

ADDENDUM #1

1.1 PROJECT INFORMATION

- A. Project Number: 2023-10835
- B. Project Title: Fleck Fuel Facility Replacement
- C. Project Location: STA Valley (Fleck) Service Center, 123 S Bowdish, Spokane Valley, WA 99206
- D. Agency: Spokane Transit Authority

1.2 NOTICE TO BIDDERS

- A. The following clarifications, changes, additions, and/or deletions are considered as Addendum #1 and are hereby made a party of the contract documents. All bidders are required to base their bid upon the information furnished in this addendum and as required in the contract documents. The Contractor is required to acknowledge Addendum #1 in their company proposal. Failure to acknowledge addendum on the bid form will result in the bid proposal being declared non-responsive.
- B. All communications shall be directed to Haley Wilson as listed in the bid documents at hwilson@spokanetransit.com or by telephone at 509-325-6076.
- C. **Last day for questions is October 30, 2023, by 12:00pm.** The bidder should use their best judgment as professionals in their field and err on the side of conservative for any questions, comments, errors, etc. found after such point.

1.3 CLARIFICATIONS / GENERAL

- A. **Prevailing Wage:** The minimum prevailing wage provisions for Washington State law apply to this project.
- B. **Facility Operations:** Morning pullout generally begins at approximately 4:00am through to 6:30am. All 40ft buses and some paratransit vehicles pull out of the garage doors to the south of the building's main entrance. An occasional Paratransit Vehicle will also pull out of the two garage doors north of the building's main entrance. Operations vehicles begin coming back for fueling and washing between approximately 2 pm through to 11:30 pm. Each vehicle is fueled and taken into the northern most garage door for washing, exiting out the back to repark in the facility. Employees access the facility at various times throughout the day between 4:00 am and 12:00 am. The projects phasing is to attempt to eliminate any potential impact to the operation.
- C. **Work Hours:** It is anticipated that work will be completed within normal business hours, between 7am and 5pm. City of Spokane Valley noise regulations and Washington State labor hour regulations are to be adhered to unless deviation is authorized by the governing authority.
- D. **Contract Award and Important Dates:** Bids will be reviewed, and the lowest most responsive and responsible bidder determined within 1-2 weeks of the bid due date. A Notice of Intent to Award will be sent to the selected contractor after that process. Due to the estimated cost, the contract must be awarded by STA's Board of Directors. The Award of Contract will go before STA's Performance Monitoring and External Relations Committee on December 6, 2023, followed by STA's Board of Directors on December 21, 2023. Once approval is gained the documentation will be routed for final executing signatures from the selected contractor and STA. Due to the holidays, we do not expect final execution will occur until the first or second week of January. At which time Bonding and Insurance are to be submitted and Notice to Proceed will immediately be issued allowing submittal review and ordering of materials. Breaking ground is not expected until March 1st at the earliest, at which time frozen ground is hopefully less of a problem and STA can have all stored materials out of the way of the work.
- E. **Permitting:** STA has submitted for, and the City of Spokane Valley has approved a plan review of the project. The contractor is expected to provide their information and pay the remaining fee for permit

issuance. The Spokane Valley Fire Department Underground Tank Removal permit has been applied for, paid, and approved. A copy of the Permit Conditions are included with this addendum as the successful Contractor will assume responsibility for these conditions. These fees are a direct reimbursable, not part of the bid price, to be invoiced to STA with no markup. The SEPA process is also underway and is expected by the time of contract award.

- F. **Restrooms:** Contractors are to include in their bid lease/rental of your own secured restroom and handwashing facilities for the duration of the work.
- G. **Existing Fuel Dispensers:** the existing fuel dispensers are less than 3 years old and retain value after removal. During the work, the selected contractor shall remove and protect the fuel dispensers and coordinate with STA Facilities to have the dispensers removed from the work site.

1.4 REVISIONS/CLARIFICATIONS TO PLANS AND SPECIFICATIONS SECTIONS

- A. **Sheet E-300 –**
Added code required convenience receptacle near exhaust fans.
General note and drawing changes for clarification.

Sheet E-301 –
Added code required convenience receptacle near exhaust fans.

Sheet E-400 –
Added CAT6 cable to building management system for fuel system controller.
General note and drawing changes for clarification.

Sheet E-501 –
Added code required convenience receptacle near exhaust fans.
Removed concrete encasement from duct bank detail.
General note and drawing changes for clarification.

Sheet E-502 –
Added CAT6 cable to building management system on controller schematic.

Sheet E-503 –
Added CT part number for clarification.

Sheet E-601 –
Added E2 Sub-Panel for clarification.

Sheet E-701 –
Added code required convenience receptacle near exhaust fans.
Added E2 Sub-Panel description for clarification.

- B. **Specification Section 231113 –**
Replace in its entirety.

Specification Section 231327 –
Replace in its entirety.

1.5 QUESTIONS / ANSWERS (from the Pre-Bid Meeting, Emails, and Phone Calls)

Question 01: *What is the Engineer's Estimate for this project?*

Answer 01: The cost estimate is approximately \$2,008,664.

Question 02: *Can you provide the referenced Geotechnical Report?*

Answer 02: Yes. Please find it included as an attachment to this addendum.

Question 03: *When was the facility built?*

Answer 03: 1990 and the existing fuel tanks and island are original to that build.

Question 04: *So, the project timeline is from March to August?*

Answer 04: Site work is anticipated from March 1st to August 3rd. All submittals, ordering of materials and any work not requiring thawed soil could potentially get under way earlier. Currently STA is planning to have all vehicles removed from the gravel yard (where the new vault will be constructed) no later than March 1, 2024.

Question 05: *What project starts after the August completion date?*

Answer 05: Replacement of the on-site bus washer located immediately east of the fuel island, and in the northern lane of the facility.

Question 06: *Why are the tanks being replaced?*

Answer 06: Two of the tanks failed in August of 2022 and due to their age are due for replacement.

Question 07: *Are the tanks coming out or abandoned in place?*

Answer 07: All three tanks are to be removed. Please refer to Plan Sheet C-200 "Fuel Tank Decommissioning Note" and Sheet C-501 for more information.

Question 08: *Tank and or dispenser lead times could be an issue for the completion date desired.*

Answer 08: Understood. The Completion date selected is because another project, to replace a bus washer, on site must begin immediately after and during the dryer summer/fall months. With the moderate to small size of the tanks, we understand should allow for more reasonable lead times. New dispensers could potentially require a longer lead however STA requests every effort to expedite. Please provide notification as soon as possible if you find that lead times from vendors are an issue and if there is an option for expediting.

Question 09: *I don't see controls for the temporary fuel dispenser. Should there be?*

Answer 09: No temporary controls will be required. A temporary Emergency Shutoff is part of the work though. STA will record information manually, however, we require the ability to lock the valve to prevent unauthorized use. Please provide a locking valve or alternative option.

Question 10: *Is the electrical crossing in a concrete duct bank?*

Answer 10: This is not required and has been removed. Please refer to the revision to detail A4 on sheet E-501 attached to this addendum.

Question 11: *Are we reusing conduit for the monitoring system and alarms inside the building? Should everything be located in the same location as today?*

Answer 11: Yes, we are reusing conduit and everything will be located in the same location as today, the small mechanics office in the maintenance bay. STA will utilize the new connection to the Buildings Automated Controls (see the clarifications on the attached electrical sheets) to monitor the system.

Question 12: *Will the pathways be reused for the Alarm & Annunciator?*

Answer 12: Yes, as per plan.

Question 13: *Is there any reinforcement/metal nosing required for the fuel island?*

Answer 13: No. See sheet C-300, sheet S-102 and detail A1 on sheet A-110 for island construction.

Question 14: *Some trees will have to be removed for the temporary driveway?*

Answer 14: Yes, two trees on the North end of the tree lining in the parking area will need to be removed.
See also Demolition Plan, sheet C-200.

ENCLOSURES:

Pre-Bid Meeting Agenda, dated October 18, 2023

Pre-Bid Meeting Sign-In, dated October 18, 2023

Tank Decommissioning Report, by Able Clean-up Technologies Inc. dated November 17, 2022

Tank Removal – SVFD Permit Conditions

Revised Electrical Plan Sheets E-300, E-301, E-400, E-501, E-502, E-503, E-601& E-701

Revised Specification Section 231113

Revised Specification Section 231327

Geotechnical Engineers Report, by Budinger & Associates, Inc., dated June 9, 2023 (separate document)

PRE-BID MEETING AGENDA

Date: October 18, 2023

Time: 10:00 a.m. - 11:00 a.m.

Meeting Location: STA Valley (Fleck) Service Center, 123 S. Bowdish, Spokane Valley, WA 99206

1. SIGN IN
2. INTRODUCTIONS
3. TOUR OF GENERAL WORK AREA
4. GUIDELINES
 - a) Questions and comments will be accepted during the meeting.
 - b) Remarks, clarifications, or corrections to the IFB during the meeting shall not change the terms of the solicitation.
 - c) A **written amendment** will be issued following the meeting stating any clarifications, corrections, or additions to the solicitation. The sign in sheet will be included along with an updated Plan Holders list with all information provided. All prospective Bidders and Plan Centers who received the original IFB will receive the amendment.
 - d) **All communications** shall be directed to the Procurement Coordinator, Haley Wilson, as listed in the bid document. You may contact Haley at hwilson@spokanetransit.com or by telephone at 509-325-6076. **Please do not contact the PM, architects, engineers, or STA staff directly. The goal is to get consistent information to all prospective Bidders.**
 - e) This is a public works project subject to Washington State Prevailing Wage requirements and public works contracting requirements.
 - f) The majority of this project (91%) qualifies as a public road work as described in WAC 458-20-171 (Rule 171). The remaining portion (9%) falls under standard tax rules (Rule 170) for building construction.
 - g) Bonding & insurance requirements (including builders risk, see section 007200.1 part 2 of the IFB).

- h) Permitting.
- i) The contractor is responsible and is to include in the bid all survey for control and accurate layout of the work as well as all public and private utility locates required.
- j) Work area delineation/traffic control/ project and STA's operational access.
- k) Noise & dust limitations/control.
- l) Project safety, project safety, & project safety.
- m) Bid due date, Tuesday, November 7, 2023, at 3:00 PM. STA 1230 W Boone Ave. Spokane, WA 99201.

5. QUESTIONS

SIGN-IN

PLEASE PRINT. ALL INFORMATION IS OPTIONAL.

	NAME	COMPANY	PHONE & EMAIL
1	BILL DURKIN	JAYBR CONTRACTORS	509-715-0676 BDURKIN@JAYBR.COM
2	Chris Peterson	Mascott Equip. Co	509-590-3424 cpeterson@mascottec.com
3	KYLE ZENDER	ULTRA NW	360-398-0134 KYLEZ@ULTRA-INC.COM
4	Michelle Duncan	Halme Builders	Dan@Halmebuilders.com
5	John Nelson	Nelson Construction Corp.	john@nelson-corp.com (509) 526-5249
6	Jesse Kure	Colvico Inc.	509-432-4720 jkure@colvicoinc.com
7	Jason Halme	Halme Const.	509-725-4200 jasonh@halmeconstruction.com
8	Scott Halme	Halme Construction	509-721-0939 scotth@halmeconstruction.com
9	Josh Smith	United Rentals Trench	509-202-2218 JSMITH27@UR.COM
10	Mark Christman	United Rentals Trench	509-370-1084 mchristman@ur.com

SIGN-IN

Pre-Bid Meeting — 2023-10835 Fleck Fuel Facility Replacement
10/18/23



PLEASE PRINT. ALL INFORMATION IS OPTIONAL.

