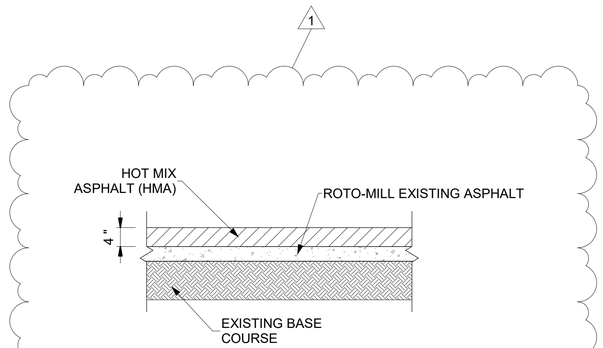
3- IF ADJACENT TO STRUCTURE, SIDEWALK SHALL BE DOWELED TO STRUCTURE WITH #4 BARS AT 18"" OC. DOWELS SHALL BE 12" LONG WITH 4" OF EMBEDMENT.

4- IF ADJACENT TO BUILDING, EXPANSION JOINT MATERIAL SHALL BE PLACED BETWEEN SIDEWALK CONCRETE AND STRUCTURE WITH SEALAND BEING PLACED ALONG TOP EDGE OF JOINT.

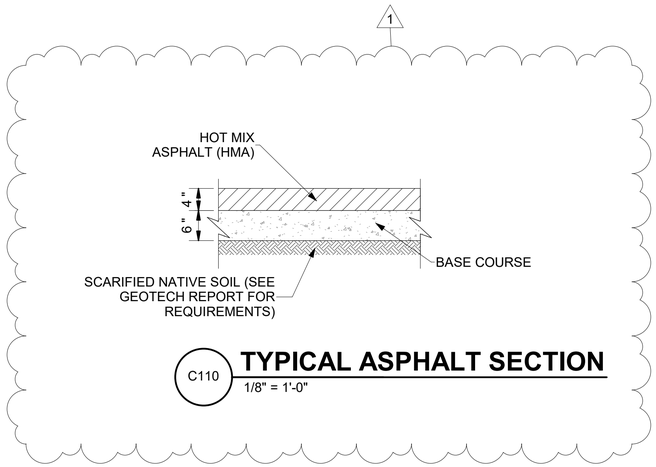
C107 **SIDEWALK**
NTS



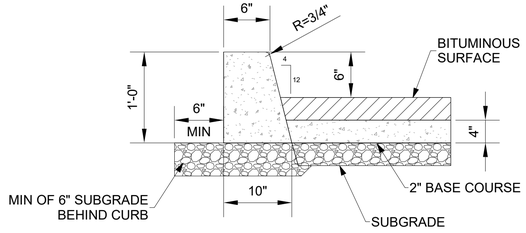
C108 **HIGH TRAFFIC SECTION**
NTS



C109 **ROTO-MILL ASPHALT SECTION**
NTS



C110 **TYPICAL ASPHALT SECTION**
1/8" = 1'-0"

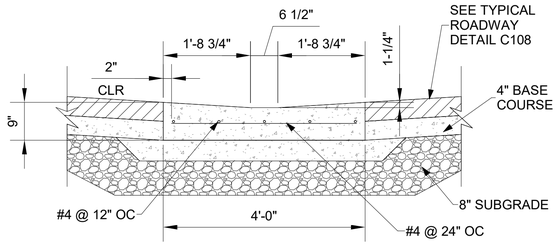


NOTES:

1- CONTRACTOR SHALL PROVIDE CONTROL JOINTS EVERY 10 FEET AND EXPANSION JOINTS EVERY 40 FEET.

2- FOR ROADWAY SECTION SEE DETAIL C108.

C112 **CONCRETE CURB**
NTS



NOTE:

1- CONTRACTOR SHALL PROVIDE CONTROL JOINTS EVERY 10 FEET AND EXPANSION JOINTS EVERY 40 FEET.

C114 **4' CROSS GUTTER**
NTS

DRAWING IS TO SCALE IF BAR MEASURES: 1" = FULL SCALE 1/2" = HALF SCALE

0 1/2 1

ORIGINAL

NO.	DATE	DESIGN	DRAWN	CHECKED
B	04/01/2024	EIT	PEL	BMR

REVISIONS

NO.	DATE	DESIGN	DRAWN	CHECKED
1	05/20/2024	EIT	CML	BMR

SOUTH DAVIS SEWER DISTRICT

NORTH PLANT UPGRADE

DETAILS
CIVIL

AQUA ENGINEERING

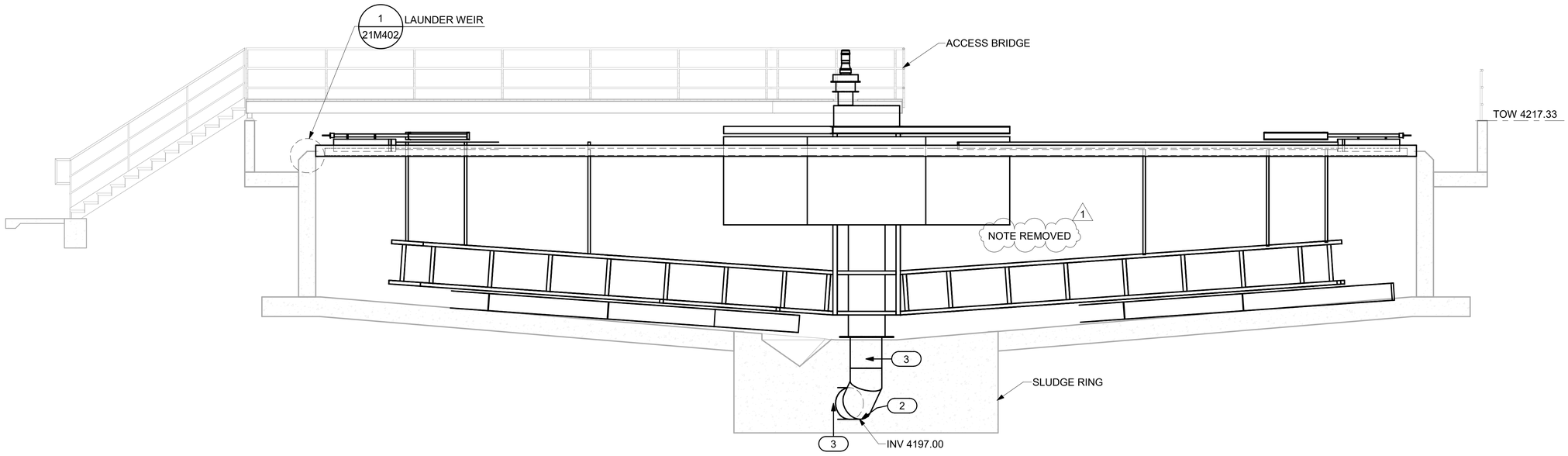
DRAWING NO.
91C902

SHEET

5/20/2024 9:19:47 AM BIM 360://001709.C SDSD North Plant Upgrade/Headworks-B V21.rvt

NOTES:

1. PRIMARY CLARIFIER #4 BID ALTERNATE



A 21M201 **SECTION**

1/4" = 1'-0"

0 4 8

Scale in Feet

PIPE SCHEDULE				
NO.	DESCRIPTION	SIZE	JOINT	MATERIAL
1	SPOOL	36"	PE	HDPE
2	90° BEND	24"	PE	HDPE
3	SPOOL	24"	PE	HDPE
4	SPOOL	6"	PE	HDPE
5	90° BEND	6"	PE	SS 316
6	SPOOL	6"	PE	SS 316

PIPE SCHEDULE

NTS

DRAWING IS TO SCALE IF BAR MEASURES: 1" = FULL SCALE 1/2" = HALF SCALE

0 1/2 1

ORIGINAL

NO.	DATE	DESIGN	DRAWN	CHECKED
B	04/01/2024	JT	CML	BMR

REVISIONS

NO.	DATE	DESIGN	DRAWN	CHECKED
1	05/17/2024	JT	BDP	BMR

SOUTH DAVIS SEWER DISTRICT

NORTH PLANT UPGRADE

PRIMARY CLARIFIER #4 MECHANICAL SECTIONS

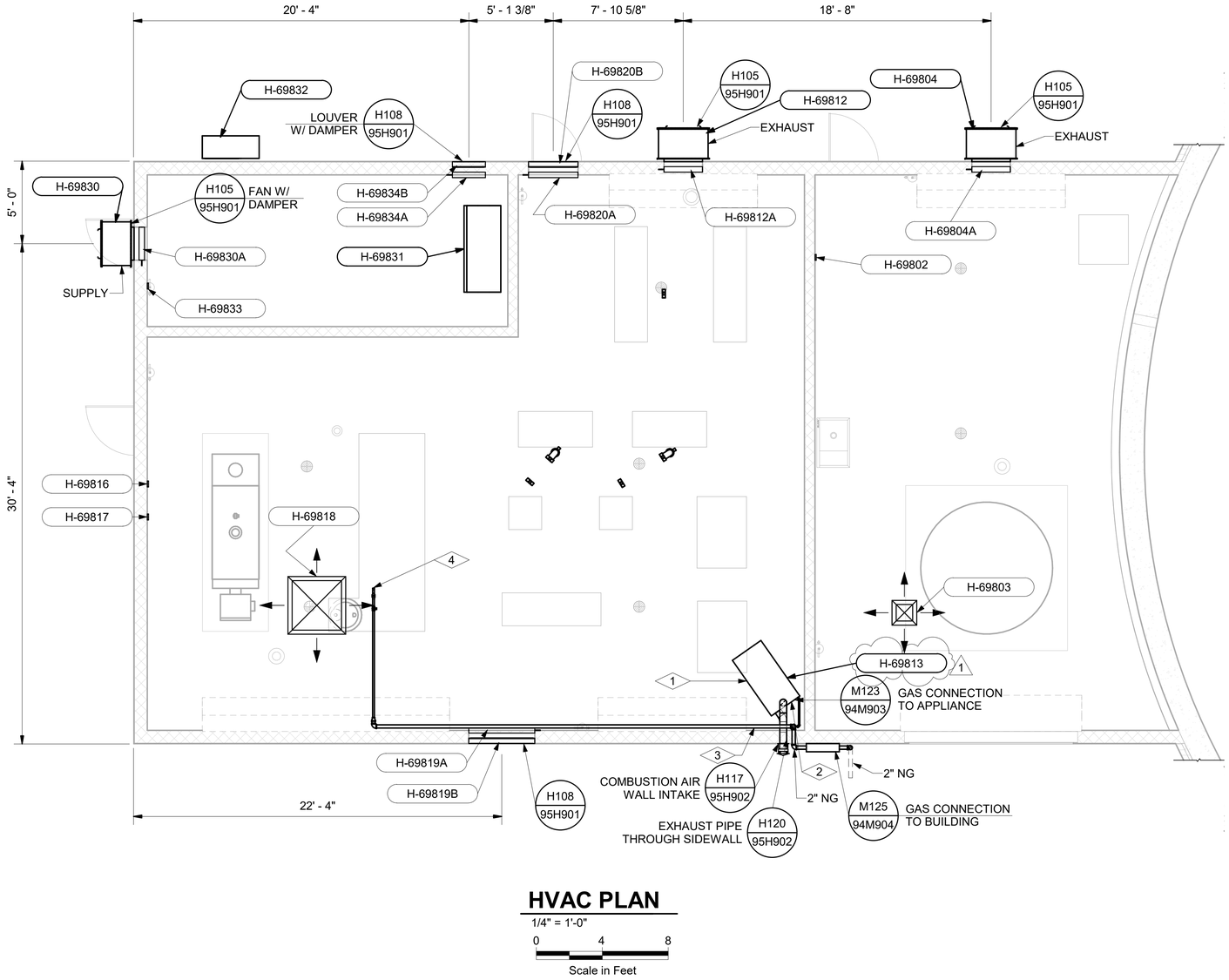
AQUA ENGINEERING

DRAWING NO.

21M401

SHEET

5/17/2024 10:16:55 AM BIM 360://001709.C SDSD North Plant Upgrade/PRIMARY CLARIFIER V21.rvt



HVAC PLAN

1/4" = 1'-0"

0 4 8

Scale in Feet

NOTES:

1. SEE 69H202 FOR ROOF HVAC MECHANICAL PLAN.
2. SEE 69P201 FOR ROUTING OF POTABLE WATER AND NATURAL GAS LINES.

KEYNOTES:

1. PROVIDE WALL MOUNT KIT & SEISMIC BRACING FOR HEATING UNITS. COORDINATE W/ EQUIPMENT SUPPLIER.
2. CONNECT NATURAL GAS TO UNIT HEATER PER MANUFACTURER REQUIREMENTS.
3. ROUTE NATURAL GAS TO ROOF MOUNTED AIR HANDLER HEATING ELEMENT COORDINATE ROOF PENETRATION W/ CONCRETE BEAMS AND AIR HANDLER UNIT.
4. CONNECT BIOGAS AND NATURAL GAS TO BOILER AS REQUIRED BY BOILER SUPPLIER. CONTRACTOR TO COORDINATE SCOPE AND REQUIREMENTS PER GAS PRESSURE REGULATING VALVES FOR CONNECTIONS.

DRAWING IS TO SCALE IF BAR MEASURES: 1" = FULL SCALE 1/2" = HALF SCALE

0 1/2 1

ORIGINAL

NO.	DATE	DESIGN	DRAWN	CHECKED
B	04/01/2024	EES	BDP	BMR

REVISIONS

NO.	DATE	DESIGN	DRAWN	CHECKED
1	05/17/2024	EES	BDP	BMR

SOUTH DAVIS SEWER PLANT

-

NORTH PLANT UPGRADE

PRIMARY DIGESTER BUILDING/DIGESTER

HVAC

PLAN

AQUA ENGINEERING

DRAWING NO.

69H201

SHEET

5/17/2024 10:27:53 AM BIM 360://001709.C SDSD North Plant Upgrade/DIGESTER-V21.rvt