	NAME	COMPANY	PHONE & EMAIL
11	Jordan Klinker	Inland Infrastructure	509-514-0639 JKlinker@inland-ca.com
12	Tom Morrow	GARCO CONST	509-535-4688 BIDS@GARCO.COM
13	Scott Lee	Peterson Eled	509 981-5754 scott@petersonelectric.com
14	David McPherson	D-MCP const.	509-401-0309 david@d-mcpc.com
15	MARC LUNDY	GRANITE PETROLEUM	MARCL@GRANITEPETROLEUM. com 509-998-3243
16			
17			
18			
19			
20			

SIGN-IN



ABOVEGROUND STORAGE TANK DECOMMISSIONING REPORT

Prepared for:

Spokane Transit Authority

Site Location:

Fleck Service Center

123 South Bowdish Road

Spokane Valley, Washington 99206

Prepared by:

Able Clean-up Technologies Inc.

5308 North Myrtle St.

Spokane, WA 99217

(509) 466-5255

Date: November 17, 2022

Prepared By: Kipp Silver PG

Job Number: 22295

Table of Contents

1.0.0 Property Information 3

1.1.0 General Scope of Work..... 4

2.0.0 Scope of Work 4

2.1.1 Pumping and Disposal of Tank and Piping Contents 4

2.1.2 Purging and Inerting 4

2.1.3 Removal and Tank Cleaning..... 5

2.4.0 Site History 5

2.4.1 Geographic Setting..... 5

2.5.0 Land Use Data 6

2.5.1 Leak Detection and Overfill Protection Systems..... 6

2.6.0 Conclusions..... 6

Attachment I. Site Photos..... 7

1.0.0 Property Information

Owner:	<u>Spokane Transit Authority</u>
Name of Facility:	<u>Charles H. Fleck Spokane Valley Service Center</u>
Facility Address:	<u>123 S. Bowdish Rd.</u> <u>Spokane Valley, WA 99206</u>
Owner Mailing Address:	<u>1230 West Boone Ave</u> <u>Spokane, WA 99201-2686</u>
Owner Telephone Number:	<u>(509) 325-6049</u>
Township & Range of Property:	<u>NW ¼, NE ¼, S21, T25N, R44E</u>

Directions for locating the property from the nearest major road: Heading east on Interstate 90, exit Sprague Ave. heading east. Turn right onto Bowdish Road and the driveway to the site will be located on the left.

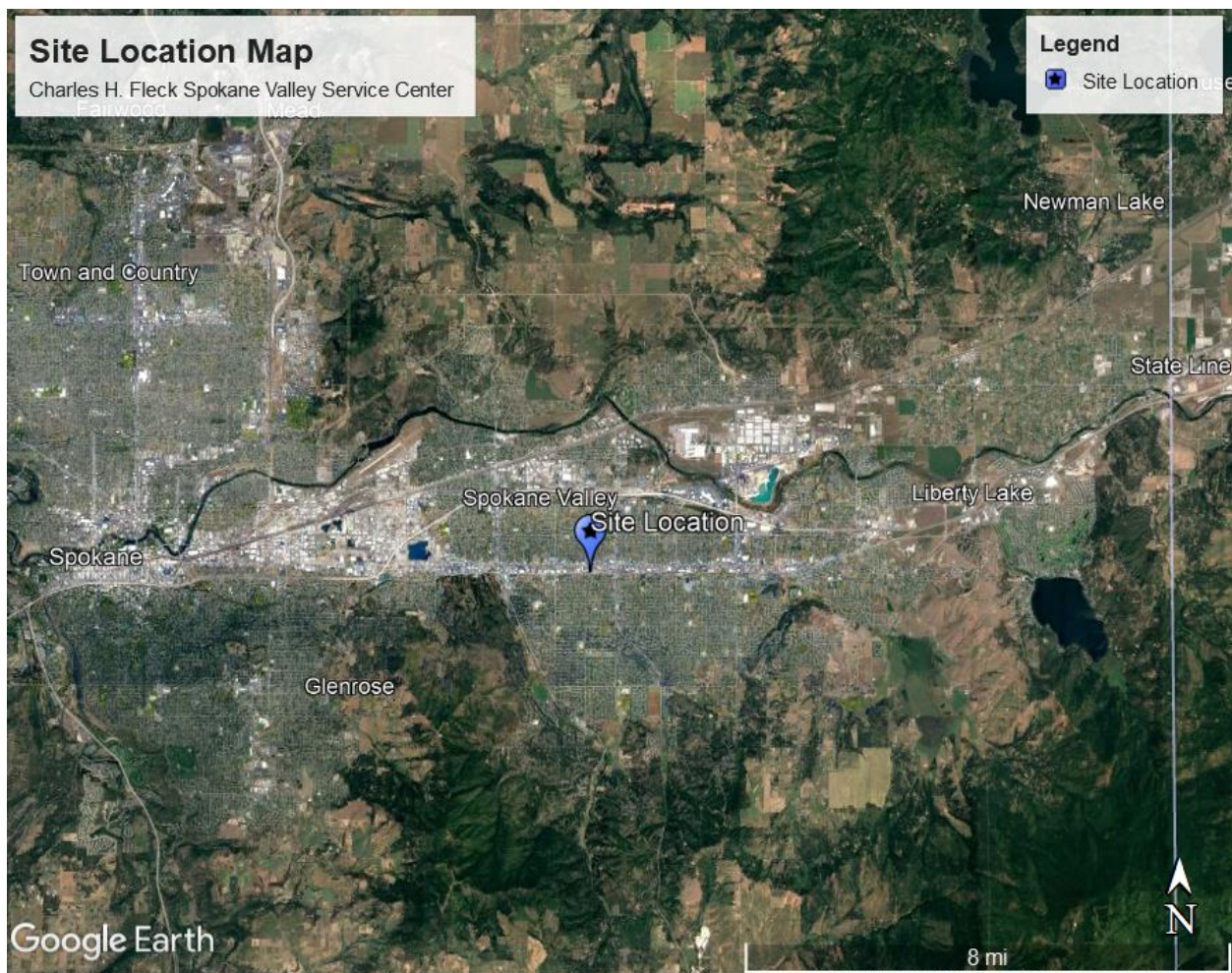


Figure 1. General Site Location Map

1.1.0 General Scope of Work

This document describes the requirements and information needed for a proper closure by Able Clean-up Technologies Inc. (ACT) pertaining to the aboveground storage tanks (AST's) purging, cutting & cleaning for Spokane Transit Authority, Fleck Service Center.

This document provides information that pertains only to the work described in the closure and cleaning of two (2) AST's at 123 South Bowdish Road, Spokane Valley, WA 99206. The AST's are described as one (1) five thousand (5,000) gallon gasoline tank and one (1) twelve thousand (12,000) gallon on road diesel tank. The AST's are located within a vault containing the two previously mentioned tanks and a third tank being a twelve thousand (12,000) gallon on road diesel tank which is still being used. The vault which contains the AST's is located directly under the canopy and refueling island at the end of the driveway and before the service building. The property is flat and consists of one building.

Due to the fact that these tanks are AST's, no soil was in contact with the tanks, so no soil samples were collected, and no site assessment is needed for the closure of the tanks.

2.0.0 Scope of Work

2.1.1 Pumping and Disposal of Tank and Piping Contents

ACT personnel arrived onsite on November 9th at 07:30. The AST's were checked to confirm the quantity of fuel remaining in each tank. The gasoline tank had only a nominal amount of fuel remaining, so no fuel was pumped. The diesel tank had about an inch of fuel remaining so ACT used a dual diaphragm pneumatic pump to recover a bit more fuel which was about 5-6 gallons.

2.1.2 Purging and Inerting

The following is a description of the procedure for inerting/purging the AST's by ACT. The tank can be made "safe" either by purging or inerting the potentially explosive atmosphere in the tank. These two methods control different points of the fire triangle. ACT used the purging method and the appropriate monitoring equipment for the AST work detailed in the following paragraphs. The vault that has the three AST's contained is also considered a confined space so purging was used for the two tanks and the vault the tanks were in.

Purging the tank replaces or dilutes the flammable vapors within the tank with air, reducing the flammable mixture of fuel and oxygen by dealing with the *fuel* point of the triangle. Gasoline petroleum products have a flammable of 1-10% by volume in air. This range defines the amount of fuel vapor necessary to become flammable in the presence of oxygen and an ignition source. Below the fuel vapor level of 1%, the lower explosive limit (LEL), mixture of fuel and oxygen is too lean to support combustion (above 10%, the mixture is too rich). The LEL is expressed as the percent of product vapor by volume in air. The goal of purging a tank is to reduce flammable vapors in the tank well below the lower explosive limit.

It is important to note that the concentration of flammable vapors may start within the flammable range or start above the flammable range and move down through the flammable range before a safe atmosphere is attained, and as such all sources of ignition must be removed and all equipment must be properly bonded or grounded before the process can be started.

After the tank is emptied of product, the concentration of flammable vapors in the tank can be reduced or eliminated by purging the tank with air. First, a drop tube is placed into the tank. This is to ensure that the heavier than air petroleum vapors that may be present at the bottom of the tank are agitated sufficiently to be moved out of the tank. At the top of the drop tube, an Allegro Industries Venturi Blower driven by compressed air is attached. The attachment sends small volumes of high velocity air

through the casting and out nozzle jets creating a pulling action that creates large volumes of air through the Venturi blower and the drop tube. All attachments are properly bonded to prevent the generation and discharge of static electricity.

Exhaust fumes from purging were vented at a minimum height of 12 feet above grade and 3 feet above any adjacent roof lines. The atmosphere at ground level was tested periodically while purging is in progress to be sure the vapors are being vented effectively into the upper atmosphere and are not collecting at ground level.

Purging the tanks is not permanent, product trapped in the bottom sludge and/or wall scale can regenerate flammable vapors within the tank. ACT monitors the concentration of flammable vapors within and around the tank frequently with a BW Technologies GasAlertMax XT II four gas detector.

The four-gas detector measures the percentage of the lower explosive limit (%LEL) of vapors present in the atmosphere. The meter reads from 0% to 100% of the LEL. As mentioned before, the LEL depends on the products flammable range, or the mixture of product and oxygen necessary to produce fire or explosives in the presence of an ignition source.

ACT's goal when purging an aboveground storage tank is to reduce the concentration of flammable vapors to zero, or as close to zero as possible. Attaining the lowest reading possible gives a margin of safety in the time it will take for flammable vapors to regenerate from product trapped in the sludge and the walls of the tank. After the tank has been purged for an extended period of time, ACT tests the tank vapor space by placing the four-gas probe into the fill opening with the drop tube removed. Readings are taken at the bottom, middle, and upper levels of the tanks.

2.1.3 Removal and Tank Cleaning

After verifying that all free liquid was removed from the tank, ACT then measured the LEL of the tank to ensure the safety of the AST atmosphere. Once the LEL goals were met, an entryway was created at the end of the tank using non-sparking tools. The tank atmosphere was then monitored for oxygen content; oxygen within the tank must be at least 19.5 percent but not more than 22 percent for personnel to safely enter the confined space. Personnel donning proper PPE then entered the tank under the Confined Space Entry Permit to begin the cleaning process. Constant air monitoring was performed while personnel completed all tasks within the tank. Once personnel had exited the confined space, air monitoring and all other documentation required by the Confined Space Entry Permit Report was completed and turned in to the Site Project Manager.

2.4.0 Site History

The current property information is outlined at the beginning of this report. The property has one building and three tanks that are located on the property. The three tanks were a five thousand (5,000) gallon gasoline tank, a twelve thousand (12,000) gallon diesel tank that were both closed and one twelve (12,000) gallon diesel tank still in operation. According to the site drawing the tanks were installed in the early 1990's.

2.4.1 Geographic Setting

The study area is in Spokane Valley, Spokane County, Washington. The property consists of the STA Fleck Valley Service Center building. The property is located west of Bowdish and south of Sprague Avenue. The tank vault is located under the fuel island canopy in front of the building. The general topography of the area is flat with commercial properties located near-by.

2.5.0 Land Use Data

North: Commercial
South: Appleway trail - residential
East: Commercial
West: Bowdish Rd. - Commercial

2.5.1 Leak Detection and Overfill Protection Systems

The tanks are single walled steel tanks. The system was equipped with leak and overfill protection system.

2.6.0 Conclusions

After cutting and cleaning the two tanks the atmosphere within the tanks that were cut and cleaned showed LEL @ 0%, H₂S @ 0ppm, CO @ 0ppm & O₂ @ 20.9%. this was also the same reading for inside the vault but outside the tanks. This conclusion is based on the reading from the 4-gas monitor. There was one container of diesel sludge which went to a subtitle D disposal facility & one container of gasoline sludge that is considered hazardous waste that carry a waste code of D001, D008 & D018 and will be disposed of at a Subtitle C disposal facility in Arlington, OR. Please note that vapors can accumulate within the confine space of the vault during any inspection process.

This report and sample analysis has been prepared on behalf of, and for, the use of Spokane Transit Authority. This report has been prepared in accordance with generally accepted AST closure practices. No other warranty expressed or implied is made.



Kipp Silver PG
ICC Certified Site Assessor/Decommissioner

Attachment I. Site Photos











FRANK SOTO JR, FIRE CHIEF

2120 N. Wilbur Rd.

Spokane Valley, WA 99206

Main: (509) 928-1700

Fax: (509) 892-4125

spokanevalleyfire.com

PERMIT CONDITIONS

PERMIT INFORMATION:

Spokane Transit Authority

ADDRESS:

123 S Bowdish Road

PERMIT TYPE:

Underground Tank Removal

APPLICANT:

Coffman Engineers

PERMIT NUMBER:

23-0124

PROJECT DESCRIPTION:

Removing buried fuel tanks

Permit Requirements:

1. Fire department shall verify and document removal at final inspection.
 - a. Clean tank and removal of diesel - Report is on file.
 - b. Tank removal.
2. Inspection requests shall be made to the inspection line: 509-892-4153. Requests shall be made a minimum of 48-hr advance.

Inspections:

☐
☐
☐
☐
☐
☐
☐
☐

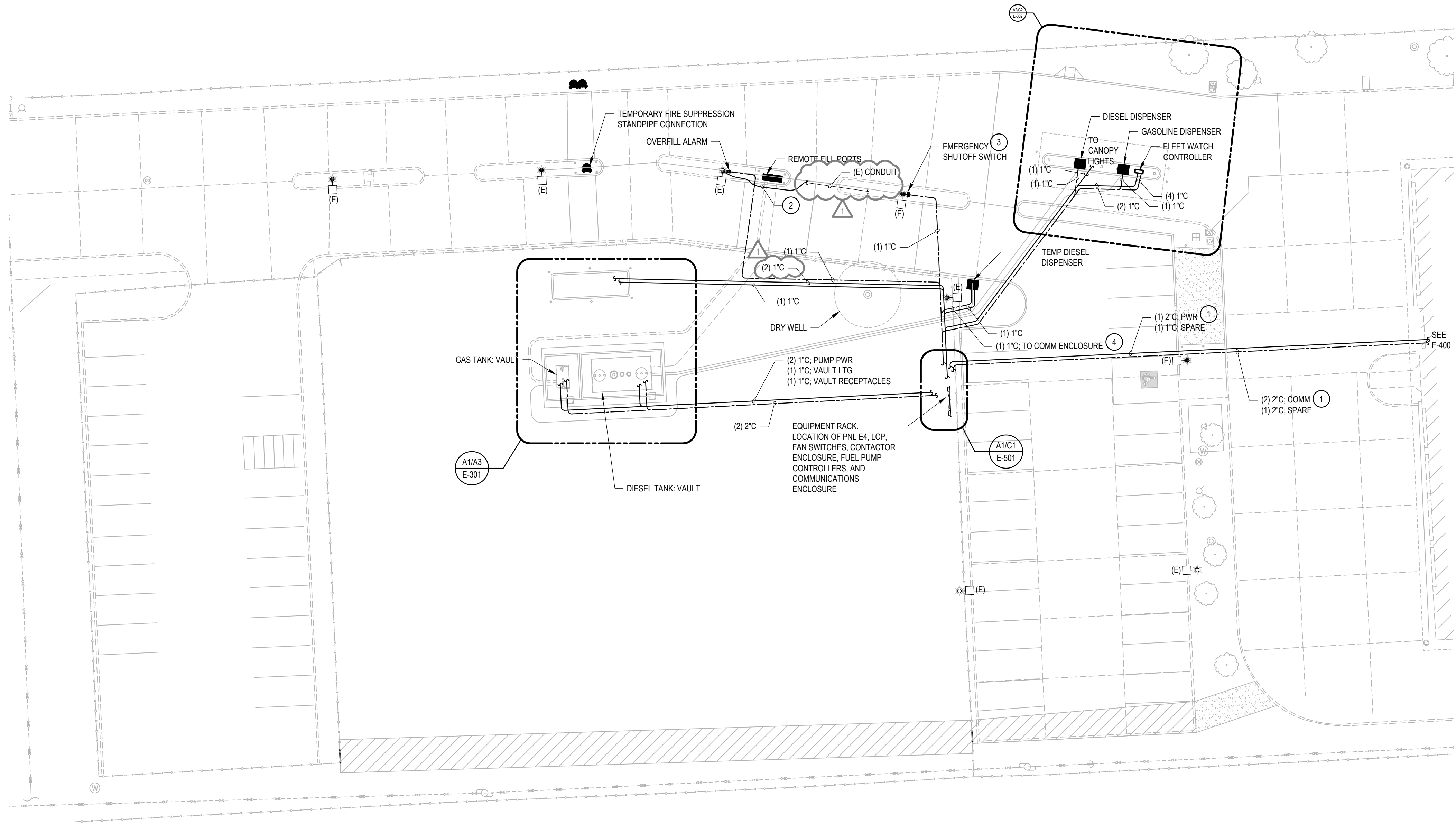
SVFD inspector to photo document tank removal.

Signed inspection card

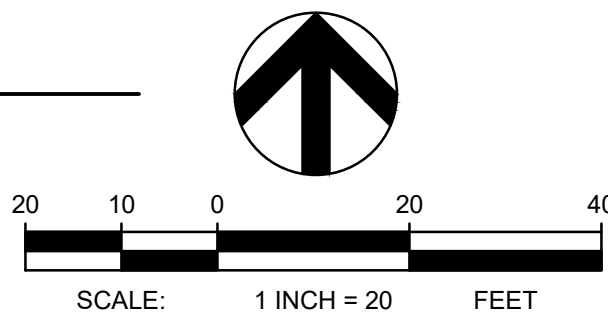
Inspector's Signature

Date

P:\SP023\085230521 STA FLECK FUEL REPLACEMENT\0.0 DWG\SE\230521_E300 - PERRY, SHAUNA - LAST SAVED October 16, 2023 - PLOT DATE: 10/19/23



A1 OVERALL ELECTRICAL SITE PLAN
SCALE: 1"=20'



GENERAL NOTES

- ALL WORK SHALL COMPLY WITH THE CURRENT EDITION OF NEC AS ADOPTED BY THE STATE OF WASHINGTON OR LOCAL AUTHORITY HAVING JURISDICTION.
- PROJECT TO COMPLY WITH THE BUY AMERICAN ACT.
- REFER TO DRAWING E-701 FOR PANEL SCHEDULES.
- REFER TO DRAWING E-701 FOR EQUIPMENT SCHEDULE.
- REFER TO DRAWING E-501 FOR ADDITIONAL CABLING REQUIREMENTS.
- REFER TO DRAWINGS E-502 AND E-503 FOR ELECTRICAL WIRING DIAGRAMS.
- PROVIDE HAZARDOUS AREA CONDUIT SEALS AS NOTED AND AS REQUIRED. REFER TO DRAWING E-200 FOR HAZARDOUS AREA CLASSIFICATIONS.

SHEET NOTES

- REFER TO DRAWING E-400 FOR CONTINUATION. DUCT BANK INSTALLATION TO BE COORDINATED WITH OWNER AND PHASED TO ALLOW CONTINUOUS USE OF DRIVE AISLE. DUCT BANK EXCAVATION SHALL BE THE MINIMUM WIDTH REQUIRED. CIVIL TO PROVIDE PROVISIONS AS NEEDED FOR CROSSING TRENCH DURING INSTALLATION. REFER TO DUCT BANK DETAIL DRAWING E-501.
- INTERCEPT EXISTING SITE LIGHTING BRANCH CIRCUIT AND RE-ROUTE AS REQUIRED FOR INSTALLATION OF FILL PORTS. PULL NEW CONDUCTORS BETWEEN EXISTING LIGHT POLES. MATCH EXISTING FEEDER SIZE.
- COORDINATE LOCATION OF FIRE DEPARTMENT E-STOP WITH MECHANICAL INSTALLATION. SEE SHEET M-300.
- COORDINATE CABLING REQUIREMENTS FOR COMMUNICATIONS AND CONTROLS WITH MANUFACTURER SUBMITTALS AND CONTROLS VENDOR.

LEGEND

- (E) - EXISTING TO REMAIN, SHOWN AS LIGHT
(D) - DEMO, SHOWN AS DASHED AND BOLD
(N) - NEW, SHOWN AS BOLD
—— POWER CONDUIT
--- COMMUNICATIONS CONDUIT

PHASING REQUIREMENTS

ALL WORK TO BE PHASED IN ACCORDANCE WITH PROJECT PHASING PLAN G-100. COORDINATE DEMOLITION ACTIVITIES, OUTAGES, AND POWER REQUIREMENTS WITH OTHER TRADES AND OWNER.

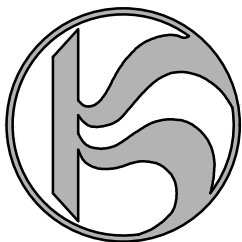


10 N. Post Street,
Suite 500
Spokane, WA 99201
ph 509.328.2994

www.coffman.com

FLECK FUEL FACILITY
REPLACEMENT
123 S. BOWDISH ROAD,
SPOKANE VALLEY, WA 99206

Spokane Transit Authority
1230 W. Boone Avenue
Spokane, Washington 99201



REV	DATE	DESCRIPTION
1	10/20/23	ADDENDUM 1

PROJ. NO. 2023-10835
DRAWN SLP
CHECKED MBV
DATE 08/30/23

© COFFMAN ENGINEERS INC.