MECHANICAL EQUIPMENT SCHEDULE

ME#	LOCATION	ITEM	SERVICE	HP (KW)	REMARKS
ME-06011	GENERATOR PAD	GENERATOR	BACK UP POWER GENERATOR	2000KW	KOHLER POWER SYSTEM DIESEL GENERATOR KOHLER KD2000 OR EQUAL
ME-06021A	FUEL STATION	FUEL MANAGEMENT SYSTEM AND DISPENSER	FUEL DISPENSING	115V / 0.75 HP	GASBOY ATLAS ELECTRONIC SINGLE HOSE SUCTION PUMP/DISPENSIER W/ TOPKAT PLUS FUEL MANAGEMENT SYSTEM, PROVIDED WITH FUEL TANK SEE SPEC 231323
ME-06021C	FUEL STATION	DIESEL FUEL TANK	FUEL TANK	-	20,000 GALLON DOUBLE WALL UL-142 DIESEL FUEL TANK OR EQUAL SEE SPEC 231323
ME-06021D	FUEL STATION	FUEL MODULAR GAUGING SYSTEM	FUEL GAUGING SYSTEM	115 / 230V	OMNTEC PROTEUS K-SS SERIES CONSOLE, PROVIDED WITH FUEL TANK SEE SPEC 231323
ME-10105	HEADWORKS BUILDING	PARSHALL FLUME	FLOW MEASURMENT	-	ENGINEERED FIBERGLASS COMPSITES PARSHALL FLUME 36" WIDE THROAT, 3-24 MGD, OR EQUAL
ME-10111	HEADWORKS BUILDING	MECHANICAL SCREEN 1	HEADWORKS MECHANICAL SCREEN 1	480V / 1.5 HP	HUBER CENTER FLOW SCREEN MODEL RAKEMAX-CF, 12-24 MGD, OR EQUAL
ME-10112	HEADWORKS BUILDING	COMPACTOR 1	SCREEN 1 WASHER COMPACTOR	480V / 5 HP	HUBER WASHER COMPACTOR MODEL WAP 4, OR EQUAL
ME-10121	HEADWORKS BUILDING	MECHANICAL SCREEN 2	HEADWORKS MECHANICAL SCREEN 2	480V / 1.5 HP	HUBER CENTER FLOW SCREEN MODEL RAKEMAX-CF, 12-24 MGD, OR EQUAL
ME-10122	HEADWORKS BUILDING	COMPACTOR 2	SCREEN 2 WASHER COMPACTOR	480V / 5 HP	HUBER WASHER COMPACTOR MODEL WAP 4, OR EQUAL
ME-10130	HEADWORKS BUILDING	INFLUENT SAMPLER	INFLUENT SAMPLER	-	INFLUENT SAMPLER RELOCATED FROM EXISTING HEADWORKS
ME-10171	PUMP STATION 1	INJECTION QUILL	CHEMICAL INJECTION	-	SAF-T-FLO MODEL EB-120-S-C-6-B-E OR EQUAL
ME-10180	HEADWORKS BUILDING	EMERGENCY SHOWER AND EYEWASH	EMERGENCY SHOWER AND EYEWASH	-	BRADLEY S19314 SERIES COMBINATION DRENCH SHOWER AND EYEWASH OR EQUAL
ME-10181	HEADWORKS BUILDING	EMERGENCY SHOWER AND EYEWASH	OUTDOOR EMERGENCY SHOWER AND EYEWASH	-	BRADLEY S19-310TW FROST-PROOF DRENCH SHOWER AND EYEWASH UNIT OR EQUAL
ME-10191	PUMP STATION 1	MONORAIL CRANE	PUMP CRANE	460V / 15HP	AMERICAN EQUIPMENT SYSTEMS 5 TON MONORAIL CRANE OR EQUAL
ME-10191	PUMP STATION 1	MONORAIL CRANE	PUMP CRANE	460V / 15HP	AMERICAN EQUIPMENT SYSTEMS 5 TON MONORAIL CRANE OR EQUAL
ME-10301	HEADWORKS BUILDING	STRAINER	CHEMICAL STRAINING	-	1/2" HAYWARD YS SERIES CPVC STRAINER W-EPDM SEALS AND PLASTIC SCREEN OR EQUAL
ME-10303	HEADWORKS BUILDNG	POLYETHYLENE TANK	ALUMINUM SULFATE/FERRIC SULFATE STORAGE TANK	-	5,400 GAL POLYPROCESSING DOUBLE WALL TANK OR EQUAL
ME-10311	HEADWORKS BUILDING	STRAINER	CHEMICAL STRAINING	-	1/2" HAYWARD YS SERIES CPVC STRAINER W-EPDM SEALS AND PLASTIC SCREEN OR EQUAL
ME-10313	HEADWORKS BUILDNG	POLYETHYLENE TANK	ALUMINUM SULFATE/FERRIC SULFATE STORAGE TANK	-	5,400 GAL POLYPROCESSING DOUBLE WALL TANK OR EQUAL
ME-10321	HEADWORKS BUILDING	STRAINER	CHEMICAL STRAINING	-	1/2" HAYWARD YS SERIES CPVC STRAINER W-EPDM SEALS AND PLASTIC SCREEN OR EQUAL
ME-10322	HEADWORKS BUILDING	CALIBRATION COLUMN	PUMP 1 CALIBRATION	-	KOFLO 2000 ML CALIBRATION COLUMN OR EQUAL
ME-10331	HEADWORKS BUILDING	STRAINER	CHEMICAL STRAINING	-	1/2" HAYWARD YS SERIES CPVC STRAINER W-EPDM SEALS AND PLASTIC SCREEN OR EQUAL
ME-10332	HEADWORKS BUILDING	CALIBRATION COLUMN	PUMP 2 CALIBRATION	-	KOFLO 2000 ML CALIBRATION COLUMN OR EQUAL
ME-20281	PRIMARY CLARIFIER 4	PRIMARY CLARIFIER	CLARIFIER	460V / 1 HP	WESTECH 75FT DIAMETER CLARIFIER MODEL COPC2G, 3-5.25 MGD, OR EQUAL
ME-33101	SNAIL TRAP	GRIT TRAP	GRIT/SNAIL REMOVAL	460V / 1 HP	OVIVO JETA GRIT COLLECTOR, MODEL 900/360 W/ SS IMPELLER OR EQUAL
ME-33301	CLASSIFIER ROOM	GRIT CLASSIFIER	GRIT REMOVAL	460V / 1 HP	OVIVO MODEL 300, 15 FT STAINLESS STEEL, 18 - 20 MGD OR EQUAL
ME-35481	BLOWER BUILDING	AERATION BLOWER	BLOWER	250 HP	1800-2800 SCFM LONESTAR BLOWER MODEL GL2 WITH ACCESSORY PACKAGE OR EQUAL
ME-35482	BLOWER BUILDING	AERATION BLOWER	BLOWER	250 HP	1800-2800 SCFM LONESTAR BLOWER MODEL GL2 WITH ACCESSORY PACKAGE OR EQUAL
ME-35483	BLOWER BUILDING	AERATION BLOWER	BLOWER	250 HP	1800-2800 SCFM LONESTAR BLOWER MODEL GL2 WITH ACCESSORY PACKAGE OR EQUAL
ME-37110	MBBR TANK 1	AERATION GRID 1	MBBR AERATION	-	EDI COARSE BUBBLE DIFFUSERS PROVIDED BY MBBR SUPPLIER
ME-37120	MBBR TANK 1	RETENTION SCREEN 1	MBBR MEDIA RETENTION	-	36"D X 36"L SCREEN PROVIDED BY MBBR SUPPLIER
ME-37121	MBBR TANK 1	RETENTION SCREEN 2	MBBR MEDIA RETENTION	-	36"D X 36"L SCREEN PROVIDED BY MBBR SUPPLIER
ME-37122	MBBR TANK 1	RETENTION SCREEN 3	MBBR MEDIA RETENTION	-	36"D X 36"L SCREEN PROVIDED BY MBBR SUPPLIER
ME-37123	MBBR TANK 1	RETENTION SCREEN 4	MBBR MEDIA RETENTION	-	36"D X 36"L SCREEN PROVIDED BY MBBR SUPPLIER
ME-37124	MBBR TANK 1	RETENTION SCREEN 5	MBBR MEDIA RETENTION	-	36"D X 36"L SCREEN PROVIDED BY MBBR SUPPLIER
ME-37125	MBBR TANK 1	RETENTION SCREEN 6	MBBR MEDIA RETENTION	-	36"D X 36"L SCREEN PROVIDED BY MBBR SUPPLIER
ME-37126	MBBR TANK 1	RETENTION SCREEN 7	MBBR MEDIA RETENTION	-	36"D X 36"L SCREEN PROVIDED BY MBBR SUPPLIER
ME-37210	MBBR TANK 2	AERATION GRID 2	MBBR AERATION	-	EDI COARSE BUBBLE DIFFUSERS PROVIDED BY MBBR SUPPLIER
ME-37220	MBBR TANK 2	RETENTION SCREEN 8	MBBR MEDIA RETENTION	-	36"D X 36"L SCREEN PROVIDED BY MBBR SUPPLIER
ME-37221	MBBR TANK 2	RETENTION SCREEN 9	MBBR MEDIA RETENTION	-	36"D X 36"L SCREEN PROVIDED BY MBBR SUPPLIER
ME-37222	MBBR TANK 2	RETENTION SCREEN 10	MBBR MEDIA RETENTION	-	36"D X 36"L SCREEN PROVIDED BY MBBR SUPPLIER
ME-37223	MBBR TANK 2	RETENTION SCREEN 11	MBBR MEDIA RETENTION	-	36"D X 36"L SCREEN PROVIDED BY MBBR SUPPLIER
ME-37224	MBBR TANK 2	RETENTION SCREEN 12	MBBR MEDIA RETENTION	-	36"D X 36"L SCREEN PROVIDED BY MBBR SUPPLIER
ME-37225	MBBR TANK 2	RETENTION SCREEN 13	MBBR MEDIA RETENTION	-	36"D X 36"L SCREEN PROVIDED BY MBBR SUPPLIER
ME-37226	MBBR TANK 2	RETENTION SCREEN 14	MBBR MEDIA RETENTION	-	36"D X 36"L SCREEN PROVIDED BY MBBR SUPPLIER
ME-38101	HEADWORKS BUILDING	STRAINER	CHEMICAL STRAINING	-	1/2" HAYWARD YS SERIES CPVC STRAINER W-EPDM SEALS AND PLASTIC SCREEN OR EQUAL
ME-38102	BLOWER BUILDING	CALIBRATION COLUMN	PUMP 1 CALIBRATION	-	KOFLO 2000 ML CALIBRATION COLUMN OR EQUAL
ME-38201	HEADWORKS BUILDING	STRAINER	CHEMICAL STRAINING	-	1/2" HAYWARD YS SERIES CPVC STRAINER W-EPDM SEALS AND PLASTIC SCREEN OR EQUAL
ME-38202	BLOWER BUILDING	CALIBRATION COLUMN	PUMP 2 CALIBRATION	-	KOFLO 2000 ML CALIBRATION COLUMN OR EQUAL
ME-38301	BLOWER BUILDING	EMERGENCY SHOWER AND EYEWASH	EMERGENCY SHOWER AND EYEWASH	-	BRADLEY S19314 SERIES COMBINATION DRENCH SHOWER AND EYEWASH OR EQUAL
ME-38302	BLOWER BUILDING	EMERGENCY SHOWER AND EYEWASH	OUTDOOR EMERGENCY SHOWER AND EYEWASH	-	BRADLEY S19-310TW FROST-PROOF DRENCH SHOWER AND EYEWASH UNIT OR EQUAL
ME-62102	RAW SLUDGE PUMP STATION	GRINDER	SLUDGE GRINDER	460V / 3 HP	300-600 GPM VOGELSANG GRINDER MODEL 10RC5 RC5000 ROTA-CUT OR EQUAL
ME-68203	EXISTING DIGESTER TANK	RELIEF VALVE W/ FLAME ARRESTER ASSEMBLY	DIGESTER TANK PRESSURE RELIEF	-	4" VAREC 5811B46S OR EQUAL
ME-68204	EXISTING DIGESTER TANK	RELIEF VALVE W/ FLAME ARRESTER ASSEMBLY	DIGESTER TANK PRESSURE RELIEF	-	4" VAREC 5811B46S OR EQUAL
ME-68223	EXISTING DIGESTER TANK	RELIEF VALVE W/ FLAME ARRESTER ASSEMBLY	DIGESTER TANK PRESSURE RELIEF	-	4" VAREC 5811B46S OR EQUAL
ME-68224	EXISTING DIGESTER TANK	RELIEF VALVE W/ FLAME ARRESTER ASSEMBLY	DIGESTER TANK PRESSURE RELIEF	-	4" VAREC 5811B46S OR EQUAL
ME-68231	EXISTING DIGESTER BUILDING 1	SEDIMENT TRAP	BIOGAS CONDENSATE AND SEDIMENT TRAP	.	4" VAREC CONDENSATE SEDIMENT TRAP MODEL 233-06-F-S OR EQUAL
ME-68232	EXISTING DIGESTER BUILDING 1	DRIP TRAP	BIOGAS CONDENSATE DRAIN	-	4" VAREC MANUAL DRIP TRAP MODEL 2466 OR EQUAL
ME-68233	EXISTING DIGESTER BUILDING 1	FLAME TRAP	BIOGAS LINE FLARE ARRESTER	-	6" VAREC 4500421S OR EQUAL

3

DRAWING IS TO SCALE IF BAR MEASURES: 1" = FULL SCALE 1/2" = HALF SCALE

0 1/2 1

ORIGINAL

NO.	DATE	DESIGN	DRAWN	CHECKED
B	04/01/2024	EIT	DCL	BMR

REVISIONS

1	04/19/2024	EIT	DCL	BMR
2	04/29/2024	EIT	DCL	BMR
3	05/20/2024	EIT	DCL	BMR

SOUTH DAVIS SEWER DISTRICT

NORTH PLANT UPGRADE

-

SCHEDULES

MECHANICAL EQUIPMENT

AQUA
533 W 2600 S, SUITE 275, BOUNTIFUL, UT 84010
PHONE (801) 299-1327 FAX (801) 299-0153

DRAWING NO.

81M802

SHEET

MECHANICAL EQUIPMENT SCHEDULE

ME#	LOCATION	ITEM	SERVICE	HP (KW)	REMARKS
ME-68530	PRIMARY DIGESTER	ANAEROBIC DIGESTER	SLUDGE DIGESTION	-	80 FT DIAMETER DIGESTER WITH LINEAR MOTION MIXER, 155,500 CU-FT OR EQUAL
ME-68534A	NEW PRIMARY DIGESTER	RELIEF VALVE W/ FLAME ARRESTER ASSEMBLY	DIGESTER TANK PRESSURE RELIEF	-	VAREC RELIEF VALVE MODEL 5811B-4-1 W/ WEATHER COVER OR EQUAL
ME-68534B	NEW PRIMARY DIGESTER	RELIEF VALVE W/ FLAME ARRESTER ASSEMBLY	DIGESTER TANK PRESSURE RELIEF	-	VAREC RELIEF VALVE MODEL 5811B-4-1 W/ WEATHER COVER OR EQUAL
ME-68537	DIGESTER BUILDING	SEDIMENT TRAP	BIOGAS CONDENSATE AND SEDIMENT TRAP	-	6" VAREC CONDENSATE SEDIMENT TRAP MODEL 233-06-F-S OR EQUAL
ME-68550	DIGESTER BUILDING	HEAT EXCHANGER	SLUDGE HEATING	.	6" ALFA LAVAL SPIRAL HEAT EXCHANGER MODEL SW OR EQUAL
ME-68560	DIGESTER BUILDING	HEAT EXCHANGER	SLUDGE HEATING	.	6" ALFA LAVAL SPIRAL HEAT EXCHANGER MODEL SW OR EQUAL
ME-70500	DIGESTER BUILDING	EXPANSION TANK	HOT WATER LOOP EXPANSION	-	80 GAL BELL & GOSSETT SERIES B-300 FULL ACCEPTANCE TANK OR EQUAL
ME-70504	DIGESTER BUILDING	FLAME ARRESTER	BOILER DIGESTER GAS LINE FLAME ARRESTER	-	4" VAREC MODEL 5010 FLAME ARRESTER WITH THERMAL SHUTOFF VALVE OR EQUAL
ME-70505	DIGESTER BUILDING	BOILER	HOT WATER LOOP HEATING	-	ALDRICH COMPANY SERIES A3W4-60-G, 2,410,000 BTUH
ME-70510	DIGESTER BUILDING	AIR SEPARATOR	HOT WATER LOOP AIR SEPARATOR	-	34 GAL BELL & GOSSETT ROLAIRTROL R-6F (B) OR EQUAL
ME-70521	DIGESTER BUILDING	SUCTION DIFFUSER	HEAT PUMP FLOW CONDITIONING	.	BELL & GOSSETT SUCTION DIFFUSER
ME-70526	DIGESTER BUILDING	SUCTION DIFFUSER	HEAT PUMP FLOW CONDITIONING	.	BELL & GOSSETT SUCTION DIFFUSER
ME-72510	FLARE LINE	FLARE IGNITION SYSTEM	WASTE GAS BURNER IGNITION	120V	PROVIDED WITH FLARE PACKAGE
ME-72520	FLARE LINE	DIGESTER GAS FLARE	WASTE GAS BURNER	.	6" VAREC 244W SERIES WASTE GAS BURNER AND IGNITION SYSTEM OR EQUAL
ME-72530	FLARE LINE	FLAME TRAP ASSEMBLY	LINE IGNITION PROTECTION AND PRESSURE RELIEF	-	4" VAREC MODEL 440 SERIES FLAME TRAP ASSEMBLY OR EQUAL
ME-76231	DIGESTER BUILDING 2	SEDIMENT TRAP	BIOGAS CONDENSATE AND SEDIMENT TRAP	-	4" VAREC CONDENSATE SEDIMENT TRAP MODEL 233-06-F-S OR EQUAL
ME-76232	DIGESTER BUILDING 2	DRIP TRAP	BIOGAS CONDENSATE DRAIN	-	4" VAREC MANUAL DRIP TRAP MODEL 2466 OR EQUAL
ME-76233	DIGESTER BUILDING 2	FLAME TRAP	BIOGAS LINE FLARE ARRESTER	-	4" VAREC 4500421S OR EQUAL
ME-80100	DEWATERING BUILDING	POLYMER DOSING SYSTEM	POLYMER MIXING	0.5 HP	SUPPLIED WITH DEWATERING EQUIPMENT
ME-80300A	DEWATERING BUILDING	POLYMER INJECTION RING	POLYMER MIXING	0.75 HP	SUPPLIED WITH DEWATERING EQUIPMENT
ME-80300B	DEWATERING BUILDING	SCREW PRESS	SLUDGE DEWATERING	5 HP	HUBER SCREW PRESS MODEL Q-PRESS 800.2 OR APPROVED EQUAL
ME-80320	DEWATERING BUILDING	AIR COMPRESSOR	SCREW PRESS AIR SUPPLY		SUPPLIED WITH DEWATERING EQUIPMENT
ME-80500	DEWATERING BUILDING	EMERGENCY EYE WASH AND SHOWER	EMERGENCY EYE WASH AND SHOWER	-	EMERGENCY SHOWER AND EYEWASH MODEL 8300.158 OR EQUAL
ME-80510	DEWATERING BUILDING	SCREW CONVEYOR	10 1/4"X17' HORIZONTAL SHAFTLESS SCREW CONVEYOR FROM DEWATERING	480V / 3 HP	JDV SHAFTLESS SCREW CONVEYOR OR EQUAL
ME-80515	DEWATERING BUILDING	SCREW CONVEYOR	10 1/4"X17' VERTICAL SHAFTLESS SCREW CONVEYOR	480V / 3 HP	JDV SHAFTLESS SCREW CONVEYOR OR EQUAL
ME-80517	DEWATERING BUILDING	SCREW CONVEYOR	10 1/4"X23'-6" HORIZONTAL SCREW CONVEYOR TO SLUDGE DRYING BED	480V / 3 HP	JDV SHAFTLESS SCREW CONVEYOR OR EQUAL
ME-80520	DEWATERING BUILDING	SCREW CONVEYOR	10 1/4"X28' HORIZONTAL SHAFTLESS SCREW CONVEYOR TO TRUCKS	480V / 3 HP	JDV SHAFTLESS SCREW CONVEYOR OR EQUAL
ME-80601	DEWATERING BUILDING	MONORAIL CRANE	DEWATERING PRESS CRANE	460V / 15HP	AMERICAN EQUIPMENT SYSTEMS 5 TON MONORAIL CRANE CLASS 1, DIVISION 2 RATED OR EQUAL

2

C:\USERS\DANIEL.LEAVITT\DCVACCDOCS\AQUA ENGINEERING\001709.C SDSD NORTH PLANT UPGRADE\PROJECT FILES\980 SCHEDULES\984-84M802 MECHANICAL SCHEDULE.DWG

5/20/2024

DRAWING IS TO SCALE
IF BAR MEASURES:
1" = FULL SCALE
1/2" = HALF SCALE

0 1/2 1

ORIGINAL

NO.	DATE	DESIGN	DRAWN	CHECKED
B	04/01/2024	EIT	DCL	BMR

REVISIONS

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2	05/20/2024	EIT	DCL	BMR

SOUTH DAVIS SEWER DISTRICT

NORTH PLANT UPGRADE
-

SCHEDULES
MECHANICAL EQUIPMENT

AQUA
533 W 2600 S, SUITE 275, BOUNTIFUL, UT 84010
PHONE (801) 299-1327 FAX (801) 299-0153

DRAWING NO.