SHEET TITLE:

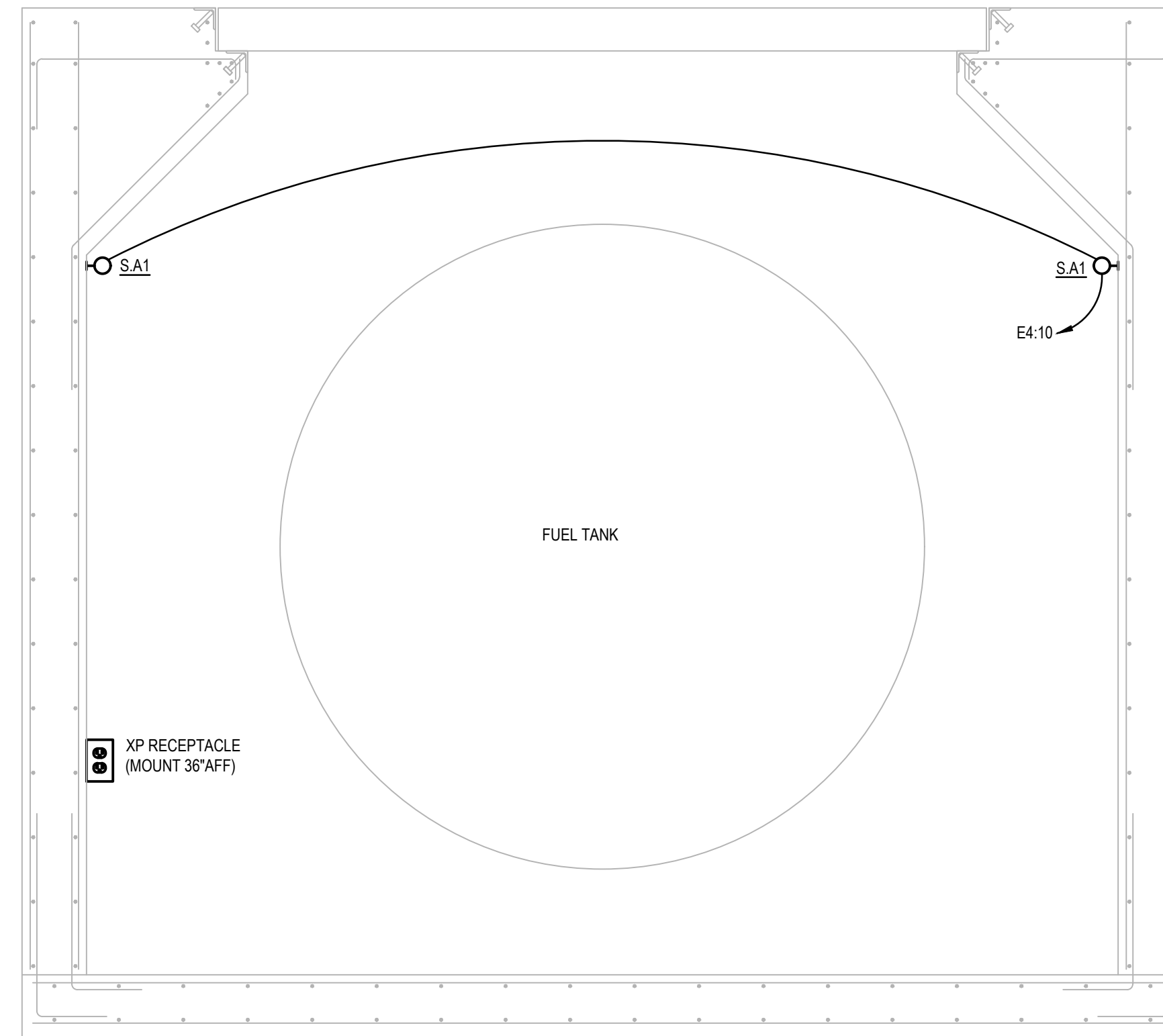
OVERALL
ELECTRICAL SITE
PLAN

SHEET NO:

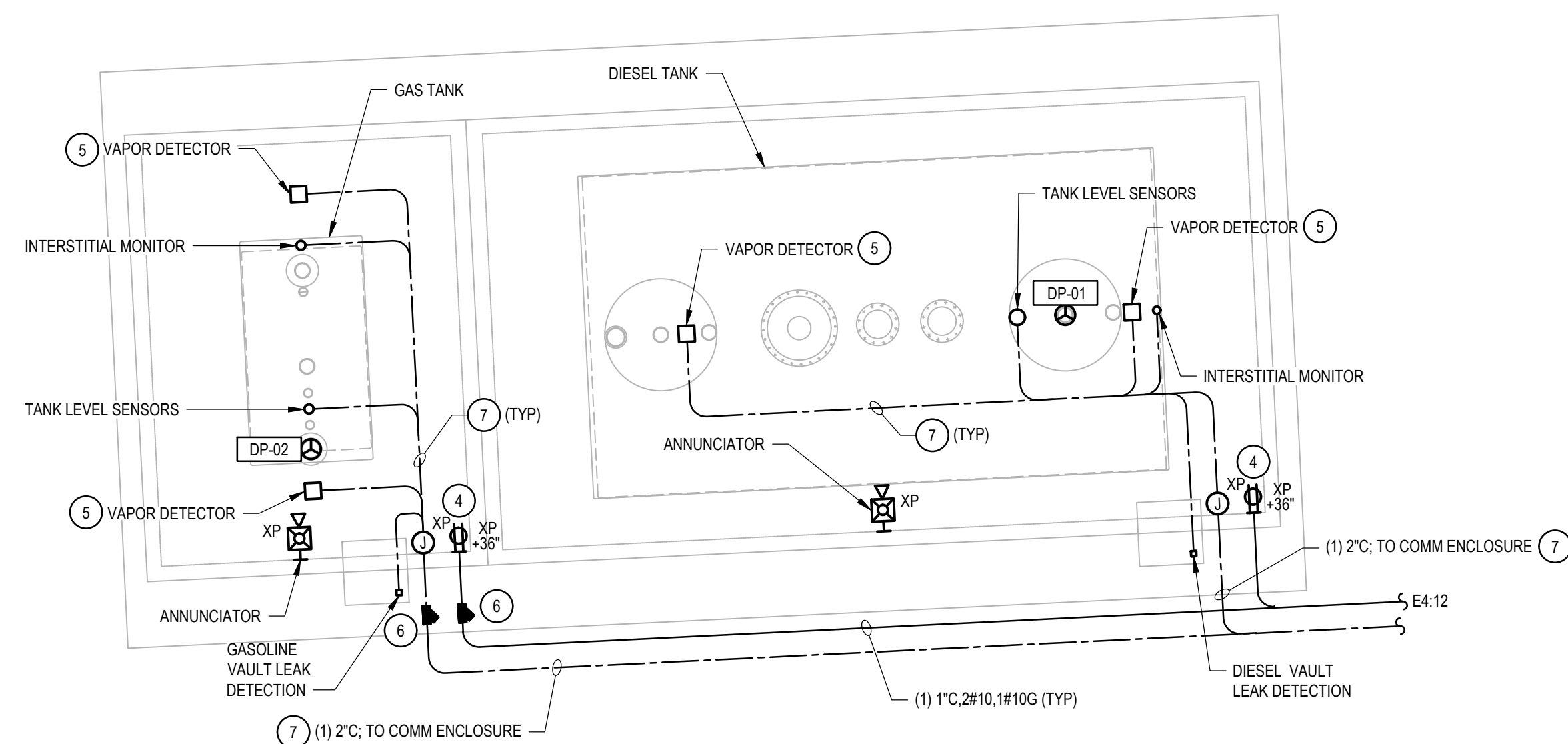
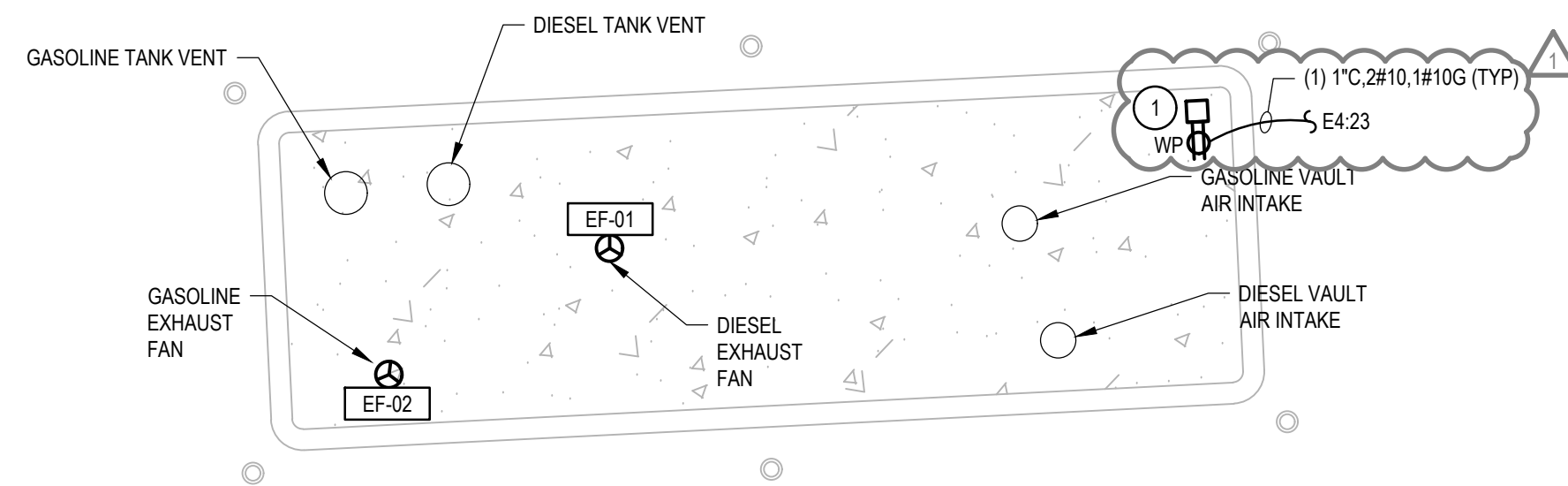
E-300

SHEET OF

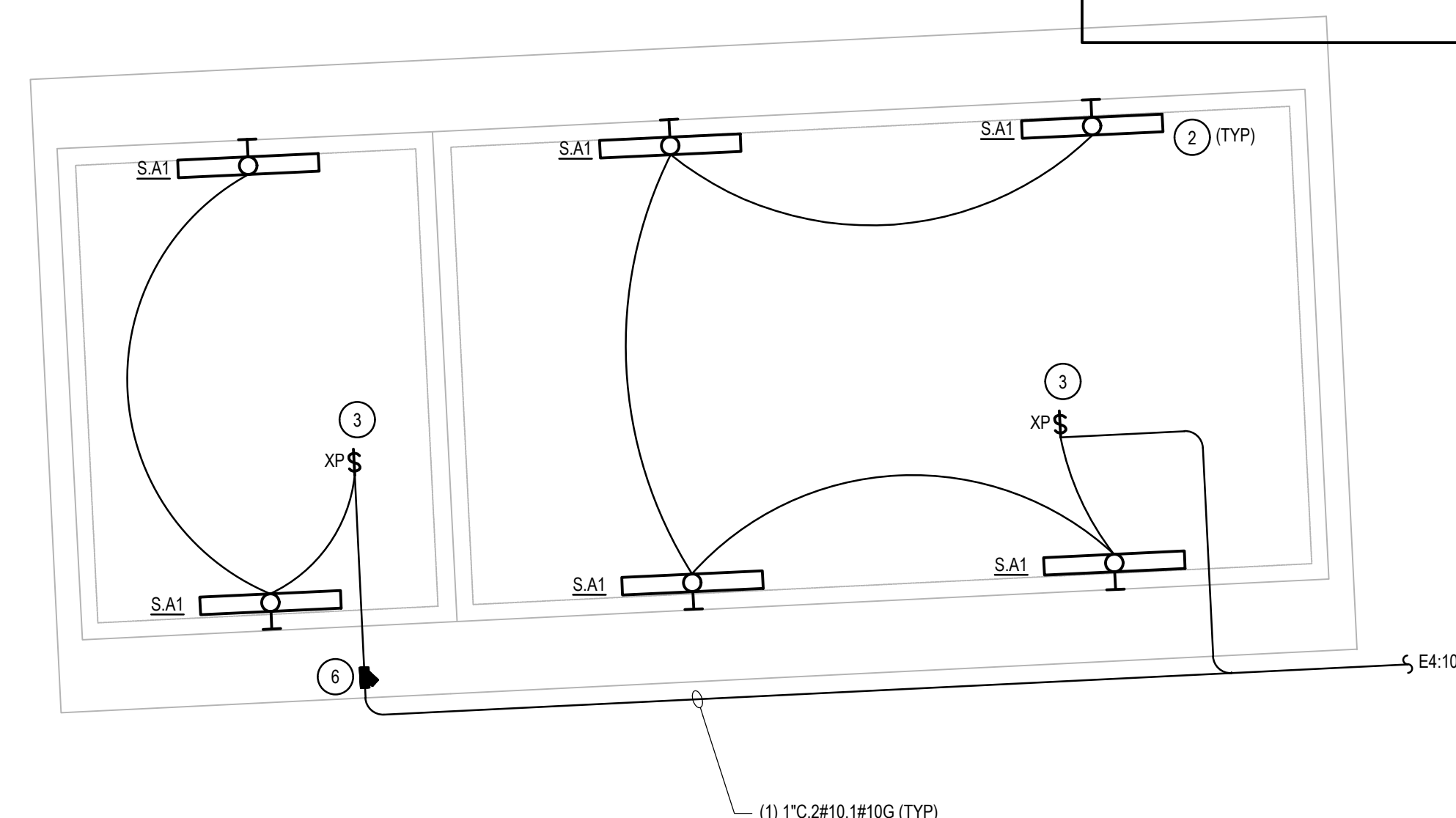
PERMIT SET



C3 **VAULT ELEVATION**
SCALE: 1/2"=1'-0"



A1 ENLARGED PLAN - VAULT POWER/SYSTEMS
SCALE: 1/4"=1'-0"



A3 ENLARGED PLAN - VAULT LIGHTING
SCALE: 1/4"=1'-0"

GENERAL NOTES

1. ALL WORK SHALL COMPLY WITH THE CURRENT EDITION OF NEC AS ADOPTED BY THE STATE OF WASHINGTON OR LOCAL AUTHORITY HAVING JURISDICTION.
2. PROJECT TO COMPLY WITH THE BUY AMERICAN ACT.
3. REFER TO DRAWING E-701 FOR PANEL SCHEDULES.
4. REFER TO DRAWING E-701 FOR EQUIPMENT SCHEDULE.
5. REFER TO DRAWING E-501 FOR ADDITIONAL CABLING REQUIREMENTS.
6. REFER TO DRAWINGS E-502 AND E-503 FOR ELECTRICAL WIRING DIAGRAMS.
7. PROVIDE HAZARDOUS AREA CONDUIT SEALS AS NOTED AND AS REQUIRED. REFER TO DRAWING E-200 FOR HAZARDOUS AREA CLASSIFICATIONS.
8. SEAL ALL CONDUITS AS THEY LEAVE THE CLASSIFIED AREA. SEAL OFF LOCATION IS DIAGRAMMATIC. SEAL OFFS WILL BE IN BUILDING OR ON BUILDING WALL.
9. VAPOR DETECTORS, CONDUITS AND OTHER EQUIPMENT SHALL BE MOUNTED SO THE LID CAN BE REMOVED.
10. CONDUIT PENETRATIONS SHALL USE DETAIL 8, SHEET S-501.

○ SHEET NOTES

1. PROVIDE PEDESTAL MOUNTED RECEPTACLE.
2. PROVIDE SA1 INDATEX EXPLOSION PROOF LED LUMINAIRE CAT#HXPL4-90-U-50K. CIRCUIT TO BE SPLIT AT SWITCHES.
3. PROVIDE XP SWITCH TO CONTROL THE SA1 LUMINAIRES. LOCATE SWITCH IN VAULT NEAR ENTRANCE.
4. EACH VAULT TO BE EQUIPPED WITH A RECEPTACLE FOR PORTABLE SUMP PUMP.
5. VAPOR DETECTOR SHALL BE MOUNTED SO THAT IT DOES NOT INTERFERE WITH LID REMOVAL.
6. PROVIDE HAZARDOUS AREA SEAL-OFF FOR CONDUIT EXITING THE GASOLINE VAULT.
7. COORDINATE CABLING REQUIREMENTS FOR COMMUNICATIONS AND CONTROLS WITH MANUFACTURER SUBMITTALS AND CONTROLS VENDOR.

LEGEND

- (E) - EXISTING TO REMAIN, SHOWN AS LIGHT
(D) - DEMO, SHOWN AS DASHED AND BOLD
(N) - NEW, SHOWN AS BOLD
- POWER CONDUIT
- - - COMMUNICATIONS CONDUIT

PHASING REQUIREMENTS

ALL WORK TO BE PHASED IN ACCORDANCE WITH PROJECT PHASING PLAN G-100.
COORDINATE DEMOLITION ACTIVITIES, OUTAGES, AND POWER REQUIREMENTS WITH
OTHER TRADES AND OWNER.

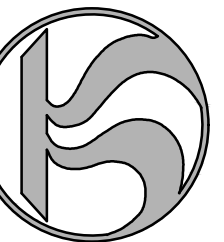


10 N. Post Street,
Suite 500
Spokane, WA 99201
ph 509.328.2994

www.coffman.com

**FLECK FUEL FACILITY
REPLACEMENT**
123 S. BOWDISH ROAD,
SPOKANE VALLEY, WA 99206

Spokane Transit Authority
1230 W. Boone Avenue
Spokane, Washington 99201



1	10/20/23	ADDENDUM 1
REV	DATE	DESCRIPTION

PROJ. NO. 2023-10835

DRAWN SLP

CHECKED MBV

DATE 08/30/23

© COFFMAN ENGINEERS INC.

SHEET TITLE:

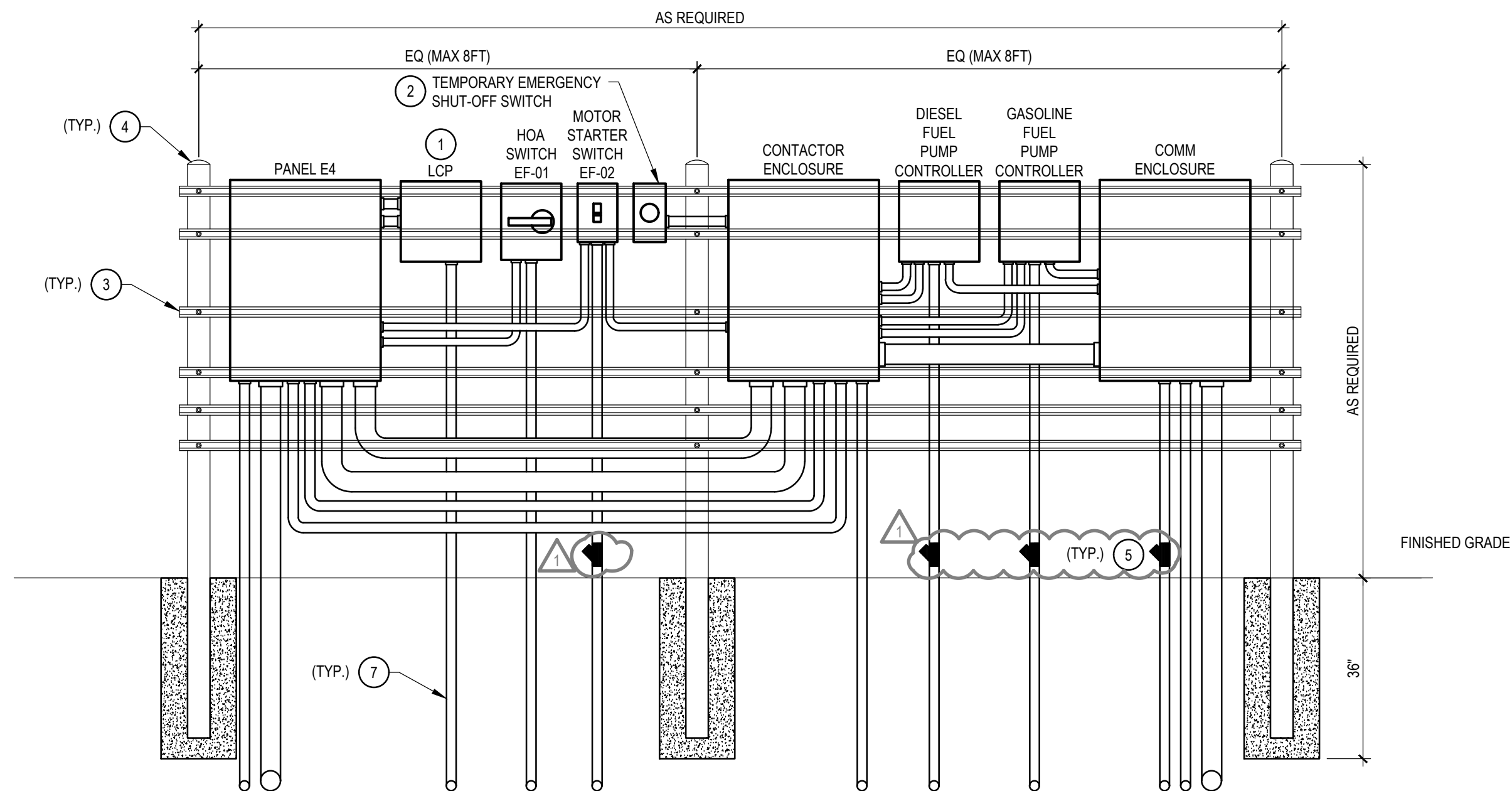
ENLARGED PLANS - VAULT

SHEET NO:

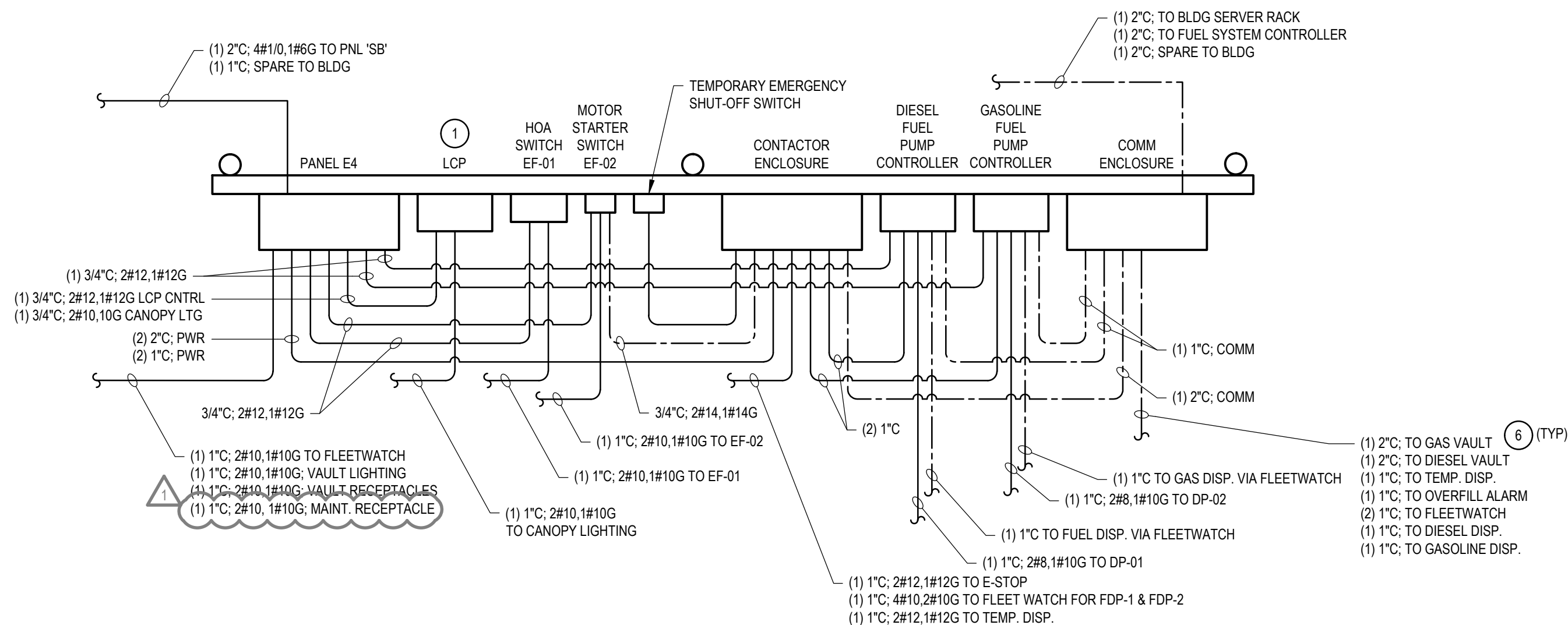
E-301

SHEET OF

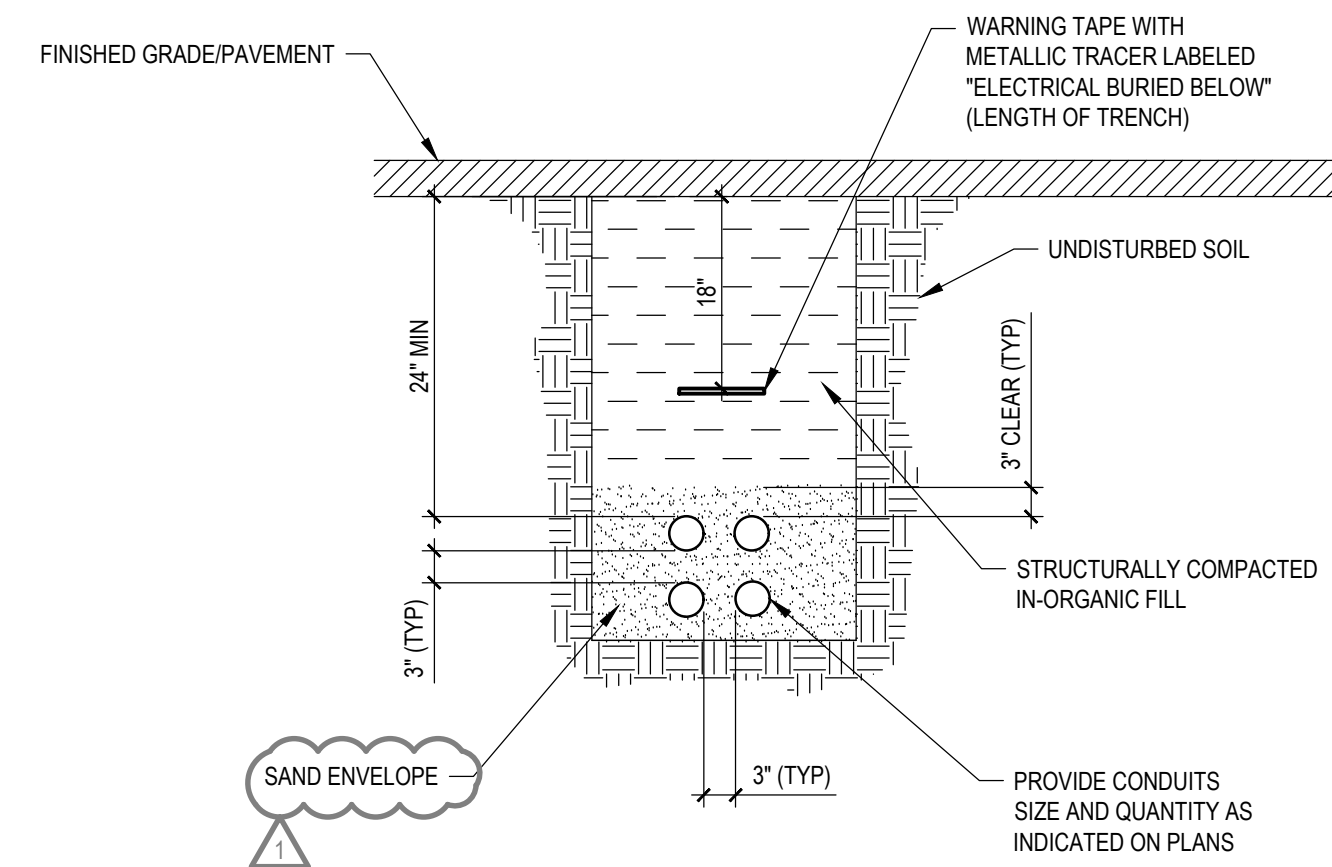
PERMIT SET |



C1 ELECTRICAL EQUIPMENT RACK ELEVATION & MOUNTING DETAIL (FRONT)
SCALE: NONE



A1 ENLARGED PLAN ELECTRICAL EQUIPMENT RACK
SCALE: 1\"/>



A4 TYPICAL DUCT BANK DETAIL
SCALE: NONE

GENERAL NOTES

1. ALL WORK SHALL COMPLY WITH THE CURRENT EDITION OF NEC AS ADOPTED BY THE STATE OF WASHINGTON OR LOCAL AUTHORITY HAVING JURISDICTION.

SHEET NOTES

1. PROVIDE NEMA 3R LIGHTING CONTROL PANEL WITH (3) 208/277V RELAYS. CONTROL PANEL TO INCLUDE PHOTOCELL AND ASTRONOMICAL TIME CLOCK FOR ON/OFF CONTROL. MOUNT PHOTOCELL TO LCP.
2. COORDINATE LOCATION OF FIRE DEPARTMENT E-STOP WITH MECHANICAL INSTALLATION; SEE SHEET M-300.
3. PROVIDE GALVANIZED FRAMING CHANNEL AS REQUIRED FOR MOUNTING OF ELECTRICAL EQUIPMENT. AFFIX GALVANIZED CHANNEL TO BOLLARD USING HOT-DIPPED GALVANIZED HARDWARE CONSISTING OF 1/2\"/>

LEGEND

- POWER CONDUIT
--- COMMUNICATIONS CONDUIT



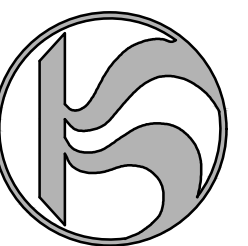
10 N. Post Street,
Suite 500
Spokane, WA 99201
ph 509.328.2994

www.coffman.com

FLECK FUEL FACILITY
REPLACEMENT

123 S. BOWDISH ROAD,
SPOKANE VALLEY, WA 99206

Spokane Transit Authority
1230 W. Boone Avenue
Spokane, Washington 99201



REV	DATE	DESCRIPTION
1	10/20/23	ADDENDUM 1

PROJ. NO. 2023-10835
DRAWN SLP
CHECKED MBV
DATE 08/30/23

© COFFMAN ENGINEERS INC.

SHEET TITLE:

ELECTRICAL DETAILS

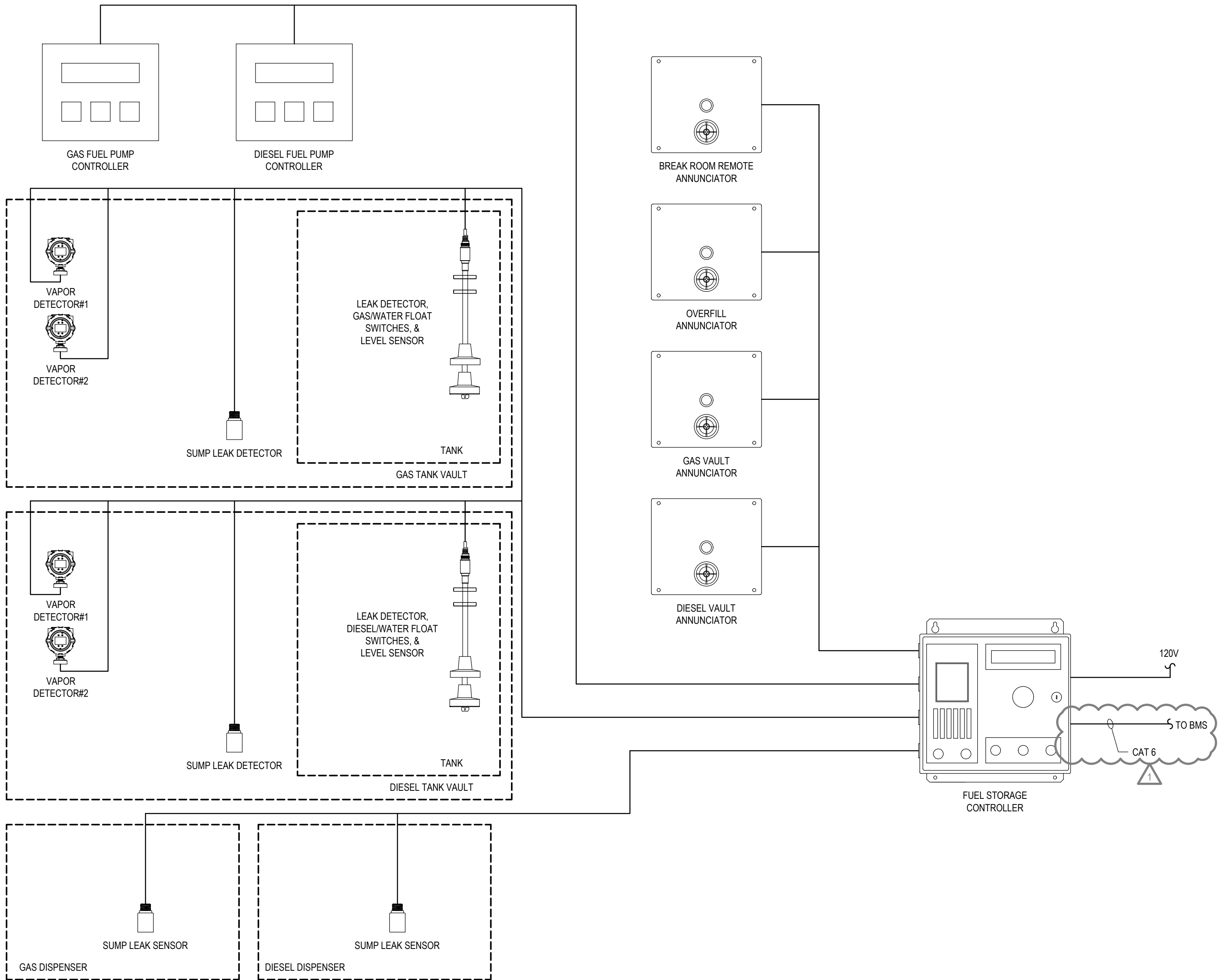
SHEET NO:

E-501

SHEET OF

PERMIT SET

P:\SP023\0BS230521 STA FLECK FUEL REPLACEMENT\0.0 DWG\SE\230521_E502_PERRY_SHAUNA - LAST SAVED October 19, 2023 - PLOT DATE: 10/19/23



B3 SYSTEM CONTROL AND SIGNALING SCHEMATIC
SCALE: NONE

REV	DATE	DESCRIPTION
1	10/20/23	ADDENDUM 1

PROJ. NO. 2023-10835
DRAWN SLP
CHECKED MBV
DATE 08/30/23

© COFFMAN ENGINEERS INC.

SHEET TITLE:

ELECTRICAL SCHEMATICS

SHEET NO:

E-502

SHEET OF

1. ALL WORK SHALL COMPLY WITH THE CURRENT EDITION OF NEC AS ADOPTED BY THE STATE OF WASHINGTON OR LOCAL AUTHORITY HAVING JURISDICTION.
2. REFER TO DRAWING E-701 FOR PANEL SCHEDULES.