81M803

SHEET

VALVE SCHEDULE

V#	LOCATION	SERVICE	TYPE	SIZE	MATERIAL	CONNECTION	ACTUATOR	REMARKS
HV-63122	GRAVITY THICKENER	THICKENED SLUDGE PUMP ISOLATION	PLUG	6"	DI	FL X FL	WHEEL	VALMATIC 100% PORT ECCENTRIC PLUG VALVE OR EQUAL
HV-63126	GRAVITY THICKENER	FLOW DIRECTION CONTROL	PLUG	6"	DI	FL X FL	WHEEL	VALMATIC 100% PORT ECCENTRIC PLUG VALVE OR EQUAL
HV-68228	DIGESTER CONTROL BUILDING	DIGESTER 1 BYPASS	PLUG	6"	DI	FL X FL	WHEEL	VALMATIC 100% PORT ECCENTRIC PLUG VALVE OR EQUAL
HV-68229	DIGESTER CONTROL BUILDING	DIGESTER 1 BYPASS	PLUG	6"	DI	FL X FL	WHEEL	VALMATIC 100% PORT ECCENTRIC PLUG VALVE OR EQUAL
HV-68510	DIGESTER CONTROL BUILDING	SLUDGE DEWATERING PUMP ISOLATION	PLUG	4"	DI	FL X FL	WHEEL	VALMATIC 100% PORT ECCENTRIC PLUG VALVE OR EQUAL
HV-68511	DIGESTER CONTROL BUILDING	SLUDGE DEWATERING PUMP ISOLATION	PLUG	4"	DI	FL X FL	WHEEL	VALMATIC 100% PORT ECCENTRIC PLUG VALVE OR EQUAL
HV-68520	DIGESTER CONTROL BUILDING	SLUDGE DEWATERING PUMP ISOLATION	PLUG	4"	DI	FL X FL	WHEEL	VALMATIC 100% PORT ECCENTRIC PLUG VALVE OR EQUAL
HV-68521	DIGESTER CONTROL BUILDING	SLUDGE DEWATERING PUMP ISOLATION	PLUG	4"	DI	FL X FL	WHEEL	VALMATIC 100% PORT ECCENTRIC PLUG VALVE OR EQUAL
HV-68522	DIGESTER CONTROL BUILDING	SLUDGE DEWATERING PUMP ISOLATION	PLUG	4"	DI	FL X FL	WHEEL	VALMATIC 100% PORT ECCENTRIC PLUG VALVE OR EQUAL
HV-68523	DIGESTER CONTROL BUILDING	METER ISOLATION	PLUG	4"	DI	FL X FL	WHEEL	VALMATIC 100% PORT ECCENTRIC PLUG VALVE OR EQUAL
HV-68532	DIGESTER BUILDING	DIGESTER OUTLET	PLUG	6"	DI	FL X FL	CW	VALMATIC 100% PORT ECCENTRIC PLUG VALVE OR EQUAL
HV-68533	DIGESTER BUILDING	DIGESTER OUTLET	PLUG	6"	DI	FL X FL	CW	VALMATIC 100% PORT ECCENTRIC PLUG VALVE OR EQUAL
HV-68534	DIGESTER BUILDING	DIGESTER OUTLET	PLUG	6"	DI	FL X FL	WHEEL	VALMATIC 100% PORT ECCENTRIC PLUG VALVE OR EQUAL
HV-68534A	DIGESTER #1 LID	P-RELIEF SELECTION VALVE	SAFTEY SELECTOR	4"	AL	FL X FL	LV	VAREC SAFETY SELECTOR VALVE MODEL SVR 16-05-B-A WITH WEATHER COVER OR EQUAL
HV-68535	DIGESTER BUILDING	SAMPLE PORT	PLUG	6"	DI	FL X FL	WHEEL	VALMATIC 100% PORT ECCENTRIC PLUG VALVE OR EQUAL
HV-68536	DIGESTER BUILDING	CONDENSATE TRAP ISOLATION	BUTTERFLY	6"	SS	LUG	LV	BRAY SERIES 30/31 W. SS DISC AND STEM, AND EPDM SEAT OR EQUAL
HV-68538	DIGESTER BUILDING	CONDENSATE TRAP ISOLATION	BUTTERFLY	6"	SS	LUG	LV	BRAY SERIES 30/31 W. SS DISC AND STEM, AND EPDM SEAT OR EQUAL
HV-68540A	DIGESTER BUILDING	SLUDGE RECIRCULATION PUMP ISOLATION	PLUG	4"	DI	FL X FL	WHEEL	VALMATIC 100% PORT ECCENTRIC PLUG VALVE OR EQUAL
HV-68540B	DIGESTER BUILDING	SLUDGE RECIRCULATION PUMP ISOLATION	PLUG	4"	DI	FL X FL	WHEEL	VALMATIC 100% PORT ECCENTRIC PLUG VALVE OR EQUAL
HV-68545A	DIGESTER BUILDING	SLUDGE RECIRCULATION PUMP ISOLATION	PLUG	4"	DI	FL X FL	WHEEL	VALMATIC 100% PORT ECCENTRIC PLUG VALVE OR EQUAL
HV-68545B	DIGESTER BUILDING	SLUDGE RECIRCULATION PUMP ISOLATION	PLUG	4"	DI	FL X FL	WHEEL	VALMATIC 100% PORT ECCENTRIC PLUG VALVE OR EQUAL
HV-68553	DIGESTER BUILDING	HEAT EXCHANGER SLUDGE ISOLATION	PLUG	6"	DI	FL X FL	WHEEL	VALMATIC 100% PORT ECCENTRIC PLUG VALVE OR EQUAL
HV-68554	DIGESTER BUILDING	HEAT EXCHANGER SLUDGE ISOLATION	PLUG	6"	DI	FL X FL	WHEEL	VALMATIC 100% PORT ECCENTRIC PLUG VALVE OR EQUAL
HV-68563	DIGESTER BUILDING	HEAT EXCHANGER SLUDGE ISOLATION	PLUG	6"	DI	FL X FL	WHEEL	VALMATIC 100% PORT ECCENTRIC PLUG VALVE OR EQUAL
HV-68564	DIGESTER BUILDING	HEAT EXCHANGER SLUDGE ISOLATION	PLUG	6"	DI	FL X FL	WHEEL	VALMATIC 100% PORT ECCENTRIC PLUG VALVE OR EQUAL
HV-68570A	DIGESTER BUILDING	SLUDGE TRANSFER PUMP ISOLATION	PLUG	4"	DI	FL X FL	WHEEL	VALMATIC 100% PORT ECCENTRIC PLUG VALVE OR EQUAL
HV-68570B	DIGESTER BUILDING	SLUDGE TRANSFER PUMP ISOLATION	PLUG	4"	DI	FL X FL	WHEEL	VALMATIC 100% PORT ECCENTRIC PLUG VALVE OR EQUAL
HV-68575A	DIGESTER BUILDING	SLUDGE TRANSFER PUMP ISOLATION	PLUG	4"	DI	FL X FL	WHEEL	VALMATIC 100% PORT ECCENTRIC PLUG VALVE OR EQUAL
HV-68575B	DIGESTER BUILDING	SLUDGE TRANSFER PUMP ISOLATION	PLUG	4"	DI	FL X FL	WHEEL	VALMATIC 100% PORT ECCENTRIC PLUG VALVE OR EQUAL
HV-68576	DIGESTER BUILDING	SLUDGE TRANSFER PUMP CLEANOUT	PLUG	6"	DI	FL X FL	WHEEL	VALMATIC 100% PORT ECCENTRIC PLUG VALVE OR EQUAL
HV-70501	DIGESTER BUILDING	AIR SEPARATOR OUTLET ISOLATION	BUTTERFLY	4"	SS	LUG	LV	BRAY SERIES 30/31 W. SS DISC AND STEM, AND EPDM SEAT OR EQUAL
HV-70505A	DIGESTER BUILDING	PRV/FLAME ARRESTOR ISOLATION	BUTTERFLY	4"	SS	LUG	LV	BRAY SERIES 40/41 MCCANNALOK W SS DISC AND STEM AND PTFE SEAT OR EQUAL
HV-70505B	DIGESTER BUILDING	PRV/FLAME ARRESTOR ISOLATION	BUTTERFLY	4"	SS	LUG	CW	BRAY SERIES 30/31 W. SS DISC AND STEM, AND EPDM SEAT OR EQUAL
HV-70508	DIGESTER BUILDING	BOILER OUTLET ISOLATION	BUTTERFLY	4"	SS	LUG	LV	BRAY SERIES 30/31 W. SS DISC AND STEM, AND EPDM SEAT OR EQUAL
HV-70511	DIGESTER BUILDING	FUTURE BOILER ISOLATION	BUTTERFLY	4"	SS	LUG	LV	BRAY SERIES 30/31 W. SS DISC AND STEM, AND EPDM SEAT OR EQUAL
HV-70512	DIGESTER BUILDING	BOILER INLET ISOLATION	BUTTERFLY	4"	SS	LUG	LV	BRAY SERIES 30/31 W. SS DISC AND STEM, AND EPDM SEAT OR EQUAL
HV-70513	DIGESTER BUILDING	FUTURE HEAT EXCHANGER ISOLATION	BUTTERFLY	4"	SS	LUG	CW	BRAY SERIES 30/31 W. SS DISC AND STEM, AND EPDM SEAT OR EQUAL
HV-70520A	DIGESTER BUILDING	PUMP INLET ISOLATION	BUTTERFLY	4"	SS	LUG	LV	BRAY SERIES 30/31 W. SS DISC AND STEM, AND EPDM SEAT OR EQUAL
HV-70520B	DIGESTER BUILDING	PUMP OUTLET ISOLATION	BUTTERFLY	4"	SS	LUG	LV	BRAY SERIES 30/31 W. SS DISC AND STEM, AND EPDM SEAT OR EQUAL
HV-70525A	DIGESTER BUILDING	PUMP INLET ISOLATION	BUTTERFLY	4"	SS	LUG	LV	BRAY SERIES 30/31 W. SS DISC AND STEM, AND EPDM SEAT OR EQUAL
HV-70525B	DIGESTER BUILDING	PUMP OUTLET ISOLATION	BUTTERFLY	4"	SS	LUG	LV	BRAY SERIES 30/31 W. SS DISC AND STEM, AND EPDM SEAT OR EQUAL
HV-70530A	DIGESTER BUILDING	HEAT PUMP INLET ISOLATION	BUTTERFLY	4"	SS	LUG	LV	BRAY SERIES 30/31 W. SS DISC AND STEM, AND EPDM SEAT OR EQUAL
HV-70530B	DIGESTER BUILDING	HEAT PUMP OUTLET ISOLATION	BUTTERFLY	4"	SS	LUG	LV	BRAY SERIES 30/31 W. SS DISC AND STEM, AND EPDM SEAT OR EQUAL
HV-70530C	DIGESTER BUILDING	HEAT EXCHANGER ISOLATION	BUTTERFLY	4"	SS	LUG	LV	BRAY SERIES 30/31 W. SS DISC AND STEM, AND EPDM SEAT OR EQUAL
HV-70540A	DIGESTER BUILDING	HEAT PUMP INLET ISOLATION	BUTTERFLY	4"	SS	LUG	LV	BRAY SERIES 30/31 W. SS DISC AND STEM, AND EPDM SEAT OR EQUAL
HV-70540B	DIGESTER BUILDING	HEAT PUMP OUTLET ISOLATION	BUTTERFLY	4"	SS	LUG	LV	BRAY SERIES 30/31 W. SS DISC AND STEM, AND EPDM SEAT OR EQUAL
HV-70540C	DIGESTER BUILDING	HEAT EXCHANGER ISOLATION	BUTTERFLY	4"	SS	LUG	LV	BRAY SERIES 30/31 W. SS DISC AND STEM, AND EPDM SEAT OR EQUAL
HV-72528	DIGESTER GAS LINE	PRESSURE GAUGE ISOLATION	BUTTERFLY	6"	SS	FL	LV	BRAY SERIES 40/41 MCCANNALOK W SS DISC AND STEM AND PTFE SEAT OR EQUAL
HV-72540	DIGESTER GAS LINE	FUTURE GAS SCRUBBER ISOLATION	BUTTERFLY	4"	SS	FL	CW	BRAY SERIES 40/41 MCCANNALOK W SS DISC AND STEM AND PTFE SEAT OR EQUAL
HV-72543	DIGESTER GAS LINE	FUTURE GAS SCRUBBER ISOLATION	BUTTERFLY	4"	SS	FL	CW	BRAY SERIES 40/41 MCCANNALOK W SS DISC AND STEM AND PTFE SEAT OR EQUAL
HV-72544	DIGESTER GAS LINE	FUTURE GAS SCRUBBER BYPASS	BUTTERFLY	6"	SS	FL	CW	BRAY SERIES 40/41 MCCANNALOK W SS DISC AND STEM AND PTFE SEAT OR EQUAL
HV-80300A	DEWATERING BUILDING	DEWATERING PRESS ISOLATION	PLUG	8"	DI	FL X FL	WHEEL	VALMATIC 100% PORT ECCENTRIC PLUG VALVE OR EQUAL
HV-80300B	DEWATERING BUILDING	POLYMER FLOW METER ISOLATION	BALL	1"	CPVC	THD	LV	ASAHI AMERICAN TYPE 21 CPVC BALL VALVE W/EPDM SEATS, VENTED BALL OR EQUAL
HV-80300C	DEWATERING BUILDING	POLYMER FLOW METER ISOLATION	BALL	1"	CPVC	THD	LV	ASAHI AMERICAN TYPE 21 CPVC BALL VALVE W/EPDM SEATS, VENTED BALL OR EQUAL
MFV-06021F	FUEL STATION	ANIT-SIPHON VALVE	PRV	1"	SS	THD	-	PROVIDED BY ABOVE GROUND FUEL TANK SUPPLIER
MFV-06021I	FUEL STATION	ANTI-SIPHON VALVE	PRV	1 1/2"	SS	THD	-	PROVIDED BY ABOVE GROUND FUEL TANK SUPPLIER
MFV-33302	CLASSIFIER ROOM	AIR/VACUUM RELIEF VALVE	AIR RELIEF	2"	DI	NPT	-	VALMATIC WASTEWATER AIR/VACUUM COMBINATION VALVE MODEL 801A OR EQUAL
MFV-62126	GRAVITY THICKENER	AIR/VACUUM RELIEF VALVE	AIR RELIEF	2"	DI	NPT	-	VALMATIC WASTEWATER AIR/VACUUM COMBINATION VALVE MODEL 801A OR EQUAL
MFV-63113	GRAVITY THICKENER	AIR/VACUUM RELIEF VALVE	AIR RELIEF	2"	DI	NPT	-	VALMATIC WASTEWATER AIR/VACUUM COMBINATION VALVE MODEL 801A OR EQUAL
MFV-68202	ANAEROBIC DIGESTER 1	DIGESTER 1 DOME PRESSURE RELIEF	PRV	4"	SS	FL	-	VAREC 7101B44TFRTS02 OR EQUAL
MFV-68222	ANAEROBIC DIGESTER 2	DIGESTER 2 DOME PRESSURE RELIEF	PRV	4"	SS	FL	-	VAREC 7101B44TFRTS02 OR EQUAL
MFV-68520	DIGESTER CONTROL BUILDING	AIR/VACUUM RELIEF VALVE	AIR RELIEF	2"	DI	NPT	-	VALMATIC WASTEWATER AIR/VACUUM COMBINATION VALVE MODEL 801A OR EQUAL
MFV-68556	DIGESTER BUILDING	AIR/VACUUM RELIEF VALVE	AIR RELIEF	2"	DI	NPT	-	VALMATIC WASTEWATER AIR/VACUUM COMBINATION VALVE MODEL 801A OR EQUAL

2

DRAWING IS TO SCALE IF BAR MEASURES: 1" = FULL SCALE 1/2" = HALF SCALE

0 1/2 1

ORIGINAL

NO.	DATE	DESIGN	DRAWN	CHECKED
B	04/01/2024	EIT	DCL	BMR

REVISIONS

1	04/19/2024	EIT	DCL	BMR
2	05/20/2024	EIT	DCL	BMR

SOUTH DAVIS SEWER DISTRICT

NORTH PLANT UPGRADE

-

SCHEDULES

VALVES

AQUA

533 W 2600 S, SUITE 275, BOUNTIFUL, UT 84010
PHONE (801) 299-1327 FAX (801) 299-0153

DRAWING NO.

81M806

SHEET

UNIT HEATER SCHEDULE

TAG					ELECTRICAL				
TYPE	#	AREA SERVICED	CFM	HEAT INPUT (KW)	VOLTAGE	PHASE	FREQUENCY	OPERATING WEIGHT	MANUF & MODEL
UH	H-69813	SLUDGE HANDLING ROOM	1,475	125,000 BTU/HR	115 VAC	SINGLE	60 HZ	265 LBS	DAYTON MODEL 55FG85 W/ WALL MOUNT KIT OR EQUAL

SPLIT SYSTEM SCHEDULE - OUTDOOR UNIT

TAG			HEATING	ELECTRICAL				
TYPE	#	COOLING (BTU/HR)	(BTU/HR)	VOLTAGE	PHASE	FREQUENCY	OPERATING WEIGHT	MANUF & MODEL
CU	H-69832	36,000 BTU/HR (3 TON)	N/A	230 VAC	SINGLE	60 HZ	210 LBS	MITSUBISHI MODEL PUY-A36NKA7 OR EQUAL

SPLIT SYSTEM SCHEDULE - INDOOR UNIT

TAG			COOLING		ELECTRICAL				
TYPE	#	AREA SERVED	(BTU/HR)	HEATING (BTU/HR)	VOLTAGE	PHASE	FREQUENCY	OPERATING WEIGHT	MANUF & MODEL
SS	H-69831 (1)	ELECTRICAL ROOM	36,000	N/A	230 VAC	SINGLE	60 HZ	80 LBS	MITSUBISHI MODEL PCY-A36NKA7 OR EQUAL

EXHAUST FAN SCHEDULE

TAG					ELECTRICAL						
TYPE	#	AREA SERVED	CFM	ESP	VOLTAGE	PHASE	FREQUENCY	RPM	HP	OPERATING WEIGHT	MANUF & MODEL
EF	H-69804	GAS HANDLING ROOM	2,448	0.5 INCHES	120 VAC	SINGLE	60 HZ	1350	0.5	110	ACME MODEL PNU150RFW W/ EXPLOSION PROOF MOTOR AND GRAVITY DAMPER OR EQUAL
EF	H-69812	SLUDGE HANDLING ROOM	2,448	0.5 INCHES	120 VAC	SINGLE	60 HZ	1350	0.5	110	ACME MODEL PNU150RFW W/ GRAVITY DAMPER OR EQUAL

SUPPLY FAN SCHEDULE

TAG					ELECTRICAL						
TYPE	#	AREA SERVED	CFM	ESP	VOLTAGE	PHASE	FREQUENCY	RPM	HP	OPERATING WEIGHT	MANUF & MODEL
SF	H-69830	DIGESTER ELECTRICAL ROOM	447	0.5 INCHES	120 VAC	SINGLE	60 HZ	2100	0	84	ACME MODEL PNU080RFW W/ GRAVITY DAMPER OR EQUAL

EVAPORATIVE COOLER SCHEDULE

TAG						PUMP		FAN				
TYPE	#	AREA SERVED	CFM	ESP	ROOF OR WALL OPENING	V/PH/HZ	HP	V/PH/HZ	HP	SPEED	OPERATING WEIGHT	MANUF & MODEL
EVAP	H-69815	SLUDGE HANDLING ROOM	13,300	0.4 INCHES	ROOF	120/1/60	0.25	480/3/60	3 HP	324 RPM	775 LBS	PHOENIX MODEL ID 701 WS080 OR EQUAL

ROOF TOP UNIT SCHEDULE

TAG						HEATING		ELECTRICAL				
TYPE	#	AREA SERVED	CFM	CFM (OUTSIDE AIR)	ESP	INPUT (BTU/HR)	OUTPUT (BTU/HR)	VOLTAGE	PHASE	FREQUENCY	OPERATING WEIGHT	MANUF & MODEL
RTU	H-69801	GAS HANDLING ROOM	1,125 - 2,250	2,250	0.5 INCHES	225,000	182,000	460 VAC	3 PHASE	60 HZ	1,550 LBS	ENGINEERED AIR MODEL DJS40/O/MV OR EQUAL

DIFFUSER AND GRILLE SCHEDULE (1)

TAG	MAX FLOW	FACE SIZE		NECK SIZE		CEILING TYPE	BLOW PATTERN	THROW @ 50 FPM	MAX NC	MANUF MODEL	SCHEDULE NOTES
		LENGTH	WIDTH	LENGTH/DIAMETER	WIDTH						
H-69818	13,300 CFM	12"	50"	38"	38"	DUCT MOUNTED	4-WAY	N/A	N/A	AES ADB DROP BOX	ADB-1 OR EQUAL
H-69803	2,250 CFM	6"	12"	14"	14"	DUCT MOUNTED	4-WAY	N/A	N/A	AES ADB DROP BOX	ADB-1 OR EQUAL

LOUVER SCHEDULE

TAG	AREA SERVED	MAX FLOW	FACE SIZE		MAX VELOCITY	MANUF & MODEL
			HEIGHT	WIDTH		
H-69819B	SLUDGE HANDLING ROOM	7600 CFM	48 INCHES	48 INCHES	800 FT/MIN	RUSKIN MODEL ELF811DD OR EQUAL
H-69834B	DIGESTER ELECTRICAL ROOM	500 CFM	24 INCHES	24 INCHES	800 FT/MIN	RUSKIN MODEL ELF811DD OR EQUAL
H-69820B	SLUDGE HANDLING ROOM	5700 CFM	48 INCHES	36 INCHES	800 FT/MIN	RUSKIN MODEL ELF811DD OR EQUAL

DAMPER SCHEDULE

TAG	AREA SERVED	MAX FLOW	FACE SIZE		MAX VELOCITY	MANUF & MODEL
			HEIGHT	WIDTH		
H-69804A	GAS HANDLING ROOM	2500 CFM	BY FAN SUPPLIER	BY FAN SUPPLIER	BY FAN SUPPLIER	INCLUDED WITH EXHAUST FAN PACKAGE
H-69812A	SLUDGE HANDLING ROOM	2500 CFM	BY FAN SUPPLIER	BY FAN SUPPLIER	BY FAN SUPPLIER	INCLUDED WITH EXHAUST FAN PACKAGE
H-69820A	SLUDGE HANDLING ROOM	5700 CFM	48 INCHES	36 INCHES	800 FT/MIN	RUSKIN MODEL BDG BACKDRAFT DAMPER OR EQUAL
H-69834A	DIGESTER ELECTRICAL ROOM	500 CFM	24 INCHES	24 INCHES	800 FT/MIN	RUSKIN MODEL BDG BACKDRAFT DAMPER OR EQUAL
H-69830A	SLUDGE HANDLING ROOM	500 CFM	BY FAN SUPPLIER	BY FAN SUPPLIER	BY FAN SUPPLIER	INCLUDED WITH EXHAUST FAN PACKAGE
H-69819A	SLUDGE HANDLING ROOM	7600 CFM	48 INCHES	48 INCHES	800 FT/MIN	RUSKIN MODEL BDG BACKDRAFT DAMPER OR EQUAL

EXHAUST FAN SCHEDULE

TAG					ELECTRICAL								
TYPE	#	AREA SERVED	CFM	ESP	VOLTAGE	PHASE	FREQUENCY	RPM	HP	SONES	OPERATING WEIGHT	MANUF & MODEL	SCHEDULE NOTES
EF	H-31801 (1)	MBBR PUMP STATION	531 CFM	0.5 IN-WG	110 V	1	60 HZ	1725	0.167	11.2	80 LBS	COOK 80SQN-B	1, 2, 3

1. SEE SPECIFICATIONS FOR OTHER APPROVED MANUFACTURERS
2. INTERLOCK WITH SWITCH IN MBBR PUMP STATION
3. PROVIDE WITH APPROPRIATE BRACKETS TO WALL MOUNT UNIT.

DRAWING IS TO SCALE IF BAR MEASURES: 1" = FULL SCALE 1/2" = HALF SCALE

ORIGINAL

NO.	DATE	DESIGN	DRAWN	CHECKED
B	04/01/2024	EIT	DCL	BMR

REVISIONS

1	05/17/2024	EIT	BDP	BMR

SOUTH DAVIS SEWER DISTRICT

NORTH PLANT UPGRADE

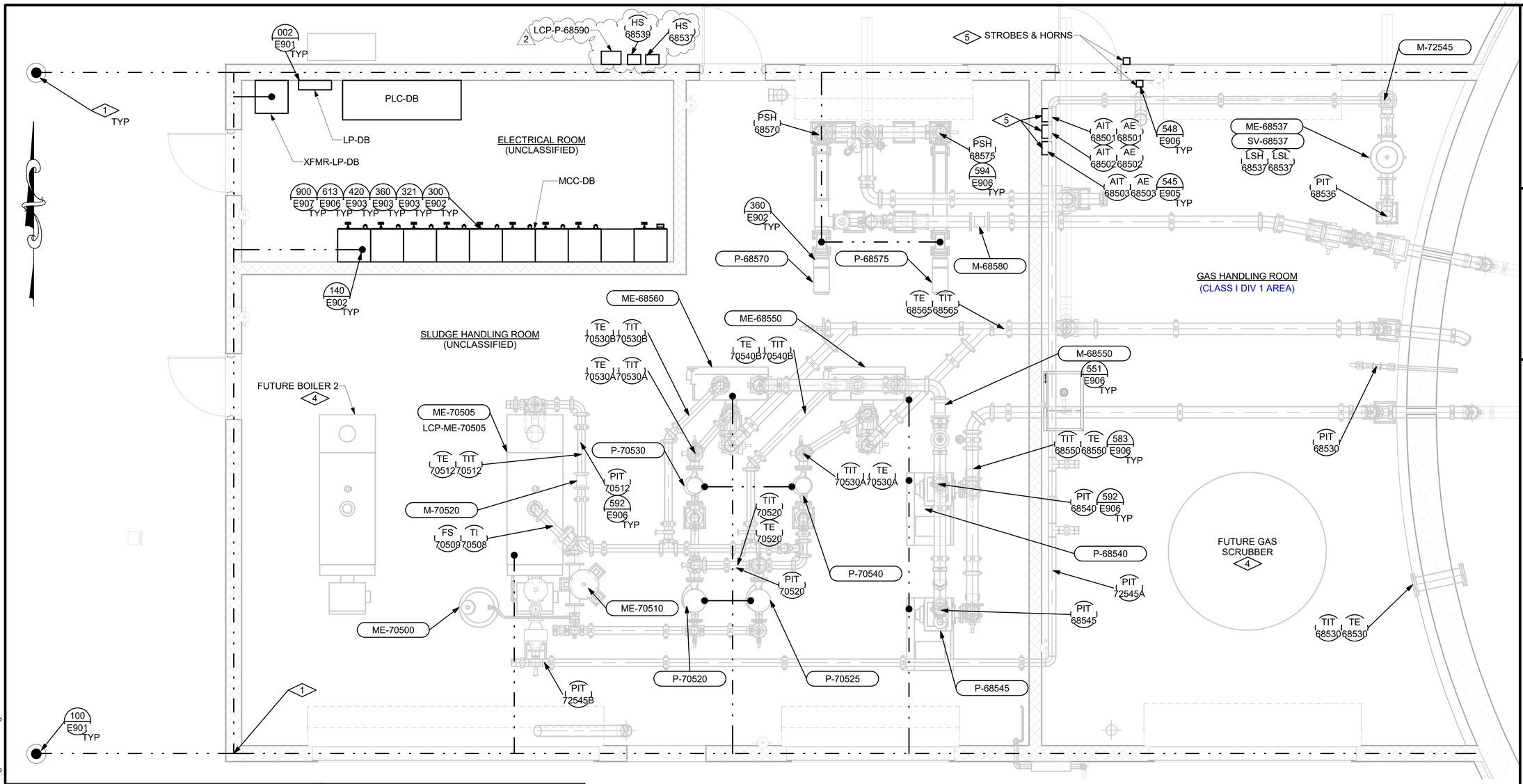
DIGESTER BUILDING/ MBBR PUMP STATION SCHEDULE HVAC

AQUA
533 W 2600 S, SUITE 275, BOUNTIFUL, UT 84010
PHONE (801) 299-1327 FAX (801) 299-0153

DRAWING NO.

85H804

SHEET



NOTES:

1. PER NFPA 820, THE GAS HANDLING ROOM IS CLASS I DIV 1. COMPONENTS WITHIN THESE BOUNDARIES SHALL BE INSTALLED PER NEC REQUIREMENTS FOR CLASSIFIED AREAS WITH SEALOFFS AS REQUIRED. ALL EXPOSED CONDUIT SHALL BE RIGID ALUMINUM. ALL CHANNEL, ANCHORS, FASTENERS AND ASSOCIATED HARDWARE SHALL BE 316SS. ALL BOXES AND FITTINGS SHALL BE CORROSION RESISTANT. ALL ENCLOSURES SHALL BE NEMA 7. CONDUIT SHALL ONLY RUN EXPOSED WHERE NECESSARY.
2. IN SLUDGE HANDLING ROOM AND ELECTRICAL ROOM, CONDUIT SHALL ONLY RUN EXPOSED WHERE NECESSARY. ALL EXPOSED CONDUIT SHALL BE RIGID ALUMINUM. PANELS IN SLUDGE HANDLING ROOM SHALL BE NEMA 4X SS. PANELS IN ELECTRICAL ROOM SHALL BE NEMA 4/12 EXCEPT AS IDENTIFIED ON ONELINES.
3. CONTRACTOR SHALL BE RESPONSIBLE FOR SUBMITTING CONDUIT DETAILS AND A CONDUIT ROUTING PLAN TO THE ELECTRICAL ENGINEER FOR APPROVAL.
4. LIMIT EXPOSED CONDUITS, 90° BENDS AND WALL PENETRATIONS. MAINTAIN SEPARATION BETWEEN SIGNAL AND POWER-CARRYING CONDUITS PER SPECIFICATIONS.

KEYNOTES:

1. CONTRACTOR SHALL PROVIDE 2 CONCRETE ENCASED ELECTRODES IN FOOTINGS PER SPECIFICATIONS 60' PER CONDUCTOR.
2. CONTRACTOR SHALL INSTALL (2) 10'X3/4"⌀ COPPER GROUND RODS 10' MINIMUM SPACING AND 10' MINIMUM FROM BUILDING.
3. BOND ALL BUILDING STEEL TO GROUND PER NEC.
4. CONTRACTOR TO INSTALL CONDUITS WITH PULL STRINGS AND CAPPED FOR FUTURE BOILER AND FUTURE GAS SCRUBBER. SEE DETAILS.
5. GAS DETECTOR, STROBE AND HORN SHALL BE RATED NEMA 7 IN THE GAS HANDLING ROOM.

DIGESTER BUILDING ELECTRICAL PLAN

3/8" = 1'-0"

0 2 4

Scale in Feet

DRAWING IS TO SCALE IF BAR MEASURES: 1" = FULL SCALE 1/2" = HALF SCALE

NO.	DATE	DESIGN	DRAWN	CHECKED
ORIGINAL				
B	08/08/2021	RSP	DCL	RSP

REVISIONS

NO.	DATE	DESIGN	DRAWN	CHECKED
1	05/10/2024	RSP	DCL	RSP
2	05/17/2024	RSP	DCL	RSP

SOUTH DAVIS SEWER PLANT

NORTH PLANT UPGRADE

ELECTRICAL - LAYOUT
DIGESTER BUILDING ELECTRICAL PLAN

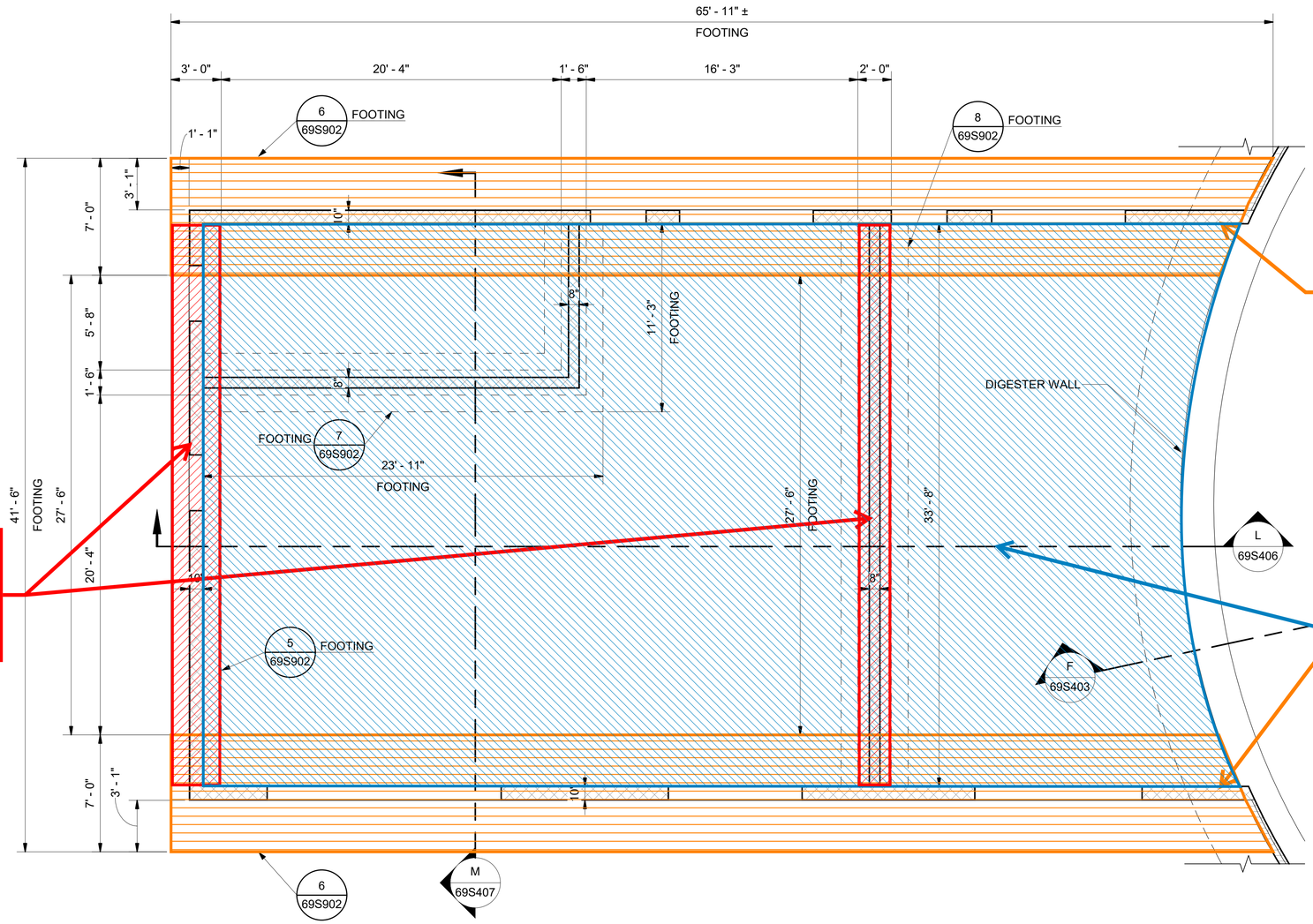
skm
533 W 2600 S,Suite 275,
Bountiful, UT 84010
Phone (801) 677-0011
www.skmeng.com

AQUA ENGINEERING

DRAWING NO.

E216

SHEET



FOUNDATION PLAN

1/4" = 1'-0"

0 4 8

Scale in Feet

PROFESSIONAL STRUCTURAL ENGINEER
No. 264975
GARY L. ELLIS
3/30/24
STATE OF UTAH

DRAWING IS TO SCALE IF BAR MEASURES: 1" = FULL SCALE 1/2" = HALF SCALE

0 1/2 1

ORIGINAL

NO.	DATE	DESIGN	DRAWN	CHECKED
B	04/01/2024	EES	CAL	BMR

REVISIONS

NO.	DATE	DESIGN	DRAWN	CHECKED

SOUTH DAVIS SEWER PLANT

-

NORTH PLANT UPGRADE

PRIMARY DIGESTER BUILDING/DIGESTER
STRUCTURAL
FOUNDATION PLAN

AQUA ENGINEERING

DRAWING NO.

69S206

SHEET

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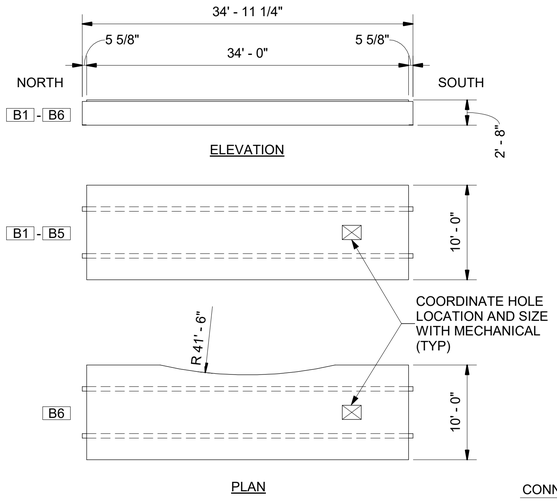
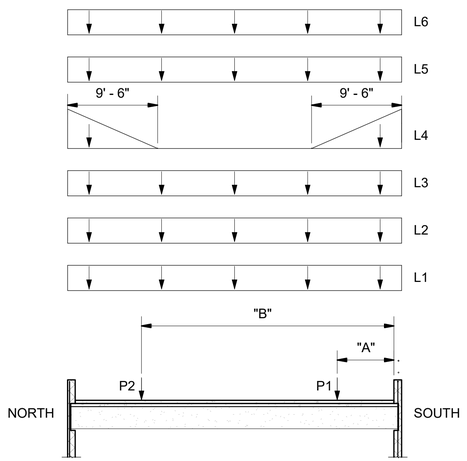


DOUBLE TEE BEAMS

NTS



		BEAM LOADS (PSF)					
ID	DESCRIPTION	B1	B2	B3	B4	B5	B6
L1	DL 4" TOPPING	50	50	50	50	50	50
L2	DL ROOF/MISC	15	15	15	15	15	15
L3	BALANCED SNOW	38	38	38	38	38	38
L4	PARAPET SNOW	-	49	49	49	49	-
L5	PARAPET SNOW	25	-	-	-	-	25
P1	ROOF MECHANICAL (lbs)*	500	500	-	2,000	-	-
P2		-	-	-	-	-	-
"A"	DISTANCE (ft)	7'-0"	7'-0"	-	6'-0"	-	-
"B"		-	-	-	-	-	-
L6	ROOF LWE LOADS	20	20	20	20	20	20

*PRELIMINARY. COMFIRM WITH EQUIPMENT SUPPLIER.

LOAD DIAGRAM

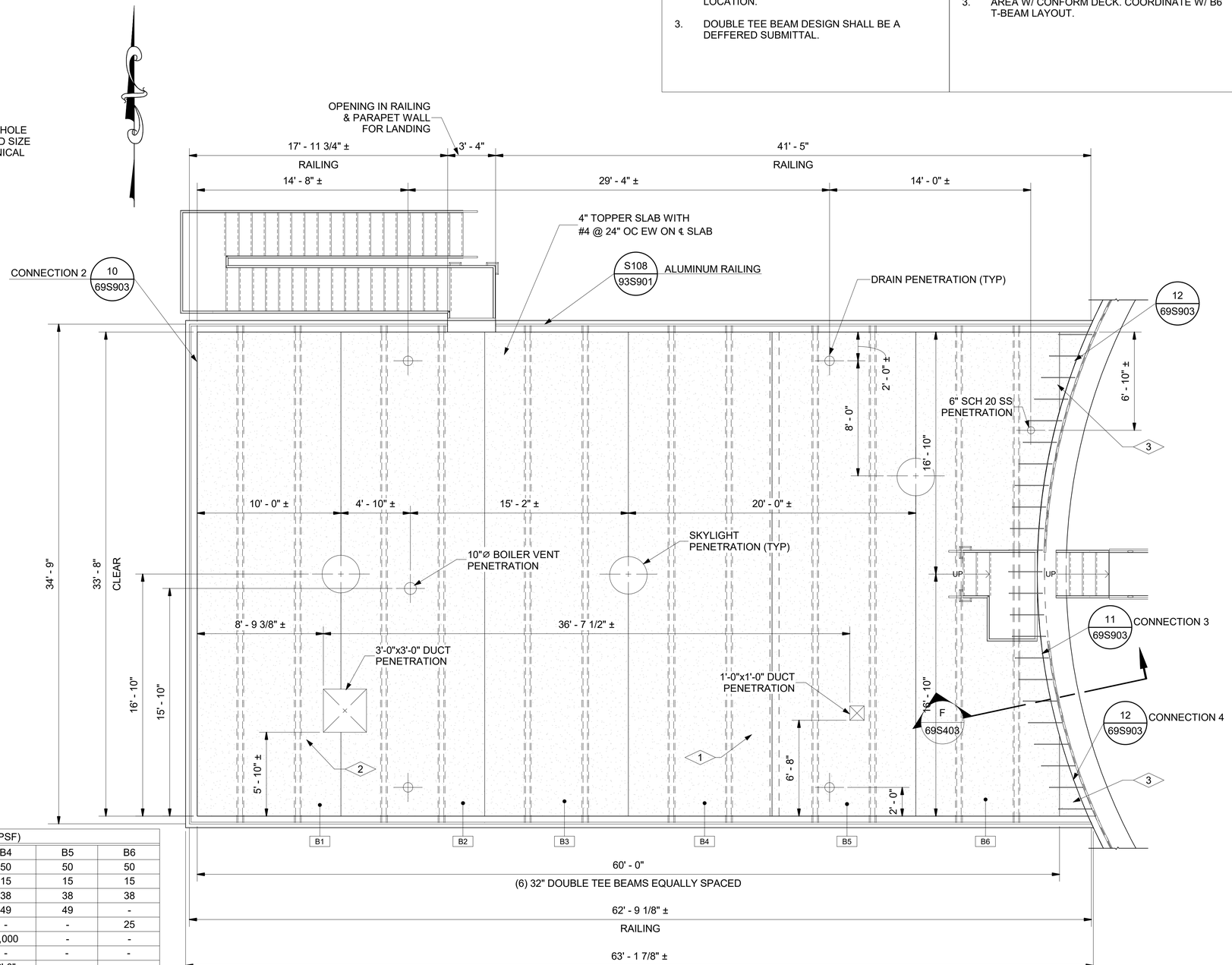
NTS

NOTES:

1. CONTRACTOR TO COORDINATE ALL ROOF PENETRATIONS WITH DOUBLE TEE BEAM MANUFACTURER.
2. REQUIRED PENETRATION SIZES & LOCATIONS ARE BASED ON PRELIMINARY EQUIPMENT INFORMATION. CONTRACTOR TO CONFIRM REQUIREMENT & COORDINATE FINAL LOCATION.
3. DOUBLE TEE BEAM DESIGN SHALL BE A DEFFERED SUBMITTAL.