- SHEET NOTES

- $\angle 1$



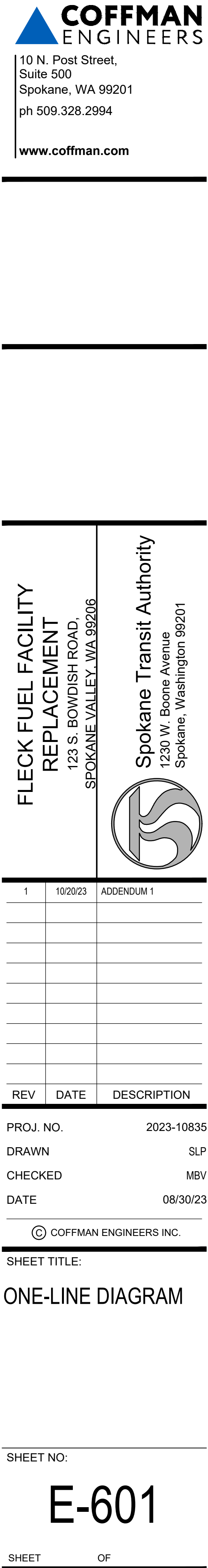
Spokane Transit Authority
1230 W. Boone Avenue
Spokane, Washington 99201

PROJ. NO.	2023-10835
DRAWN	SLP
CHECKED	MBV
DATE	08/30/23

SHEET TITLE:

SHEET NO: _____

SHEET OF



- EXISTING PANELS 'E2' AND 'SUB-PNL', TO BE REMOVED. REFER TO SITE DRAWINGS FOR PHASING OF DEMOLITION.

1. DEDICATED GFCI BREAKER FOR RECEPTACLES SERVING SUMP PUMP

Notes: 1. PROVIDE NEW BREAKER, MATCH EXISTING TYPE AND RATING

MECHANICAL EQUIPMENT SCHEDULE

Project No: 230521

Notes:

A. FURNISHED AND INSTALLED BY DIVISION 23
B. FURNISHED BY DIVISION 23, INSTALLED BY DIVISION 26
C. FURNISHED AND INSTALLED BY DIVISION 26
D. FURNISHED BY OTHERS, INSTALLED BY DIVISION 26
E. FURNISHED AND INSTALLED BY OTHERS

F. NEMA 5-15R RECEPTACLE
G. NEMA 5-20R RECEPTACLE
H. NEMA 6-20R RECEPTACLE
I. NEMA 5-50R RECEPTACLE
J. DIRECT CONNECTION

Key:

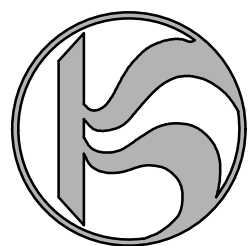
FLA - FULL LOAD AMPS
MCA - MINIMUM CIRCUIT AMPS
VFD - VARIABLE FREQUENCY DRIVE
HP- HORSE POWER

PHASING REQUIREMENTS

ALL WORK TO BE PHASED IN ACCORDANCE WITH PROJECT PHASING PLAN G-100.
COORDINATE DEMOLITION ACTIVITIES, OUTAGES, AND POWER REQUIREMENTS WITH
OTHER TRADES AND OWNER.

**FLECK FUEL FACILITY
REPLACEMENT**
123 S. BOWDISH ROAD,
SPOKANE VALLEY, WA 99206

Spokane Transit Authority
1230 W. Boone Avenue
Spokane, Washington 99201



1	10/20/23	ADDENDUM 1
REV	DATE	DESCRIPTION

PROJ. NO. 2023-10835

DRAWN SLIP

CHECKED MBY

DATE 08/30/23

© COFFMAN ENGINEERS INC

SHEET TITLE:

PANEL AND EQUIPMENT SCHEDULES

SHEET NO

E-701

PERMIT SET

SECTION 231113 - FACILITY FUEL PIPING AND EQUIPMENT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
- B. Facility fuel piping supply and installation of facility fuel piping shall be by the same subcontractor as Section 231327 – “Facility Aboveground Fuel Storage Tanks”.

1.2 SUMMARY

A. Performance:

- 1. Facility Diesel and Gasoline Fuel Distribution System components shall be supplied by a single supplier with five years or more experience in commercial or industrial motor vehicle fuel systems as a primary line of business.
- 2. Installers shall be factory certified for the control system, double wall piping, and pumps.
- 3. Facility Diesel and Gasoline Fuel Distribution System components shall be supplied by the same supplier as the AST, Fuel pumps, and AST accessories as required in specification Section 231327 “Facility Aboveground Fuel Storage Tanks”.
- 4. Facility Fuel Piping components shall form a complete system between the AST and Dispenser. The system performance shall meet the applicable codes of the City of Spokane Valley, the State of Washington, and NFPA 30 and NFPA 30A. The system control and leak detection shall interface with the existing dispensers and AST accessories or in the case that the bid additive alternate dispensers are provided systems shall be compatible and integrated with those dispensers.

B. Section Includes:

- 1. Pipes, tubes, and fittings.
- 2. Double-containment piping and fittings.
- 3. Piping specialties.
- 4. Joining materials.
- 5. Specialty valves.
- 6. Mechanical leak-detection valves.
- 7. Leak detection and monitoring system.
- 8. Labels and identification.
- 9. Dispensers.
- 10. Fuel hoses.
- 11. Hose retractors.

1.3 DEFINITIONS

- A. Exposed, Interior Installations: Exposed to view indoors. Examples include finished occupied spaces and mechanical equipment rooms.
- B. Exposed, Exterior Installations: Exposed to view outdoors or subject to outdoor ambient temperatures and weather conditions. Examples include rooftop locations.
- C. Finished Spaces: Spaces other than mechanical and electrical equipment rooms, furred spaces, pipe and duct shafts, unheated spaces immediately below roof, spaces above ceilings, unexcavated spaces, crawlspace, and tunnels.
- D. AST: Above ground Storage Tank
- E. NRTL: Nationally Recognized Testing Laboratory

1.4 DELEGATED DESIGN

- A. Delegated Design Submittals: For fueling inventory, leak detection and control system products and installation indicated as being delegated.
 - 1. Supporting documentation showing system design complies with performance requirements indicated, including calculations and other documentation necessary to prove compliance.

1.5 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Include construction details, material descriptions, and dimensions of individual components and profiles.
 - 2. Include, where applicable, rated capacities, operating characteristics, electrical characteristics, and furnished specialties and accessories.
 - 3. For valves, include pressure rating, capacity, settings, and electrical connection data of selected models.
- B. Fueling Control and Monitoring System Shop Drawings:
 - 1. General Requirements:
 - a. Include cover drawing with Project name, location, Owner, Engineer, Contractor, and issue date with each Shop Drawings submission.
 - b. Include a drawing index sheet listing each drawing number and title that matches information in each title block.
 - 2. Include plans, elevations, sections, and mounting details where applicable.
 - 3. Include details of product assemblies. Indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.

4. Plan Drawings indicating the following:
 - a. Dispensers.
 - b. Pumps.
 - c. Tanks
 - d. Sensors.
 - e. Emergency stop buttons.
 - f. Alarm panels.
 - g. Fleetwatch panel.
 - h. Building Management System (BMS) panel.
5. Schematic drawings for system indicating the following:
 - a. I/O points labeled with point names shown. Indicate instrument range, normal operating set points, and alarm set points.
 - b. I/O listed in table format showing point name, type of device, manufacturer, model number, and cross-reference to product data sheet number.
 - c. A graphic showing location of control I/O in proper relationship to system.
 - d. Wiring diagram with each I/O point having a unique identification and indicating labels for all wiring terminals.
 - e. Unique identification of each I/O that to be consistently used between different drawings showing same point.
 - f. Narrative sequence of operation.

C. Shop Drawings: For Diesel and Gasoline Piping.

1. Include plans, elevations sections, bedding, and supports for multiple pipes.
2. Include details of location of anchors, alignment guides, and loops.
3. Include pipe inverts, pipe slope and sump elevations.
4. Scale: $\frac{1}{4}'' = 1'-0''$.

1.6 INFORMATIONAL SUBMITTALS

A. Coordination Drawings:

1. Plans and details, drawn to scale, on which diesel and gasoline piping is shown and coordinated with other installations, using input from installers of the items involved.
2. Site Survey: Plans, drawn to scale, on which diesel and gasoline piping and tanks are shown and coordinated with other services and utilities.
3. Conduit plans with sizes for tank gauging, leak detection, pump power and control.
4. Conduit plans with sizes for dispensers, dispenser sumps, remote fill, vapor return, vapor recovery, sensors, alarms, indicator lights, switches, Emergency Stop Buttons, and acknowledgement switches.

B. Field quality-control reports.

C. Sample Warranty: For special warranty.

1.7 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For diesel and gasoline equipment and accessories to include in emergency, operation, and maintenance manuals.

1.8 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1.9 QUALITY ASSURANCE

- A. Installer Qualifications: Trained and certified by the flexible piping manufacturer. The installer shall be responsible for the piping and all accessories. Petroleum storage tanks and dispensing systems shall be a primary line of business of the installing subcontractor. The installer shall have at least five years' experience installing petroleum underground storage tanks and dispensing systems.
- B. Leak detection, inventory, instrumentation, and control systems shall only be installed by factory certified installers.
- C. Storage Tanks: Comply with requirements of the International Fire Code, EPA, state and local authorities having jurisdiction, including recording storage tanks.
- D. A single AST vendor shall provide components and construction verification for a complete system. Including system components specified in Section 231327 "Facility Aboveground Fuel Storage Tanks".
- E. Proprietary systems shall be tested per the manufacturer's recommendations and all requirements to meet factory requirements.
- F. Brazing: Qualify processes and operators according to ASME Boiler and Pressure Vessel Code: Section IX.
- G. Steel Support Welding Qualifications: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."
- H. Pipe Welding Qualifications: Qualify procedures and personnel according to ASME Boiler and Pressure Vessel Code.
- I. Fiberglass Pipe: Training and Certification:- All joints installed or constructed in the field shall be assembled by employees of the contractor who have been trained by the pipe manufacturer. The pipe manufacturer or their authorized representative, shall train the contractor's employees in the proper joining and assembling procedures required for the project, including hands-on participation by the contractor's employees. Each bonder shall fabricate one pipe-to-pipe and one pipe-to-fitting joint that shall pass the minimum pressure test without leaking. Only bonders that have successfully completed the pressure test shall bond pipe and fittings. Each bonder shall carry a current, manufacturer proof of training card.

1.10 DELIVERY, STORAGE, AND HANDLING

- A. Lift and support diesel and gasoline storage tanks only at designated lifting or supporting points, as shown on Shop Drawings. Do not move or lift tanks unless empty.
- B. Deliver pipes and tubes with factory-applied end caps. Maintain end caps through shipping, storage, and handling to prevent pipe end damage and to prevent entrance of dirt, debris, and moisture.
- C. Store pipes and tubes with protective PE coating to avoid damaging the coating and to protect from direct sunlight.
- D. Store PE pipes and valves protected from direct sunlight.

1.11 WARRANTY

- A. Control components, panels, programming, instrumentation, alarms, leak detection, inventory monitoring, and wiring shall have a one year warranty from the time of being put into service.
- B. Special Warranty: Manufacturer agrees to repair or replace components of flexible, double-containment piping and related equipment that fail in materials or workmanship within specified warranty period.
 - 1. Failures due to defective materials or workmanship for materials including piping, dispenser sumps, water-tight sump entry boots, terminations, and other end fittings.
 - 2. Warranty Period: 10 years from date of Substantial Completion.
- C. General warranty:
 - 1. Failures due to defective materials or workmanship for materials.
 - 2. Warranty Period: 1 year from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 SYSTEM DESCRIPTION

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- B. Diesel and Gasoline Valves: Comply with UL 842 and have service mark initials "WOG" permanently marked on valve body.
- C. Comply with requirements of the EPA and of state and local authorities having jurisdiction. Include recording of diesel and gasoline piping.

2.2 PERFORMANCE REQUIREMENTS

- A. Maximum Operating-Pressure Ratings: 60-psig diesel and gasoline supply pressure at dispensers.