KEYNOTES:

1. PENETRATION FOR 3/4"⌀ NATURAL GAS CONNECTION TO AIR HANDLER. CONFIRM COORDINATE W/ SELECTED EQUIPMENT.
2. PENETRATION FOR 3/4"⌀ POTABLE WATER CONNECTION TO EVAPORATIVE UNIT. COORDINATE W/ SELECTED EQUIPMENT.
3. AREA W/ CONFORM DECK. COORDINATE W/ B6 T-BEAM LAYOUT.



STRUCTURAL ROOF PLAN

1/4" = 1'-0"

0 4 8

Scale in Feet

PROFESSIONAL STRUCTURAL ENGINEER
No. 264975
GARY L. ELLIS
3/20/24
STATE OF UTAH

DRAWING IS TO SCALE IF BAR MEASURES: 1" = FULL SCALE 1/2" = HALF SCALE

0 1/2 1

ORIGINAL

NO.	DATE	DESIGN	DRAWN	CHECKED
B	04/01/2024	EES	CAL	BMR

REVISIONS

NO.	DATE	DESIGN	DRAWN	CHECKED

SOUTH DAVIS SEWER PLANT

-

NORTH PLANT PLANT UPGRADE

PRIMARY DIGESTER BUILDING/DIGESTER

STRUCTURAL

ROOF PLAN

AQUA ENGINEERING

DRAWING NO.

69S207

SHEET

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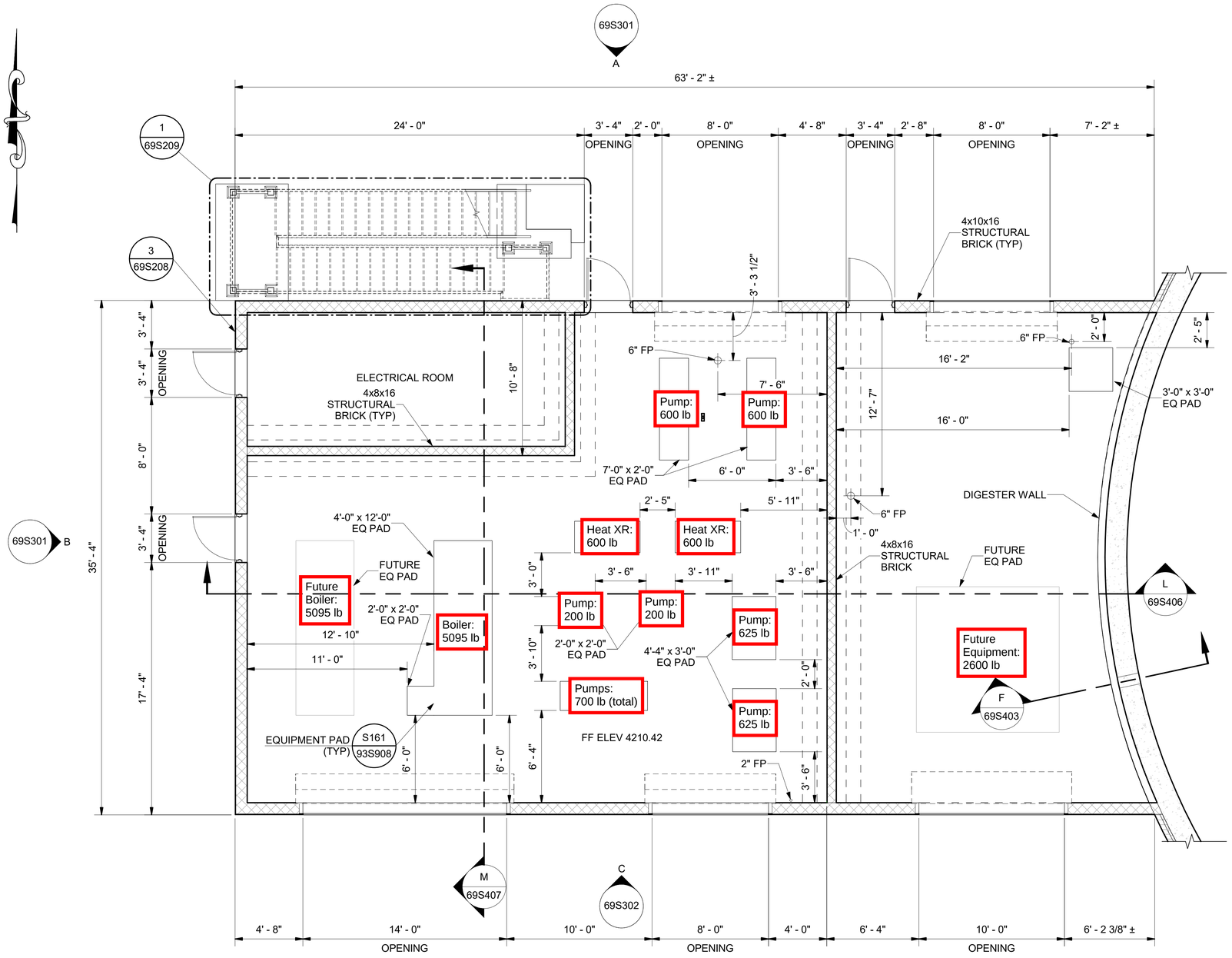

STRUCTURAL PLAN

2 / 69S201 — 1/4" = 1'-0"

0 4 8

Scale in Feet

NOTES:

1. EQUIPMENT PAD DIMENSIONS ARE BASED ON PRELIMINARY INFORMATION FROM DESIGN BASIS EQUIPMENT. CONTRACTOR TO CONFIRM FINAL PAD SIZES WITH ENGINEER AND SUPPLIER OF SELECTED EQUIPMENT.
2. ROUTE UTILITY WATER & NATURAL GAS LINES BENEATH FOOTING THEN ROUTE TO FLOOR PENETRATION LOCATION.

PROFESSIONAL STRUCTURAL ENGINEER
No. 264975
GARY L. ELLIS
3/20/24
STATE OF UTAH

DRAWING IS TO SCALE IF BAR MEASURES: 1" = FULL SCALE 1/2" = HALF SCALE

NO.	DATE	DESIGN	DRAWN	CHECKED
ORIGINAL				
B	04/01/2024	EES	CML	BMR

REVISIONS				
NO.	DATE	DESIGN	DRAWN	CHECKED

SOUTH DAVIS SEWER PLANT

-

NORTH PLANT UPGRADE

PRIMARY DIGESTER BUILDING/DIGESTER
STRUCTURAL
PLAN

AQUA ENGINEERING

DRAWING NO.

69S205

SHEET

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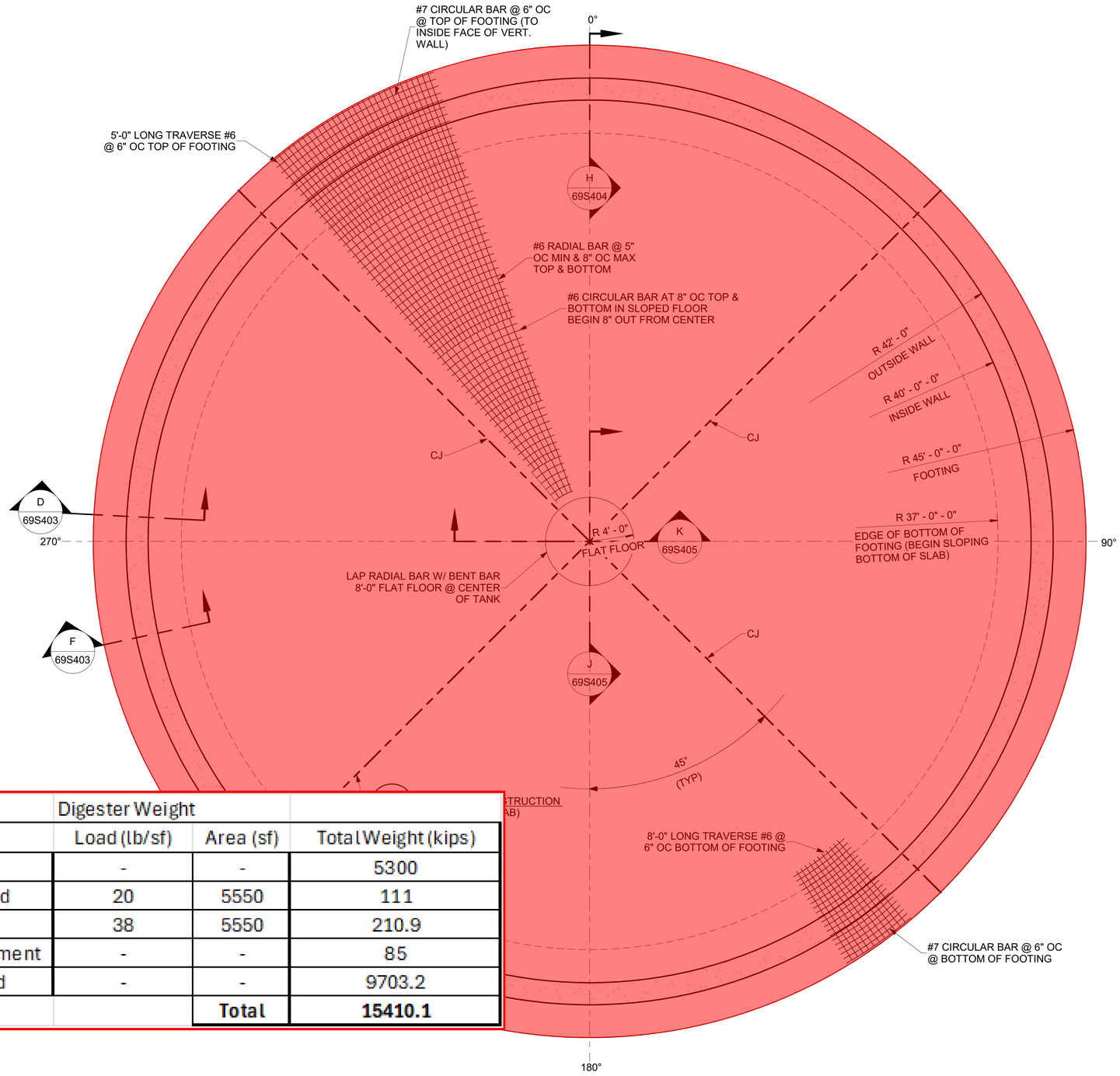

Digester Weight			
Type	Load (lb/sf)	Area (sf)	Total Weight (kips)
Dead Load	-	-	5300
Roof Live Load	20	5550	111
Snow Load	38	5550	210.9
Cover and Equipment	-	-	85
Sludge/Liquid	-	-	9703.2
		Total	**15410.1**

DIGESTER FOUNDATION PLAN

3/16" = 1'-0"

0 4 8

Scale in Feet

PROFESSIONAL STRUCTURAL ENGINEER
9252489
DARIN M. HAWKES
03/28/2024
STATE OF UTAH

DRAWING IS TO SCALE IF BAR MEASURES: 1" = FULL SCALE 1/2" = HALF SCALE

0 1/2 1

NO.	DATE	DESIGN	DRAWN	CHECKED
	ORIGINAL			
B	04/01/2024	EES	BDP	BMR

NO.	DATE	DESIGN	DRAWN	CHECKED
	REVISIONS			

SOUTH DAVIS SEWER PLANT
-
NORTH PLANT UPGRADE

PRIMARY DIGESTER BUILDING/DIGESTER
STRUCTURAL
FOUNDATION PLAN

AQUA ENGINEERING

DRAWING NO.
69S203

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SECTION 066400 – FIBERGLASS REINFORCED PLATIC PANELS

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Fiberglass reinforced polyester panel system for adhesive mounting.

B. Moldings, adhesive, and joint sealants.

1.2 REFERENCES

A. ANSI/AHA A135.5 - Prefinished Hardboard Paneling; 1995.

B. ASTM D 256 - Standard Test Methods for Determining the Izod Pendulum Impact Resistance of Plastics; 1997.

C. ASTM D 523 - Standard Test Method for Specular Gloss; 1989 (Reapproved 1994).

D. ASTM D 570 - Standard Test Method for Water Absorption of Plastics; 1998.

E. ASTM D 638 - Standard Test Method for Tensile Properties of Plastics; 1997.

F. ASTM D 696 - Standard Test Method for Coefficient of Linear Thermal Expansion of Plastics Between -30 degrees C and 30 degrees C With a Vitreous Silica Dilatometer; 1998.

G. ASTM D 790 - Standard Test Methods for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials; 1997.

H. ASTM D 792 - Standard Test Methods for Density and Specific Gravity (Relative Density) of Plastics by Displacement; 1998.

I. ASTM D 968 - Standard Test Methods for Abrasion Resistance of Organic Coatings by Falling Abrasive; 1993.

J. ASTM D 1037 - Standard Test Methods for Evaluating Properties of Wood-Base Fiber and Particle Panel Materials; 1996a.

K. ASTM D 1308 - Standard Test Method for Effect of Household Chemicals on Clear and Pigmented Organic Finishes; 1987 (Reapproved 1998).

L. ASTM D 2197 - Standard Test Methods for Adhesion of Organic Coatings by Scrape Adhesion; 1998.

M. ASTM D 2486 - Standard Test Method for Scrub Resistance of Wall Paints; 1996.

N. ASTM D 2583 - Standard Test Method for Indentation Hardness of Rigid Plastics by Means of a Barcol Impressor; 1995.

O. ASTM E 84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 1998.

1.3 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 methods.

C. Selection Samples: For each finish specified, two complete sets of color chips representing manufacturer's full range of available colors and patterns.

D. Maintenance Instructions: Deliver to Owner.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Store products in manufacturer's unopened packaging until ready for installation.

B. Store and dispose of solvent-based materials, and materials used with solvent-based materials, in accordance with requirements of local authorities having jurisdiction.

1.5 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.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturers: Marlite, Crane Composites.

B. Substitutions: or equal

2.2 PANEL SYSTEM

A. Plastic Panel System: Factory finished panels, trim, sealant, and accessories.

B. Panels:

1. Surface Burning Characteristics: Flame spread index of 200 or less, smoke developed index of 450 or less, when tested in accordance with ASTM E 84 (Class C/III).
2. Surface Texture: Gently pebbled, high-gloss.
3. Thickness: Minimum 3/32 inch (3 mm), nominal.
4. Tongue-and-groove vertical edges.
5. Flexural Strength: 13,000 psi, when tested in accordance with ASTM D 790.
6. Flexural Modulus: 600,000 psi (4137 MPa), when tested in accordance with ASTM D 790.
7. Tensile Strength: 7,000 psi, when tested in accordance with ASTM D 638.
8. Tensile Modulus: 9,000 psi, when tested in accordance with ASTM D 638.
9. Barcol Hardness: 40, when tested in accordance with ASTM D 2583.
10. Izod Impact: 12 ft-lb/in, when tested in accordance with ASTM D 256, Izod method.
11. Screw Pullout Resistance: 250 pounds, when tested in accordance with ASTM D 1037 through face of panel.
12. Coefficient of Thermal Expansion: $0.17x10^{-5}$ in/in/degree F, measured in accordance with ASTM D 696.
13. Water Absorption: 0.32 percent/24 hrs @ 77 ˚F, when tested in accordance with ASTM D 570.
14. Specific Gravity: 1.53, when tested in accordance with ASTM D 792.
15. Color : As selected by Owner from manufacturer's standard selection.

C. Panel Trim: Extruded PVC, in manufacturer's standard colors.

1. Outside corners, inside corners, edge trim, and division molding.
2. Base Molding: Design that simplifies installation and helps seal wall panel system, with factory made corners and splices.
3. Borders: 4 inch (100 mm) wide decorative strips made of same material as panels.

D. Sealant: Marlite Silicone Sealant; gunnable silicone rubber.

1. Color: Clear.
2. Color: Almond, low gloss.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Do not begin installation until substrates have been properly prepared.

B. The substrate preparation is the responsibility of the Contractor.

3.2 PREPARATION

A. Take panels out of cartons and allow to acclimatize to room conditions for at least 48 hours prior to installation.

B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

C. Clean surfaces thoroughly prior to installation.

D. Protect existing surfaces from damage due to installation.

3.3 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Provide recommended substrate material and necessary framing and accessories to properly install a complete fiberglass panel system (either for walls or ceilings) as indicated in the design drawings. If no substrate material is indicated, provide CDX or OSB as backing material. Install FRP panel onto substrate material as recommended by the FRP manufacturer.

C. Use the adhesives recommended by the panel manufacturer unless prohibited by local regulations; obtain manufacturer's approval of alternative adhesives.

D. Install continuous bead of silicone sealant in each joint and trim groove and between trim and adjacent construction, maintaining 1/8 inch (3 mm) expansion space.

E. Avoid contamination of panel faces with adhesives, solvents, or cleaners; clean as necessary and replace if not possible to repair to original condition.

F. Protect installed products until completion of project.

G. Touch-up, repair or replace damaged products after Substantial Completion.

END OF SECTION 066400

SECTION 083613 - SECTIONAL DOORS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes electrically operated sectional doors.

B. Related Requirements:

1. Section 055000 "Metal Fabrications" for miscellaneous steel supports.

1.2 ACTION SUBMITTALS

A. Product Data: For each type and size of sectional door and accessory.

B. Shop Drawings: For each installation and for special components not dimensioned or detailed in manufacturer's product data.

C. Samples: For each exposed product and for each color and texture specified.

1.3 INFORMATIONAL SUBMITTALS

A. Sample warranty.

1.4 CLOSEOUT SUBMITTALS

A. Maintenance data.

1.5 QUALITY ASSURANCE

A. Wood Sectional Door Manufacturer Qualifications: A qualified manufacturer that is certified for chain of custody by an FSC-accredited certification body.

B. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer for both installation and maintenance of units required for this Project.

1.6 WARRANTY

A. Special Warranty: Manufacturer agrees to repair or replace components of sectional doors that fail in materials or workmanship within specified warranty period.

1. Warranty Period: Five years from date of Substantial Completion.

B. Special Finish Warranty: Manufacturer agrees to repair or replace components that show evidence of deterioration of factory-applied finishes within specified warranty period.

1. Warranty Period: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. General Performance: Sectional doors shall comply with performance requirements specified without failure due to defective manufacture, fabrication, installation, or other defects in construction and without requiring temporary installation of reinforcing components.

B. Structural Performance, Exterior Doors: Capable of withstanding the design wind loads.

1. Design Wind Load: Uniform pressure (velocity pressure) of 40 lbf/sq. ft., acting inward and outward.
2. Testing: According to ASTM E 330 or DASMA 108 for garage doors and complying with the acceptance criteria of DASMA 108.

C. Seismic Performance: Sectional doors shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.

2.2 DOOR ASSEMBLY

A. Steel Sectional Door: Sectional door formed with hinged sections and fabricated according to DASMA 102 unless otherwise indicated.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
   a. Martin Door Manufacturing.
   b. Overhead Door Corporation.
   c. Or Equal

B. Operation Cycles: Door components and operators capable of operating for not less than 10,000.

C. Air Infiltration: Maximum rate of 0.08 cfm/sq. ft. at 15 and 25 mph when tested according to ASTM E 283 or DASMA 105.

D. Installed R-Value: 11.

E. Steel Sections: Zinc-coated (galvanized) steel sheet with G60 zinc coating.

1. Section Thickness: 1-3/8 inches.
2. Exterior-Face Surface: Flat.
3. Interior Facing Material: Zinc-coated (galvanized) steel sheet.

F. Track Configuration: As noted in the schedule.

G. Weatherseals: Fitted to bottom and top and around entire perimeter of door. Provide combination bottom weatherseal and sensor edge.

H. Locking Devices: Equip door with slide bolt for padlock.

I. Electric Door Operator:

1. Usage Classification: Medium Duty, up to 10 cycles per hour.
2. Operator Type: Manufacturer's standard for door requirements.
3. Safety: Listed according to UL 325 by a qualified testing agency for commercial or industrial use; moving parts of operator enclosed or guarded if exposed and mounted at 8 feet or lower.
4. Motor Exposure: Interior, Humid, Dirt, Partially conditioned
5. Emergency Manual Operation: Push-up type.
6. Obstruction-Detection Device: Automatic photoelectric sensor.
7. Control Station: Interior-side mounted.

J. Door Finish:
1. Finish of Interior Facing Material: Finish as selected by Owner from manufacturer's full range.

2.3 STEEL DOOR SECTIONS

A. Exterior Section Faces and Frames: Zinc-coated (galvanized), cold-rolled, commercial steel (CS) sheet, with backed-on polyester finish, with color by owner.

1. Roll horizontal meeting edges to a continuous, interlocking, keyed, rabbeted, shiplap, or tongue-in-groove weather-resistant seal, with a reinforcing flange return.
2. For insulated doors, provide sections with continuous thermal-break construction, separating the exterior and interior faces of door.

B. Section Ends and Intermediate Stiles: Enclose open ends of sections with channel end stiles formed from galvanized-steel sheet welded to door section. Provide intermediate stiles formed from galvanized-steel sheet, cut to door section profile, and welded in place. Space stiles not more than 48 inches apart.

C. Reinforce bottom section with a continuous channel or angle conforming to bottom-section profile and allowing installation of astragal.

D. Reinforce sections with continuous horizontal and diagonal reinforcement, as required to stiffen door and for wind loading. Provide galvanized-steel bars, struts, trusses, or strip steel, formed to depth and bolted or welded in place.

E. Provide reinforcement for hardware attachment.

F. Thermal Insulation: Insulate interior of steel sections with door manufacturer's standard CFC-free insulation, with maximum flame-spread and smoke-developed indexes of 75 and 450,

respectively, according to ASTM E 84. Enclose insulation completely within steel sections and the interior facing material, with no exposed insulation.

2.4 TRACKS, SUPPORTS, AND ACCESSORIES

A. Tracks: Manufacturer's standard, galvanized-steel track system of configuration indicated, sized for door size and weight, designed for lift type indicated and clearances indicated on Drawings, Provide complete system including brackets, bracing, and reinforcement to ensure rigid support of ball-bearing roller guides for required door type, size, weight, and loading. Hardware shall be, at a minimum, corrosion resistant steel with primer.

1. Track Reinforcement and Supports: Galvanized-steel members to support track without sag, sway, and vibration during opening and closing of doors. Slot vertical sections of track spaced 2 inches apart for door-drop safety device.

B. Weatherseals: Replaceable, adjustable, continuous, compressible weather-stripping gaskets of flexible vinyl, rubber, or neoprene fitted to bottom and top of sectional door unless otherwise indicated.

C. Windows: Manufacturer's standard window units of type, size, and in arrangement indicated. Provide removable stops of same material as door-section frames.

D. Where HI-LIFT style doors are indicated in the door schedule, provide HI-LIFT style doors to maximize the allowable vertical track for the installation. **Supplier to coordinate final configuration of door track with Contractor and Engineer during the submittal process**.

2.5 HARDWARE

A. General: Heavy-duty, stainless-steel, corrosion-resistant fasteners.

B. Hinges: Heavy-duty, galvanized-steel hinges at each end stile and at each intermediate stile, according to manufacturer's written recommendations for door size. Attach hinges to door sections through stiles and rails.

C. Rollers: Heavy-duty rollers with steel ball-bearings in case-hardened steel races, mounted with varying projections to suit slope of track. Provide 3-inch- diameter roller tires for 3-inch- wide track and 2-inch- diameter roller tires for 2-inch- wide track.

D. Push/Pull Handles: Equip each push-up operated or emergency-operated door with galvanized-steel lifting handles on each side of door, finished to match door.

2.6 LOCKING DEVICES

A. Slide Bolt: Fabricate with side-locking bolts to engage through slots in tracks for locking by padlock, located on single-jamb side, operable from inside only.

2.7 COUNTERBALANCE MECHANISM

A. Torsion Spring: Counterbalance mechanism consisting of adjustable-tension torsion springs fabricated from steel-spring wire complying with ASTM A 229/A 229M, mounted on torsion shaft made of steel tube or solid steel. Provide springs designed for number of operation cycles indicated.

B. Cable Drums and Shaft for Doors: Cast-aluminum or gray-iron casting cable drums mounted on torsion shaft and grooved to receive door-lifting cables as door is raised. Mount counterbalance mechanism with manufacturer's standard ball-bearing brackets at each end of torsion shaft.

C. Cables: Galvanized-steel, multistrand, lifting cables.

D. Cable Safety Device: Include a spring-loaded steel or spring-loaded bronze cam mounted to bottom door roller assembly on each side and designed to automatically stop door if either lifting cable breaks.

E. Bracket: Provide anchor support bracket as required to connect stationary end of spring to the wall and to level the shaft and prevent sag.

F. Bumper: Provide spring bumper at each horizontal track to cushion door at end of opening operation.

2.8 MANUAL DOOR OPERATORS

A. General: Equip door with manual door operator by door manufacturer.

B. Push-up Operation: Lift handles and pull rope for raising and lowering doors, with counterbalance mechanism designed so that required lift or pull for door operation does not exceed 25 lbf.

C. Chain-Hoist Operator: Consisting of endless steel hand chain, chain-pocket wheel and guard, and gear-reduction unit with a maximum 25-lbf force for door operation. Provide alloy-steel hand chain with chain holder secured to operator guide.

2.9 ELECTRIC DOOR OPERATORS

A. General: Electric door operator assembly of size and capacity recommended and provided by door manufacturer for door and "operation cycles" requirement specified, with electric motor and factory-prewired motor controls, starter, gear-reduction unit, solenoid-operated brake, clutch, control stations, control devices, integral gearing for locking door, and accessories required for proper operation.

1. Comply with NFPA 70.
2. Control equipment complying with NEMA ICS 1, NEMA ICS 2, and NEMA ICS 6; with NFPA 70, Class 2 control circuit, maximum 24-V ac or dc.

3. **Where indicated as Explosion Proof or Classified in door schedule, provide Explosion proof (Class 1/Division 1) electric actuators Overhead Door RHX Explosion Proof Operator or Equal.**

B. Door-Operator Type: Unit consisting of electric motor, gears, pulleys, belts, sprockets, chains, and controls needed to operate door and meet required usage classification.

C. Motors: Reversible-type motor with controller (disconnect switch) for motor exposure indicated.

1. Electrical Characteristics:

a. Phase: Single phase.
b. Volts: 115 V.
c. Hertz: 60.

2. Motor Size: Minimum size as indicated. If not indicated, large enough to start, accelerate, and operate door in either direction from any position, at a speed not less than 8 in./sec. and not more than 12 in./sec., without exceeding nameplate ratings or service factor.

D. Obstruction Detection Device: External entrapment protection consisting of indicated automatic safety sensor capable of protecting full width of door opening. Activation of device immediately stops and reverses downward door travel.

1. Photoelectric Sensor: Manufacturer's standard system designed to detect an obstruction in door opening without contact between door and obstruction.

a. Self-Monitoring Type: Designed to interface with door operator control circuit to detect damage to or disconnection of sensing device. When self-monitoring feature is activated, door closes only with sustained pressure on close button.

E. Control Station: Three-button control station in fixed location with momentary-contact push-button controls labeled "Open" and "Stop" and sustained- or constant-pressure, push-button control labeled "Close."
1. Wall-Mounted Units: Full-guarded, standard-duty, surface-mounted, weatherproof type, NEMA ICS 6, Type 4X enclosure.

F. Emergency Manual Operation: Equip electrically powered door with capability for emergency manual operation. Design manual mechanism so required force for door operation does not exceed 25 lbf.

G. Emergency Operation Disconnect Device: Equip operator with hand-operated disconnect mechanism for automatically engaging manual operator and releasing brake for emergency manual operation while disconnecting motor without affecting timing of limit switch. Mount mechanism so it is accessible from floor level. Include interlock device to automatically prevent motor from operating when emergency operator is engaged.

H. Motor Removal: Design operator so motor may be removed without disturbing limit-switch adjustment and without affecting emergency manual operation.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install sectional doors and operating equipment complete with necessary hardware, anchors, inserts, hangers, and equipment supports; according to manufacturer's written instructions and as specified.

B. Tracks: Provide sway bracing, diagonal bracing, and reinforcement as required for rigid installation of track and door-operating equipment.

C. Accessibility: Install sectional doors, switches, and controls along accessible routes in compliance with regulatory requirements for accessibility.

D. Power-Operated Doors: Install automatic garage doors openers according to UL 325.

E. Adjust hardware and moving parts to function smoothly so that doors operate easily, free of warp, twist, or distortion.

F. Touch-up Painting: Immediately after welding galvanized materials, clean welds and abraded galvanized surfaces and repair galvanizing to comply with ASTM A 780/A 780M.

3.2 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain sectional doors.

END OF SECTION 083613

SECTION 312000 - EARTH MOVING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Preparing subgrades for slabs-on-grade, walks, pavements, turf, and grasses and plants.
2. Excavating and backfilling for buildings and structures.
3. Drainage course for concrete slabs-on-grade.
4. Subbase course for concrete walks, pavements.
5. Subbase course and base course for asphalt paving.
6. Excavating and backfilling for utility trenches.

1.2 DEFINITIONS

A. Backfill: Soil material used to fill an excavation.

1. Initial Backfill: Backfill placed beside and over pipe in a trench, including haunches to support sides of pipe.
2. Final Backfill: Backfill placed over initial backfill to fill a trench.

B. Base Course: Aggregate layer placed between the subbase course and hot-mix asphalt paving.

C. Bedding Course: Aggregate layer placed over the excavated subgrade in a trench before laying pipe.

D. Borrow Soil: Satisfactory soil imported from off-site for use as fill or backfill.

E. Drainage Course: Aggregate layer supporting the slab-on-grade that also minimizes upward capillary flow of pore water.

F. Excavation: Removal of material encountered above subgrade elevations and to lines and dimensions indicated.

1. Authorized Additional Excavation: Excavation below subgrade elevations or beyond indicated lines and dimensions as directed by Architect. Authorized additional excavation and replacement material will be paid for according to Contract provisions for changes in the Work.
2. Unauthorized Excavation: Excavation below subgrade elevations or beyond indicated lines and dimensions without direction by Architect. Unauthorized excavation, as well as remedial work directed by Architect, shall be without additional compensation.

G. Fill: Soil materials used to raise existing grades.

H. Structures: Buildings, footings, foundations, retaining walls, slabs, tanks, curbs, mechanical and electrical appurtenances, or other man-made stationary features constructed above or below the ground surface.

I. Subbase Course: Aggregate layer placed between the subgrade and base course for hot-mix asphalt pavement, or aggregate layer placed between the subgrade and a cement concrete pavement or a cement concrete or hot-mix asphalt walk.

J. Subgrade: Uppermost surface of an excavation or the top surface of a fill or backfill immediately below subbase, drainage fill, drainage course, or topsoil materials.

K. Utilities: On-site underground pipes, conduits, ducts, and cables, as well as underground services within buildings.

1.3 QUALITY ASSURANCE

A. Contractor to notify Engineer of excavation plans a minimum of 48 hours in advance.

1.4 PROJECT CONDITIONS

A. Utility Locator Service: Notify utility locator service for area where Project is located before beginning earth moving operations.

PART 2 - PRODUCTS

2.1 SOIL MATERIALS

A. General: Provide borrow soil materials when sufficient satisfactory soil materials are not available from excavations.

B. Satisfactory Soils: Soil Classification Groups GW, GP, GM, SW, SP, and SM according to ASTM D 2487, or a combination of these groups; free of rock or gravel larger than 3 inches in any dimension, debris, waste, frozen materials, vegetation, and other deleterious matter.

C. Unsatisfactory Soils: Soil Classification Groups GC, SC, CL, ML, OL, CH, MH, OH, and PT according to ASTM D 2487, or a combination of these groups.

1. Unsatisfactory soils also include satisfactory soils not maintained within 2 percent of optimum moisture content at time of compaction.

D. Subbase Material: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940; with at least 90 percent passing a 1-1/2-inch sieve and not more than 12 percent passing a No. 200 sieve.

E. Base Course: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940; with at least 95 percent passing a 1-1/2-inch sieve and not more than 8 percent passing a No. 200 sieve.

F. Engineered Fill: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940; with at least 100 percent passing a 1-1/2-inch sieve and not more than 10 percent passing a No. 200 sieve. The gradation shall have the following gradation requirements:

1-1/2 inch Gradation

Sieve Size	Percentage Passing	Tolerance
1-1/2-inch	100	0
3/4-inch	86	±5
1/2-inch	72	±5
No. 4	48	±5
No. 16	26	±3
No. 200	8	±2

3/4 inch Gradation

Sieve Size	Percentage Passing	Tolerance
3/4-inch	100	0
1/2-inch	85	±7
No. 4	61	±6
No. 16	33	±5
No. 200	9	±2

G. Bedding Course: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940; except with 100 percent passing a 1-inch sieve and not more than 8 percent passing a No. 200 sieve.

H. Bank Run Fill: Imported granular material free from rock or gravel larger than 6-inches in any dimension with less than fifteen percent (15%) passing the No. 200 sieve. Bank-run fill shall be placed in finished lifts not to exceed 8 inches and compacted to 95% of maximum dry density per ASTM D-698.

Sieve Size	Percentage Passing
3-inch	100
3/8-inch	40-50
No. 8	35-65
No. 50	10-30
No. 200	5-15

I. Drainage Course: Narrowly graded mixture of washed crushed stone, or crushed or uncrushed gravel; ASTM D 448; coarse-aggregate grading Size 57; with 100 percent passing a 1-1/2-inch sieve and 0 to 5 percent passing a No. 8 sieve. The gradation shall have the following gradation requirements:

Sieve Size	Percentage Passing
1-1/2-inch	100
3/4-inch	90-100
3/8-inch	40-100
No. 4	5-40
No. 8	0-5

2.2 ACCESSORIES

A. Warning Tape: Acid- and alkali-resistant, polyethylene film warning tape manufactured for marking and identifying underground utilities, 6 inches wide and 4 mils thick, continuously inscribed with a description of the utility; colored to comply with local practice or requirements of authorities having jurisdiction.

B. Detectable Warning Tape: Acid- and alkali-resistant, polyethylene film warning tape manufactured for marking and identifying underground utilities, a minimum of 6 inches wide and 4 mils thick, continuously inscribed with a description of the utility, with metallic core encased in a protective jacket for corrosion protection, detectable by metal detector when tape is buried up to 30 inches deep; colored to comply with local practice or requirements of authorities having jurisdiction.

PART 3 - EXECUTION

3.1 PREPARATION

A. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earth moving operations.

B. Protect and maintain erosion and sedimentation controls during earth moving operations.

C. Protect subgrades and foundation soils from freezing temperatures and frost. Remove temporary protection before placing subsequent materials.

3.2 EXCAVATION, GENERAL

A. Unclassified Excavation: Excavate to subgrade elevations regardless of the character of surface and subsurface conditions encountered. Unclassified excavated materials may include rock, soil materials, and obstructions. No changes in the Contract Sum or the Contract Time will be authorized for rock excavation or removal of obstructions.

1. If excavated materials intended for fill and backfill include unsatisfactory soil materials and rock, replace with satisfactory soil materials.

3.3 EXCAVATION FOR STRUCTURES

A. Excavations shall include the removal of all materials of whatever nature encountered including removal or relocation of all obstructions that would interfere with the proper execution of the Work. The removal of said materials shall conform to the lines and grades shown on the plans or ordered by the Engineer. The Contractor shall furnish, place and maintain all supports and shoring that may be required for safety of excavations and protection of adjacent structures and all pumping, ditching or other measures necessary for the removal or exclusion of water, including taking care of storm water, groundwater and wastewater reaching the site of the Work from any source so as to prevent damage to the Work or adjoining property. Excavations shall be sloped or otherwise supported in a safe manner in accordance with applicable State safety

requirements and the requirements of OSHA Safety and Health Standards for Construction (29CFR1926).

B. Excavations beneath structures shall be carried to the grades shown or specified. Over-excavations ordered by the Engineer that are not shown or specified and the resulting backfill will be paid for under a separate unit price bid item if such bid item has been established, otherwise payment will be made in accordance with a negotiated price. After the required excavation or over-excavation has been completed the exposed surface shall be scarified to a depth of 6-inches, brought to optimum moisture content and rolled with heavy compaction equipment to obtain ninety percent (90%) of maximum density.

C. Excavation under roadways and areas to be paved shall extend to the bottom of the aggregate base. After the required excavation has been completed the exposed surface shall be scarified brought to optimum moisture content and rolled with heavy compaction equipment to obtain ninety-five percent (95%) of maximum density.

D. The subgrade area beneath embankments shall be excavated to remove the top 8-inches of native or topsoil material. Where the subgrade is sloped the excavation shall be benched.

E. The Contractor shall keep separate and stockpile from required excavations all topsoil consisting of the top 8-inches of native material. The Contractor shall place and grade this topsoil material as the top 6-inches on areas requiring landscaping, if applicable, to the extent it remains available.

F. The Contractor shall notify the Engineer of the completion of any structural excavation and shall allow the Engineer at least 24-hours review period before the exposed foundation is scarified and compacted or is covered with any structural backfill materials.

G. The Contractor shall remove and dispose of all excess excavated material at a site selected by the Contractor and reviewed by the Engineer.

H. Excavate to indicated elevations and dimensions within a tolerance of plus or minus 1 inch. If applicable, extend excavations a sufficient distance from structures for placing and removing concrete formwork, for installing services and other construction, and for inspections.

1. Excavations for Footings and Foundations: Do not disturb bottom of excavation. Excavate by hand to final grade just before placing concrete reinforcement. Trim bottoms to required lines and grades to leave solid base to receive other work.

I. Excavations at Edges of Tree- and Plant-Protection Zones:

1. Excavate by hand to indicated lines, cross sections, elevations, and subgrades. Use narrow-tine spading forks to comb soil and expose roots. Do not break, tear, or chop exposed roots. Do not use mechanical equipment that rips, tears, or pulls roots.
2. Cut and protect roots according to requirements in Section 015639 "Temporary Tree and Plant Protection."

3.4 EXCAVATION FOR WALKS AND PAVEMENTS

A. Excavate surfaces under walks and pavements to indicated lines, cross sections, elevations, and subgrades.

3.5 EXCAVATION FOR UTILITY TRENCHES

A. Unless otherwise shown or ordered, excavation for pipelines and utilities shall be open-cut trenches. The bottom of the trench shall have a minimum width equal to the outside diameter of the pipe plus 24-inches. Trenches for pipelines smaller than 8-inches shall be excavated uniformly to the grade of the bottom of the pipe. Trenches for pipelines 8 inches and larger, unless otherwise ordered by the Engineer, shall be excavated uniformly to the grade 6-inches below the grade of the outside bottom of the pipe. The over-excavation shall be replaced with material as indicated in the Geotechnical Report (Section 319000). The pipe bedding shall be compacted by mechanical means suitable to the Engineer to eighty-five percent (85%) of relative density. The trench bottom shall be uniformly graded so that each pipe section when first laid will be continually in contact with the bedding along the entire length of the pipe. Where granular backfill under footings encases an underdrain piping system or has a thickness of 18-inches or greater or where shown on the Drawings, a layer of soil stabilization fabric shall be placed under the first horizontal layer of granular backfill. Soil stabilizer fabric shall be Mirafi 500, Contech C200, or equal. The sloping or vertical side slopes shall receive a layer of Mirafi 140 NL, Contech C-45NW, or equal.

B. The maximum amount of open trench permitted in any one location shall be the length necessary to accommodate the amount of pipe installed and backfilled in a single day. The Contractor shall make every reasonable effort to backfill all trenches at the end of each day. When this is not possible, barricades with warning lights meeting OSHA requirements shall be provided, set and maintained.

C. All pipeline and utility trench excavations shall be kept reasonably free from excess water during excavation, fine grading, pipe laying, and backfilling operations. Ground water shall be lowered to the extent necessary to keep the trench free from water and the trench bottom stable when the work within the trench is in progress. The Contractor shall provide and maintain at all times during construction ample means and equipment with which to properly and promptly remove and dispose of all water entering the excavation or other parts of the Work whether the water be surface water or underground water. The Contractor shall dispose of the water from the Work site in a suitable manner without damage to adjacent property.

D. When ordered by the Engineer, whether indicated on the Drawings or not, trenches shall be over-excavated beyond the depth shown or specified. Such over-excavation shall be to the depth ordered. The trench shall then be backfilled to the grade required. When the over excavation ordered by the Engineer is 4-inches or greater below the limits shown, additional payment will be made to the Contractor for that portion of the Work which is located below said 4-inch distance. Said additional payment will be made under separate unit price bid items for over-excavation and bedding if such bid items have been established, otherwise payment will be made in accordance with a negotiated price.

E. The Contractor shall remove and dispose of all excess excavated material at a site selected by the Contractor and reviewed by the Engineer.

F. Excavate trenches to indicated gradients, lines, depths, and elevations.

G. Trenches in Tree- and Plant-Protection Zones:

1. Hand-excavate to indicated lines, cross sections, elevations, and subgrades. Use narrow-tine spading forks to comb soil and expose roots. Do not break, tear, or chop exposed roots. Do not use mechanical equipment that rips, tears, or pulls roots.
2. Do not cut main lateral roots or taproots; cut only smaller roots that interfere with installation of utilities.
3. Cut and protect roots according to requirements in Section 015639 "Temporary Tree and Plant Protection."

3.6 UNAUTHORIZED EXCAVATION

A. Fill unauthorized excavation under foundations or wall footings by extending bottom elevation of concrete foundation or footing to excavation bottom, without altering top elevation. Fill of unauthorized excavations shall be at the Contractor's expense. Lean concrete fill, with 28-day compressive strength of 2500 psi, may be used when approved by Engineer.

1. Fill unauthorized excavations under other construction, pipe, or conduit as directed by Engineer.

3.7 STORAGE OF SOIL MATERIALS

A. Stockpile borrow soil materials and excavated satisfactory soil materials without intermixing. Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust.

1. Stockpile soil materials away from edge of excavations. Do not store within drip line of remaining trees.

3.8 PIPE AND UTILITY TRENCH BACKFILL

A. Place backfill on subgrades free of water, mud, frost, snow, or ice.

B. Except for drain rock materials being placed in over-excavated areas of the trench for dewatering purposes, backfill shall be placed after all water is removed from the excavation.

C. Place and compact bedding course on trench bottoms and where indicated. Shape bedding course to provide continuous support for bells, joints, and barrels of pipes and for joints, fittings, and bodies of conduits.

D. Trenches under Footings: Any piping which passes below a footing within 6 feet (measured from the bottom of the footing to the top of the pipe), shall be encased in concrete as detailed in the drawings.

E. Place and compact initial backfill of as required in the Geotechnical Report (Section 319000).

1. Backfill material shall not be dropped directly on the pipe or utility conduit.

2. Carefully compact initial backfill under pipe haunches and compact evenly up on both sides and along the full length of piping or conduit to avoid damage or displacement of piping or conduit. Coordinate backfilling with utilities testing.

F. Place and compact final backfill as required in the Geotechnical Report (Section 319000) to final subgrade elevation.

G. Install warning tape directly above utilities, 12 inches below finished grade, except 6 inches below subgrade under pavements and slabs.

H. Pipe-zone and utility trench backfill material shall be spread and compacted in layers not to exceed 6-inches in thickness. Compaction shall be achieved using mechanical equipment. Flooding, ponding or jetting shall not be used for compaction unless otherwise approved by the Engineer. Pipe zone backfill material shall be manually spread around the pipe so, when compacted, the pipe zone backfill will provide uniform bearing and side support. Piping shall be protected from lateral displacement and possible damage resulting from impact or unbalanced loading during backfill operations. Trench zone backfill material shall be uniformly spread and mechanically compacted in layers not to exceed 12-inches in thickness. Moisture content shall be uniformly adjusted by wetting or drying as necessary.

I. Pipe zone including bedding compaction requirements shall be ninety-five percent (95%) of maximum density or eighty-five percent (85%) at relative density whichever is applicable.

J. Trench zone backfill using required excavated material shall be not less than eighty-five (85%) of maximum density except under paved areas, sidewalks, pipelines, utilities and structures which shall not be less than ninety-five percent (95%) of maximum density.

K. Aggregate base course materials shall be placed and compacted to not less than ninety-five percent (95%) of maximum density.

3.9 SOIL FILL

A. Plow, scarify, bench, or break up sloped surfaces steeper than 1 vertical to 4 horizontal so fill material will bond with existing material.

B. Place and compact fill material in layers to required elevations using satisfactory native material, or imported as required in the Geotechnical Report.

3.10 SOIL MOISTURE CONTROL

A. Uniformly moisten or aerate subgrade and each subsequent fill or backfill soil layer before compaction to within 2 percent of optimum moisture content.

1. Do not place backfill or fill soil material on surfaces that are muddy, frozen, or contain frost or ice.
2. Remove and replace, or scarify and air dry, otherwise satisfactory soil material that exceeds optimum moisture content by 2 percent and is too wet to compact to specified dry unit weight.

3.11 COMPACTION OF SOIL BACKFILLS AND FILLS

A. Place backfill and fill soil materials in layers not more than 8 inches in loose depth for material compacted by heavy compaction equipment, and not more than 4 inches in loose depth for material compacted by hand-operated tampers.

B. Place backfill and fill soil materials evenly on all sides of structures to required elevations, and uniformly along the full length of each structure.

C. Compact soil materials to not less than the following percentages of maximum dry unit weight according to AASHTO T-180:

1. Under structures, building slabs, steps, and pavements, scarify and recompact top 12 inches of existing subgrade and each layer of backfill or fill soil material at 95 percent.
2. Under walkways, scarify and recompact top 6 inches below subgrade and compact each layer of backfill or fill soil material at 92 percent.
3. Under turf or unpaved areas, scarify and recompact top 6 inches below subgrade and compact each layer of backfill or fill soil material at 85 percent.
4. For utility trenches, compact each layer of initial and final backfill soil material at 85 percent.

D. Backfill shall not be dropped directly on or against any structure. Backfill shall not be placed around or upon any structure until the concrete has attained the required strength to support the loads imposed. Backfill around water retaining structures shall not be placed until the structures have been tested for leaks and the structures are full of water while the backfill is being placed.

E. Equipment weighing more than 10,000 pounds shall not be used closer to walls than a horizontal distance equal to the depth of the fill at that time. Hand operated power compaction equipment shall be used where use of heavier equipment is impractical or restricted due to weight limitations or may cause damage to the structure.

3.12 GRADING

A. General: Uniformly grade areas to a smooth surface, free of irregular surface changes. Comply with compaction requirements and grade to cross sections, lines, and elevations indicated.

B. Site Rough Grading: Slope grades to direct water away from buildings and to prevent ponding. Finish subgrades to required elevations within the following tolerances:

1. Turf or Unpaved Areas: Plus or minus 1 inch.
2. Walks: Plus or minus 1 inch.
3. Pavements: Plus or minus 1/2 inch.

C. Grading inside Building Lines: Finish subgrade to a tolerance of 1/2 inch when tested with a 10-foot straightedge.

3.13 SUBBASE AND BASE COURSES UNDER PAVEMENTS AND WALKS

A. Place subbase course and base course on subgrades free of mud, frost, snow, or ice.

B. On prepared subgrade, place subbase course and base course under pavements and walks as follows:

1. Shape subbase course and base course to required crown elevations and cross-slope grades.
2. Place subbase course and base course that exceeds 6 inches in compacted thickness in layers of equal thickness, with no compacted layer more than 6 inches thick or less than 3 inches thick.
3. Compact subbase course and base course at optimum moisture content to required grades, lines, cross sections, and thickness to not less than 95 percent of maximum dry unit weight according to AASHTO T-180.

3.14 DRAINAGE COURSE UNDER CONCRETE SLABS-ON-GRADE

A. Place drainage course on subgrades free of mud, frost, snow, or ice.

B. On prepared subgrade, place and compact drainage course under cast-in-place concrete slabs-on-grade as follows:

1. Place drainage course that exceeds 6 inches in compacted thickness in layers of equal thickness, with no compacted layer more than 6 inches thick or less than 3 inches thick.
2. Compact each layer of drainage course to required cross sections and thicknesses to not less than 95 percent of maximum dry unit weight according to AASHTO T-180.

3.15 FIELD QUALITY CONTROL

A. Testing Agency: Refer to General Conditions and Summary of Work to determine who will engage a qualified geotechnical engineering testing agency to perform tests and inspections.

B. Allow testing agency to inspect and test subgrades and each fill or backfill layer. Proceed with subsequent earth moving only after test results for previously completed work comply with requirements.

C. Footing Subgrade: At footing subgrades, at least one test of each soil stratum will be performed to verify design bearing capacities. Subsequent verification and approval of other footing subgrades may be based on a visual comparison of subgrade with tested subgrade when approved by Engineer.

D. When testing agency reports that subgrades, fills, or backfills have not achieved degree of compaction specified, scarify and moisten or aerate, or remove and replace soil materials to depth required; recompact and retest until specified compaction is obtained.

3.16 PROTECTION

A. Protecting Graded Areas: Protect newly graded areas from traffic, freezing, and erosion. Keep free of trash and debris.

B. Repair and reestablish grades to specified tolerances where completed or partially completed surfaces become eroded, rutted, settled, or where they lose compaction due to subsequent construction operations or weather conditions.

C. Where settling occurs before Project correction period elapses, remove finished surfacing, backfill with additional soil material, compact, and reconstruct surfacing.

1. Restore appearance, quality, and condition of finished surfacing to match adjacent work, and eliminate evidence of restoration to greatest extent possible.

3.17 DISPOSAL OF SURPLUS AND WASTE MATERIALS

A. Remove surplus satisfactory soil and waste materials, including unsatisfactory soil, trash, and debris, and legally dispose of them off Owner's property at the Contractor’s expense.

3.18 DEWATERING

A. Prevent surface water and subsurface or ground water from flowing into trenches and excavations and from flooding project site and surrounding area.

1. The Contractor shall investigate site and submit a dewatering plan to the engineer for review
2. The existing drain system may be used for discharging ground water.
3. Do not allow water to accumulate in excavations. Remove water to prevent softening of foundation bottoms, undercutting footings, and soil changes detrimental to stability of subgrades and foundations. Provide and maintain pumps, well point, sumps, suction and discharge lines, and other dewatering system components necessary to convey water away from excavations.
4. Establish and maintain temporary drainage ditches and other diversions outside excavation limits to convey rainwater and water removed from excavations to collecting or runoff areas. Do not use trench excavations as temporary drainage ditches.

END OF SECTION 312000

SECTION 400574 - PINCH VALVES

PART 1 - GENERAL

1.1 SUBMITTALS

A. Submit product literature that includes information on the performance and operation of the valve, materials of construction, dimensions and weights, sleeve trim design, elastomer characteristics, flow data, pressure rating.

B. Upon request, provide shop drawings that clearly identify the valve dimensions including all supplied accessories.

1.2 QUALITY ASSURANCE

A. Supplier shall have at least ten (10) years experience in the manufacture of pinch style valves and shall provide references and a list of installations upon request.

PART 2 - PRODUCTS

2.1 AIR OPERATED PINCH VALVES

A. Valves are to be of the pneumatically operated jacket pinch type with flanged joint ends. Valve body shall be of cast iron construction and shall be drilled and tapped for a pressure connection on top and on bottom of the housing. Valve shall be two-piece split body construction. The two halves shall be sealed by diamond shaped cross section EPDM gasket permanently locked by a groove in the valve body. Company name and location shall be cast onto the valve body.

B. All internal metal valve parts are to be completely protected from the process fluid by a flexible EPDM pinch tube. The EPDM pinch sleeve shall be one piece construction with flanges, drilled to be retained by the flange bolts. The pinch tube shall also be Nylon reinforced with an exterior wrapping of 1/8" thick Neoprene. Port area shall be 100% of the mating pipe port area through the entire valve length.

2.2 FUNCTION

A. To close the valve, air or hydraulic pressure is applied to the outside of the sleeve via the NPT connection tapped into the valve body. Required pressure is calculated as follows: 0.58 psi (Line Pressure) + 25 psi (Required Actuation Pressure) = 25.6 psi (Total Closing Pressure Required). With no pressure applied, valve will return to full open position.

2.3 MANUFACTURER

A. All valves shall be of the Type A as manufactured by the Red Valve Co., Inc. of Carnegie, PA 15106 or equal.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Valve shall be installed in accordance with manufacturer's written Installation and Operation Manual and approved submittals.

3.2 MANUFACTURER'S CUSTOMER SERVICE

A. Manufacturer's authorized representative shall be available for customer service during installation and start-up, and to train personnel in the operation, maintenance and troubleshooting of the valve.

B. Manufacturer shall also make customer service available directly from the factory in addition to authorized representatives for assistance during installation and start-up, and to train personnel in the operation, maintenance and troubleshooting of the valve.

END OF SECTION

SECTION 437600 – DIGESTER GAS SAFETY EQUIPMENT

PART 1 - GENERAL

1.1 SUMMARY

A. The Contractor shall furnish and install gas handling equipment for the anaerobic sludge digesters and the sewage gas piping system and all appurtenant work, complete and operable, including condensate and sediment traps, drip traps, flame arresters, flame traps, flame check, pressure relief/flame trap, pressure and vacuum relief valves, foam separator, and waste gas burner in accordance with the requirements of the Contract Documents.

1.2 REFERENCE SPECIFICATIONS, CODES, AND STANDARDS

A. Codes: All codes, as referenced herein, are specified in Section 014200 – Reference Standards.

1. ANSI/NFPA 70 - National Electric Code

B. Commercial Standards

1. ANSI B16.1 - Cast Iron Pipe Flanges and Flanged Fittings, Class 25, 123, 250, and 800

2. ANSI B16.5 - Pipe Flanges and Flanged Fittings, Steel Nickel Alloy and Other Special Alloys

1.3 CONTRACTOR SUBMITTALS

A. Prior to ordering of equipment, the CONTRACTOR shall submit shop drawings of all sludge processing equipment in accordance with Section 013300 – Contractor Submittals.

PART 2 - PRODUCTS

2.1 DRIP TRAPS

A. The drip traps shall be of a “Manual Drip Trap” style and shall have a 1” NPT inlet and outlet connections. Drip Trap shall be rotating disc type. Gas escaping to atmosphere is not possible regardless of the disc position. An air inlet port shall be provided to permit free flow of condensate from reservoir when draining. All ports shall be O ring sealed. Construction shall be low copper aluminum body and cover. Internal working parts and

fasteners shall be stainless steel. Maximum working pressure shall be at least 5 psig. The drip trap shall have 6 quart capacity. All drip traps shall be piped to a drain, as shown on the Drawings.

B. Acceptable Manufacturers:

1. Varec Biogas,

2. Shand and Jurs,

3. Groth Corporation,

4. Or equal

2.2 CONDENSATE TRAPS

A. Condensate and sediment trap shall have connections as shown in drawings. Storage capacity shall be a minimum of 6 gallons (23 liters) sediment and 6 gallons (23 liters) condensate. An inlet elbow shall be specifically designed to swirl the gas inside the reservoir. An internal baffle shall be located at the base of the reservoir to provide efficient separation of entrained solids. A 2" (50 mm) NPT blowout connection, a 1" (25 mm) NPT drain connection, and two 1/2" (15 mm) NPT connections for a sight glass shall be provided. A removable top cover for interior access with integral 3/4" (20 mm) NPT inspection pipe for sediment level measurement shall be provided.

B. Construction shall be 316SS

C. Flanges shall be drilled to ANSI 150 FF dimensions. Maximum working pressure shall be 25 psig (172 kPa). Condensate and Sediment trap shall be Varec Biogas 233 Series.

D. Sight glass assembly shall have 1/2" NPT connections. Assembly shall include two stainless steel isolation valves to facilitate cleaning. The lower valve shall include a stainless steel drain cock. For protection, the sight tube shall be provided with stainless steel guard rods.

E. Sight glass shall be Varec Biogas Model 2181.

2.3 FLAME ARRESTERS

A. The flame arrester shall have an ANSI class 125 flange as shown on the drawings. Housing construction shall be cast aluminum. Flame arrester net free area through the bank assembly shall be not less than three times the corresponding size standard pipe. Entire bank assembly shall slide easily out of the arrester housing to facilitate inspection and cleaning. Removing or replacing the bank assembly shall not require support for alignment, jackscrew for extending the housing, and shall not place a strain on the connecting piping. Bank frame shall be extensible and shall be filled with corrugated rectangular shaped bank sheets. Alternating flat and crimped ribbon is not an acceptable substitute. When installed on a horizontal position, the flame arrester shall include an offset housing with a ½" drip trap connection at the low point. Vertical installation shall

be self-draining. Arrester housing construction shall be low copper cast aluminum. Bank assembly shall include a low copper aluminum frame and bank sheets with stainless steel hardware.

B. Acceptable Manufacturers:

1. Varec Biogas,

2. Shand and Jurs,

3. Groth Corporation,

4. Or equal

2.4 PRESSURE AND VACUUM RELIEF VALVE

A. Pressure and vacuum relief valve shall have flanged connections. Pressure relief shall be set at 15" WC. Capacity shall be not less than 4,000 SCFH digester gas of 0.8 s.g. at 4" WC overpressure. Vacuum relief shall be set at 2" w.c. Capacity shall not be less than 4,000 SCFH digester gas of 0.8 s.g. at 1" w.c. under pressure.

B. Valve pressure and vacuum ports shall be oversized to keep overpressure to a minimum. Pallets and seat rings shall be replaceable and interchangeable. Pallets shall be dead weight loaded, and both center and side guided for stability. They shall incorporate replaceable "air cushion" Teflon seat inserts. HDPE protective screens shall be provided at the pressure and vacuum ports, located external of the pallets.

C. The valve body and cover shall be low copper cast aluminum construction. Spun hood, seat rights, and pallet assemblies shall be low copper aluminum. Guideposts shall be 304 stainless steel. Flanges shall be drilled ANSI 125 FF Flanged dimensions.

D. Acceptable Manufacturers:

1. Varec Biogas,

2. Groth Corporation,

3. Shand and Jurs,

4. Or equal

2.5 SAFETY SELECTOR VALVE

A. The valve design shall prevent the possibility of leaving the digester unprotected at any time during the switch-over of the operating Pressure and Vacuum Relief (PVR) Valve and Flame Arrester Assembly.

B. Valve shall have built in seat equalization. This is defined as the pressure being uniform and equalized across the SSV seat during changeover to facilitate the changeover process. During changeover pressure shall be applied to both sides of the seating surface. Valves in which pressure is applied to only one side of the seating surface during changeover shall not be allowed. No special tools shall be required to operate the unit. The SSV shall require no more than 80 foot-pounds of torque to equalize the seat. Units requiring more than 80 foot-pounds shall be supplied with explosion proof electric actuators.

C. There shall be means to accommodate a locking device shall be provided to prevent unwanted access to either of the Pressure and Vacuum Relief (PVR)Valve and Flame Arrester Assembly.

D. The SSV shall have a pressure drop through the active device of not greater than 3% of the flow with the pressure relief valve fully open. Valve design shall have Cv values which are verified in an ASME certified flow test facility. Testing shall have been witnessed by an ASME observer and test reports shall be supplied as part of the submittal process. Cv shall, at a minimum, be as defined in the following table:

Size	Cv
2”	225
3”	612
4”	1061
6”	2713
8”	4512

E. Packing design shall be tested to ASTM E427, Method A Halogen Leak Test, to reduce the possibility of fugitive emissions.

F. The SSV shall come with threaded ports on both process sides. The threaded ports shall come with 1” manual hand valves constructed in stainless steel. This will allow pressure testing of each process side and subsequently allow field testing and calibration of the Pressure and Vacuum Relief Valve and Flame Arrester.

G. The Safety Selector Valve shall be rated for a minimum pressure of 15 psig at 100 degrees F and shall be rated for a maximum temperature of 400 degrees F. The unit shall come with ANSI 150 FF Flanged Connections.

H. Material shall be as follows: Body, Base: Aluminum; Rotor, Indicator and Seat: 316 SS; Isolation Disk, Index Shaft, Retraction Bushing: 1704 stainless steel; Body/Base Nut and Process Connection Nut: SA194-8M stainless steel; Body/Base Stud and Process Connection Stud: SA193-B8M stainless steel; Soft Goods: Teflon.

2.6 INSULATING JACKETS

A. The units installed outside shall be provided with an easily removable 1” thick insulation jacket. The insulating jacket shall be constructed with a silicone impregnated woven glass cloth lining with a 1” thick, 6-lb density fiber glass insulating material. Through-cover quilting pins provide firm support for the insulation. The pins shall keep the insulation from shifting inside the liner and jacket for dimensional stability and uniform heat retention. The silicone lining has inside seams and folded closing seams with two parallel

rows of stitching. The specially made insulating jacket shall be attached to the unit with a combination of Velcro and cinch belts. When specifying with flame arrester: The jacket must allow access to the flame arrester bank assembly during maintenance without removing the entire jacket.

PART 1 - EXECUTION

1.1 INSTALLATION

A. General: All gas handling equipment shall be installed in strict accordance with the manufacturer's printed recommendations.

B. Upon completion of the installation, each piece of equipment and each system shall be tested for satisfactory operation without leakage, excessive noise, vibration, overheating, etc. All equipment must be adjusted and checked for misalignment, clearance, supports, and adherence to safety standards.

END OF SECTION 437600

SECTION 437720 - DIGESTER GAS WASTE GAS BURNER SYSTEM

PART 1 - GENERAL

1.1 SUMMARY

A. This Section specifies equipment required to burn raw, wet, unconditioned biogas from anaerobic digesters. Equipment shall include the candle-stick flare and include automatic pilot ignition equipment.

1.2 RELATED WORK

A. Section 033000 – Cast-in-place Concrete

B. Section 221060 – Stainless Steel Pipe

C. Division 26 – Electrical

D. Division 40 – Process Integration

E. Section 437100 – Digester Gas H_2S Scrubber System

F. Section 437600 – Digester Gas Safety Equipment

1.3 SUPPLIER QUALIFICATIONS

A. The equipment supplier shall have a minimum of 5 years of experience in supply similar equipment for digester gas purification with the specified treatment and conditioning units.

1.4 QUALITY ASSURANCE

A. Qualifications of installers: Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work of this section.

B. Basis of acceptance: The manufacturer's recommended installation procedures, when approved by the Engineer, will become the basis for inspecting and accepting or rejecting actual installation procedures used on this work.

1.5 WARRANTY

A. The waste gas burner system including all equipment, instrumentation, appurtenances, controls, and system performance, shall have a written Warranty for the lesser of 18 months from the receipt date of the complete system, or for 12 months of operating time unless otherwise specified. The warranty shall include parts and labor. The manufacturer shall provide instrumentation and

monitoring systems sufficient to verify the performance of the system in accordance with the requirements of this section.

B. Where equipment or system does not perform as required above, the equipment shall be repaired or replaced by the manufacturer at no cost to the Owner until such conditions are met.

1.6 PIPING COORDINATION

A. The supplier shall coordinate with the Contractor for the design and installation of all interconnecting digester gas and drainage piping so that the digester gas handling system functions properly. The Contractor shall furnish the Supplier with piping layouts prior to fabrication. The Supplier shall review Contractor pipe layouts and notify both the Contractor and the Engineer of any changes required to make the digester gas handling system function properly.

1.7 ENVIRONMENTAL CONDITIONS

A. The equipment to be provided under this section shall be suitable for installation in weather exposed locations at the operating wastewater treatment plant in North Salt Lake, Utah. The project site is approximately 4,260 feet above sea level. Outside ambient temperatures are expected to range between -16°F and 112 °F. The equipment will be subject to wind, rain, UV/sun exposure, snow and extending freezing conditions. All exposed gas and drain piping shall be insulated and heat traced.

1.8 SUBMITTALS

1. Submittals shall comply with the requirements of Section 013300 – Contractor Submittals.
2. Electrical wiring diagram and details.
3. Drawing and catalog information detailing all control devices in the control cabinets as well as overall panel layout interconnection diagrams and construction.

A. Foundation recommendations and anchor bolt sizing for the vessels, and seismic design calculations signed and sealed by a Utah registered P.E.

B. Supplier’s information confirming interface requirements between PLC and plant SCADA system.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. Proprietary products: References to specified proprietary products are used to establish minimum standards of utility and quality. Other materials may be considered by the Engineer in accordance with the provisions of Section.

B. Acceptable Manufacturers:

1. Varec Biogas,

2. Shand and Jurs,

3. Groth Corporation,

4. Or equal

2.2 DIGESTER GAS BURNER SYSTEM (FLARE)

A. The Digester Gas flare system shall be a unitized, modular system including all components for a complete and operational system.

B. The pilot system shall utilize on-site natural gas connection.

C. Design Parameters

1. Waste gas burner shall have a 6-inch size flanged waste gas connection. Burning capacity shall not more than 60 CFM gas of 0.9 specific gravity at 60 deg. F with 0.5" WC pressure drop. Burner shall be designed for waste gas composed primarily of methane.

D. Burner Construction

1. Burner shall be self-supporting on 150# ANSI RF flange for winds to 150 mph (242 km/h).

2. Burner shall be constructed with 304 stainless steel shroud and upper 24" (610 mm) of stack and pilot piping. Remainder of burner stack shall be mild steel. 316 SS Pilot nozzles, 316 SS thermocouple.

E. Pilot Gas Supply

1. Continuous flame nozzle shall be mounted integral to the burner and shall have a long profile flame. Pilot shall be inclined 45 degrees off vertical. Pilot flame shall extend through waste gas flow profile to ensure ignition of waste gas regardless of the flow rate.

2. Unprotected pilot shall withstand winds up to 110 mph (180 km/h) without the use of downdraft protectors, vortex vanes or other flow restricting devices.

3. Provide a waste gas burner that will allow operation using pilot gas supply pressure of 10" WC minimum to a maximum of 20" WC.

4. Waste gas burner shall operate using only one of the following pilot gases at 10" – 20" WC supply pressure:

a. Natural gas

b. Digester gas with minimum heat content of 500 BTU/cubic ft. or greater as pilot fuel.

5. Pilot gas only runs continuously when there is a demand to flare or combust waste gas, otherwise the burner remains on standby and does not continuously use pilot gas. Pilot gas and air shall be mixed and ignited at ground level, remote from the burner stack. Specifically, no component of the ignition system shall be mounted to the burner stack or shroud; nor shall heat shields be substituted to protect such devices from the heat of combustion.

F. Theory of Operation

1. The pilot ignition system shall utilize flame front technology.

   a. Either a plant signal, or a pressure switch installed on the main gas line, initiates start-up sequence through the remote start contacts. The transformer sends voltage to the spark plug. This generates a flame front. The Continuous Nozzle catches the flame front establishing the pilot. The thermocouple located inside the continuous flame nozzle heats up. When it exceeds its temperature set point, the retention solenoid valve closes. Pilot ON indication comes on in the control panel.

2. LOCAL START OPERATION – In "AUTO" mode, the burner and the pilot will remain lit and will attempt re- ignition in case the pilot is lost. Ignition will continue to occur until PILOT ON indication is achieved. If the flare system fails to reignite in a set amount of Spark On attempts, the flare goes into system failure. The solenoid valves close, the blower shuts down and the System Failure Dry Contact changes state.

3. REMOTE START OPERATION - The flare system will be in standby until it receives the Remote Start Permissive signal. If the Remote Start Permissive signal is not present, the Remote Start Time Delay starts to time. Once it times out, the flare goes into stand by and waits for the Permissive signal to start up again.

G. Pilot Gas Control Components

1. The pilot gas control components shall be mounted on a stainless steel plate. The control panel will be mounted 15 feet from the waste gas burner to comply with NFPA 820.

2. Venturi must be installed between 25' and a maximum of 100' horizontal distance from the flare. The pilot gas piping from the pilot gas control components panel to the waste gas burner connection may have 45 deg. Elbows only to connect to the pilot gas connections in the burner stack. The pilot gas piping and venturi are at an incline to maximize air-gas mixing.

3. Pilot gas components include:

   a. Class 1, Div. 1 Group D explosion proof solenoid valves with aluminum construction and stainless steel internals

   b. Pressure gauges, 0-30 inches water column

   c. Isolation Valves

   d. 2" 347 stainless steel (SS) inspiriting venturi

e. Air blower

f. All tubing, piping, and threaded fasteners shall be provided in stainless steel

g. Remote Spark igniter in a NEMA 4X enclosure

H. Spare Parts: One each of the following devices, of the manufacturer, type and model installed in the system, as applicable shall be provided as a part of this scope of work and supply;

1. Thermocouple

2. Complete set of fuses applicable to system operation

3. Spark plug

I. Burner Controls

1. Control panel shall include the following features:

a. NEMA 4X

b. Type K Thermocouple Pilot flame monitoring

c. Status indicators for “Pilot On”, “Pilot Off”, “System Alarm”, “Retention Valve Open”, “Continuous Valve Open”, “Main Gas Line Open”, “Blower On”, “System Standby”.

d. Field adjustable set points for, Pilot purge time, Spark time, Thermocouple Hot, Re-ignition attempts, and Remote Start Time Delay

e. Heater and thermostat

f. Manual ignition button

g. SPDT dry contacts for Pilot On/Off and System Alarm

h. 120VAC, 1Ph, 60Hz power required (220-240VAC, 1PH, 50/60Hz Option)

i. 15Amp fused protection

j. Certified UL 508A

k. Provide the following sets of dry contacts to allow for monitoring of the flare system: “Pilot ON”, “System ALARM”, “System IN AUTO”.

J. Related Equipment

1. Pressure relief and flame trap assembly shall have inch size flanged connections. Valve shall be set to relieve pressure at 12” WC. Capacity shall be not less than 9000 SCFH gas of specific gravity of 0.8 at 0.5” WC pressure increase above setting. A large spring loaded

diaphragm shall control regulator valve. Regulator shall operate normally closed and shall maintain a back pressure within approximately 10% of the setting. The spring barrel shall include a glass-enclosed pointer and scale to indicate setting. A spring adjusting screw shall permit setting adjustments without disassembling the diaphragm housing. Construction shall be low copper cast aluminum body, diaphragm and spring housings, and diaphragm inner plate. Inner valve shall include low copper aluminum pallet with 304 SS stems and bushings. Diaphragm shall be molded Buna-N rubber with Nylon reinforcement. Setting spring shall be zinc plated steel. Valve shall include ½" NPT connections for the pressure sensing line and atmospheric vent line. Tubing provided by Contractor per the manufacturer's recommendations

Flame arrester net free area through the bank assembly shall be not less than three times the corresponding size standard pipe. Entire bank assembly shall slide easily out of the arrester housing to facilitate inspection and cleaning. Removing or replacing the bank assembly shall not require support for alignment, jackscrew for extending the housing, and shall not place a strain on the connecting piping. Bank frame shall be extensible and shall be filled with corrugated rectangular shaped bank sheets. Alternating flat and crimped ribbon sheets are not an acceptable substitute. Flame arrester shall include an offset housing with a 1/2" NPT drain connection. Arrester housing construction shall be low copper cast aluminum. Bank assembly shall include a low copper aluminum frame and stainless steel bank sheets. The assembly shall be interconnected with a thermal bypass shut-off valve. Valve shall be the spring-actuated double acting needle type. Bypass valve shall operate within 15 seconds when the thermal element reaches 260^{o} F (127^{o} C). Bypass valve shall automatically close the regulator by applying full upstream gas pressure on the upper portion of the diaphragm. Fusible element shall be replaceable without disassembling the valve. By-pass valve assembly shall be constructed of aluminum and stainless steel with Buna-N "O" rings. Regulator, flame arrester, and bypass valve shall be factory assembled as a single unit. Flanges shall be drilled to ANSI 150 FF Flanged dimensions. Assembly shall be leak proof to 5 psig (34.5 kPa). Pressure relief and flame trap assembly shall be Varec Biogas 440 Series, or equal.

2. Flame Check for flame retention line, regulator vent line and pilot gas supply line shall have a compressed woven wire element design and shall utilize NPT connections. The housing shall be constructed of low copper cast aluminum. The flame arresting element shall be 316 stainless steel. Maximum working pressure shall be 25 psig. Flame check shall be Varec Series 5200, or equal.

3. Pressure Switch for Remote-Auto Start pilot capabilities A pressure switch is supplied for "REMOTE AUTO- START" capabilities. The pilot is established only when the system pressure rises to the point where biogas will be relieved to the burner for flaring, thus conserving pilot fuel. The continuous pilot heats the pilot thermocouple above its set point in the controller. The pilot alarm contacts switches to indicate that the continuous pilot is lit and up to temperature.

    a. Range: 4" to 30" (100mm to 750mm) W.C. Pressure Connection: 1/4" NPT

    b. Switch Rating: 15 amps @ 125 VAC

    c. Enclosure: NEMA 4X

    d. Deadband: 0.5" (28 mm) W.C. Conduit Connection: 3/4" NPT

    e. Temperature Range: -80° to +180°F (-62° to +82°C)

f. Approval: UL Approved

2.3 Relay-based control panel shall be provided.

PART 3 - EXECUTION

3.1 INSTALLATION & HANDLING

A. Protection: The Contractor shall use all means necessary to protect the condition and integrity of the equipment provided under this section both during and after receipt of said equipment, and to protect the installed work and all other trades.

B. Replacements: In the event of damage during installation, Contractor shall immediately make all repairs and/or replacements necessary to the approval of the Engineer and at no additional cost to the Owner.

C. Deliver materials in manufacturer's original packaging with all tags and labels intact and legible.

D. Store and handle material in such a manner as to avoid damage; store at site under cover if required to meet the conditions of this section.

E. General: Install the work of this section in strict accordance with the manufacturer's recommendations as approved by the Engineer.

F. Installation shall proceed in compliance with the submitted installation schedule, as approved by the Engineer.

G. The work of this section shall be installed plumb and perpendicular to piping where required on Construction Drawings.

H. Painting: Marred or abraded surfaces shall be cleaned and refinished in accordance with the manufacturer’s recommendations.

I. The supplier shall coordinate with the Contractor for the design and installation of all interconnecting digester gas and drainage piping so that the digester gas handling system functions properly. The Contractor shall furnish the Supplier with piping layouts prior to fabrication. The Supplier shall review Contractor pipe layouts and notify both the Contractor and the Engineer of any changes required to make the digester gas handling system function properly.

3.2 START-UP & TESTING

A. Factory Test: The entire system, including all controls shall be tested at the manufacturer's plant before shipment. Complete test reports shall be made available which shall show all system controls operate correctly prior to shipment.

B. Start-up: The manufacturer shall furnish his factory trained representative for a minimum of three (3) days of start-up & training labor. The representative will remain on site until start-up of the system has been completed to the engineers’ satisfaction, unless failure to achieve a successful start-up is NOT the fault or cause of the manufacturer.

C. Functional and Validation Tests: Upon completion of the installation, functional and validation tests shall be performed by the Contractor with the assistance of the manufacturer's representative in accordance with Section 017500, “Commissioning”. The manufacturer’s representative will demonstrate compliant operation of the system to the engineer’s satisfaction. Should the system NOT perform to the requirements of this specification, the expense of any re-testing, if required, will be borne by the system manufacturer, unless failure to achieve successful operation is neither the fault or cause of the manufacturer.

3.3 TRAINING

A. When all required approvals of this portion of the work have been obtained, and at a time designated by the Owner and/or Engineer, the Contractor and/or the manufacturer’s representative in charge of start-up and testing shall thoroughly demonstrate to the Owners operation and maintenance personnel the operation and maintenance of all items installed under the work of this section.

B. The instructions shall be separate from the installation check, start-up and equipment adjustment services.

3.4 CLEANING

A. Clean exposed surface of all grease, dirt and other foreign materials.

B. Touch up all marred or abraded surfaces as specified herein.

3.5 PAINTING

A. Surface Preparation

1. All surfaces of equipment shall be provided with the manufacturer’s standard shop priming and painting system. The installing Contractor shall be responsible for field touch up coating, in accordance with Specification Section 098000, “Protective Coatings” and the manufacturer’s recommendations.

END OF SECTION 437720