2.3 DIESEL AND GASOLINE PIPES, TUBES, AND FITTINGS

- A. See "Outdoor Piping Installation" and "Indoor Piping Installation" articles for where pipes, tubes, fittings, and joining materials are applied in various services.
- B. Steel Pipe: ASTM A 53 Grade B seamless or ERW or ASTM A106 Grade B seamless. 2" and larger Schedule 40, 1 ½" and smaller Schedule 80.
 - 1. Malleable-Iron Threaded Fittings: ASME B16.3, Class 300, standard pattern.
 - 2. Wrought-Steel Welding Fittings: ASTM A 234/A 234M, for butt welding.
 - 3. Unions: ASME B16.39, Class 300, malleable iron with brass-to-iron seat, ground joint, and threaded ends.
 - 4. Forged-Steel Socket Weld Fittings and Unions: ASME B16.11, minimum Class 3000, ASTM A105 forged steel.
 - 5. Weld-On Branch Fittings: MSS-SP-97 and ASME B16.11, minimum Class 3000, ASTM A105 forged steel.
 - 6. Forged-Steel Flanges and Flanged Fittings: ASME B16.5, minimum Class 150, including bolts, nuts, and gaskets of the following material group, end connections, and facings:
 - a. Material Group: 1.1.
 - b. End Connections: Threaded or butt welding to match pipe.
 - c. Lapped Face: Not permitted underground.
 - d. Gasket Materials: Asbestos free, ASME B16.20 metallic, or ASME B16.21 nonmetallic, gaskets compatible with fuel oil.
 - e. Bolts and Nuts: ASME B18.2.1, cadmium-plated steel.
 - 7. Protective Coating for Piping in vaults and trenches: Factory-applied, three-layer coating of epoxy, adhesive, and PE.
 - a. Joint Cover Kits: Epoxy paint, adhesive, and heat-shrink PE sleeves.
- C. Tubing and Fittings:
 - 1. All tubing and fittings shall be of the same manufacturer. Basis of Design Swagelok
 - 2. Tubing Material: seamless bright annealed 316L stainless steel, 1/2"x0.049" wall thickness, 3/4" x 0.065" wall thickness, ASTM A213/A269.
 - 3. Tubing system fittings shall have gauge spacer to verify the fitting is attached properly.
 - 4. Fittings: Type 316 stainless steel, ASTM A213/A269, nut and double ferrule, 4,000 psi minimum pressure rating.

2.4 DOUBLE-CONTAINMENT PIPE AND FITTINGS

- A. Flexible, Nonmetallic, Double-Containment Piping: Comply with UL 971.

1. Pipe Materials: PVDF complying with ASTM D 3222 for carrier pipe with mechanical couplings to seal carrier, and PE pipe complying with ASTM D 4976 for containment piping. Piping shall be designed to allow vacuum testing of interstitial pipe.
2. Carrier/Access Pipe: H20 Load rating corrugated flexible plastic pipe designed specifically for the purpose of being a conduit double wall flexible pipe to be installed and replaced in the future.
3. Watertight sump entry boots, Rigid type with pipe adapters, test ports and tubes, coaxial fittings, and couplings.
4. Minimum Operating Pressure Rating: Primary pipe UL listed for a 100 PSI (6.89 bar) maximum operating pressure.
5. Plastic to Steel Pipe Transition Fittings: Factory-fabricated fittings with plastic end matching or compatible with carrier piping, and steel pipe end complying with ASTM A 53/A 53M, black steel, Schedule 40, Type E or S, Grade B.

2.5 UNDERGROUND DIESEL AND GASOLINE VAPOR RETURN PIPING

- A. Fiberglass reinforced plastic (FRP) pipe for single wall vent and vapor applications including gasoline, unleaded gasoline, gasoline/alcohol mixtures, bio-diesel, DEF and diesel up to 150°F and 250 psig cyclic pressure.
- B. Governing Standards – materials and construction methods shall comply with and be tested in accordance with the following standards and test methods:
 1. UL971 2004 Standard for Nonmetallic Underground Piping for Flammable Liquids
 2. ASTM D2310 Standard Classification for Machine-Made “Fiberglass” (Glass Fiber Reinforced Thermosetting Resin) Pipe
 3. ASTM D2992 Standard Test Method for Obtaining Hydrostatic or Pressure Design Basis for “Fiberglass” (Glass Fiber Reinforced Thermosetting Resin) Pipe and Fittings
 4. ASTM D2310 Classifications at (73.4°F)
 - a. 2”-3” RTRP-11AF
 - b. 4” RTRP-11AH
5. Pipe manufacturer’s quality program shall be in compliance with ISO 9001 and/or API Q1.
- C. 2”-4” Pipe – The pipe shall be manufactured by the filament winding process using an amine cured epoxy thermosetting resin to impregnate strands of continuous glass filaments, which are wound around a mandrel at a 54 ¾° winding angle under controlled tension. Pipe shall be heat cured and the cure shall be confirmed using a Differential Scanning Calorimeter. Pipe shall be supplied with threaded and bonded ends. Pipe shall have a minimum continuous cyclic pressure rating of 125 psig at 150 degree F in accordance with ASTM D2992, Procedure A or UL 971 pressure rating. All pipe shall be 100% hydrotested at the factory before shipment at a minimum pressure of 265 psig and shall be UL 971-2004 Listed and labeled.
- D. Fittings - All fittings shall be manufactured using the same type of material as the pipe. Fittings may be manufactured either by compression molding, filament winding, resin transfer molding or contact molding methods. All fittings, adapter, and sump penetrations shall be UL 971-2004 Listed.

- E. Connections – Connections to flex connectors or other piping materials shall be made by the use of NPT (National Pipe Thread) threaded adapters or flanges bonded to the FRP piping system.
 - F. Sump Penetrations – Sump penetrations shall be made by means of a permanently bonded FRP coupling. The coupling shall be capable of adjusting for the slope of the piping system entering or exiting the sump wall.
 - G. Adhesives shall be manufacturer's standard for the piping system specified.
- 2.6 UNDERGROUND DIESEL AND GASOLINE VENT AND VENTILATION AIR PIPES, JOINTS, AND FITTINGS
- A. Ductile-Iron Pipe
 - 1. Use ductile iron pipe for underground air duct and tank vents. Duct shall be electrically conductive for conveyance of flammable fumes. Ductile-Iron pipe shall conform to AWWA C151, Class 53, except 3" size can be Class 52 or 54, and working pressure not less than 150 psi, unless otherwise shown or specified. Pipe shall be cement-mortar lined and asphalt coated in accordance with AWWA C104.
 - B. Joints
 - 1. Ductile-Iron Pipe Joints shall be mechanical grooved type. Mechanical joints shall be of the restrained stuffing box type and shall conform to AWWA C606. Pipe joints shall be cut grooved and shouldered joints in accordance with AWWA C606 with a minimum working pressure of 150 psi. The coupling shall provide for full circumferential bearing against the face of the pipe groove or shoulder end, with a positive locking action when the components being joined are in line. Restrained joints shall be of the type that cannot be separated without failure of the pipe joint material. Pipe joints shall not rely on friction between metal-to-metal contact surfaces for restraint. Set-screw type joints will not be permitted. Rubber gaskets and lubricants shall be as specified by the manufacturer of the joining system and shall conform to the applicable requirements of ASTM D2000 for fuel resistance.
 - C. Flanges
 - 1. Flanges shall conform to AWWA C207. Flanges shall be flat faced.
 - D. Ductile Iron Fittings
 - 1. Fittings and specials for ductile-iron pipe and steel pipe may be interchanged where applicable. Mating surfaces between steel and iron flanges shall be plain faced. Protective materials for fittings and specials that cannot be mechanically lined and coated shall be lined and coated by hand using the same materials as are used for the pipe with the same number of applications of each material carefully and smoothly applied.
 - 2. Fittings and specials for flanged joint pipe shall conform to AWWA C110. Fittings required on the drawings which are not covered in AWWA C110 shall have AWWA flanges and be based on AWWA C110 design principles. Fittings and specials for cut

grooved and shouldered end pipe shall conform to AWWA C606 without field preparation. Malleable iron shall be ASTM A47. Ductile iron shall be ASTM A536.

- a. Elbows shall have a centerline radius no less than 1.5 times the nominal pipe diameter.
- b. AWWA size fittings rigid radius grooves in accordance with ANSI/AWWA C-606
- c. Fittings conform to ANSI 21.10/AWWA C-110 for center-to-end dimensions and AWWA C-153 or ANSI 21.10/AWWA C-110 for wall thicknesses.
- d. Pressure rated up to 350 psi

2.7 PIPING SPECIALTIES

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. EBW, Inc.
2. Franklin Fueling Systems
3. Morrison Bros. Co.
4. OPW.
5. Preferred Utilities Manufacturing Corporation.
6. Universal Valve Company.

- B. Metallic Flexible Connectors:

1. Listed and labeled for aboveground and underground applications by an NRTL acceptable to authorities having jurisdiction.
2. Stainless-steel bellows with woven, flexible, bronze or stainless-steel, wire-reinforcing protective jacket.
3. Minimum Operating Pressure: 150 psig.
4. End Connections: Socket, flanged, or threaded end to match connected piping.
5. Maximum Length: 30 inches
6. Swivel end, 50-psig maximum operating pressure.
7. Factory-furnished anode for connection to cathodic protection.

- C. Y-Pattern Strainers:

1. Body: ASTM A 126, Class B, cast iron with bolted cover and bottom drain connection.
2. End Connections: Threaded ends for NPS 2 and smaller; flanged ends for NPS 2-1/2 and larger.
3. Strainer Screen: 80-mesh startup strainer and perforated stainless-steel basket with 50 percent free area.
4. CWP Rating: 125 psig

- D. Basket Strainers:

1. Body: ASTM A 126, Class B, high-tensile cast iron with bolted cover and bottom drain connection.

2. End Connections: Threaded ends for NPS 2 and smaller; flanged ends for NPS 2-1/2 and larger.
3. Strainer Screen: 80-mesh startup strainer and perforated stainless-steel basket with 50 percent free area.
4. CWP Rating: 125 psig

E. T-Pattern Strainers:

1. Body: Ductile or malleable iron with removable access coupling and end cap for strainer maintenance.
2. End Connections: Grooved ends.
3. Strainer Screen: 80-mesh startup strainer and perforated stainless-steel basket with 57 percent free area.
4. CWP Rating: 750 psig

F. Manual Air Vents:

1. Body: Bronze.
2. Internal Parts: Nonferrous.
3. Operator: Screwdriver or thumbscrew.
4. Inlet Connection: NPS 1/2.
5. Discharge Connection: NPS 1/8.
6. CWP Rating: 150 psig.
7. Maximum Operating Temperature: 225 deg F.

2.8 FILTERS

A. Filters and Filter Heads

1. Dual 2" NPT, dual filter head, high flow.
2. Single 1" NPT filter head, high flow.
3. Aluminum body,
4. Filters shall be 10 micron, water absorbing, material for 30 gpm flow.

2.9 JOINING MATERIALS

- A. Joint Compound and Tape for Threaded Joints: Suitable for fuel oil.
- B. Welding Filler Metals: Comply with AWS D10.12/D10.12M for welding materials appropriate for wall thickness and chemical analysis of steel pipe being welded.
- C. Brazing Filler Metals: Alloy with melting point greater than 1000 deg F complying with AWS A5.8/A5.8M. Brazing alloys containing more than 0.05 percent phosphorus are prohibited.

2.10 SPECIALTY VALVES

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. EBW, Inc.
2. Franklin Fueling Systems
3. Morrison Bros. Co.
4. OPW.
5. Preferred Utilities Manufacturing Corporation.
6. Universal Valve Company.
7. Franklin Fueling

B. Pressure Relief Valves:

1. Listed and labeled for diesel and gasoline service by an NRTL acceptable to authorities having jurisdiction.
2. Body: Brass, bronze, or cast steel.
3. Springs: Stainless steel, interchangeable.
4. Seat and Seal: Nitrile rubber.
5. Orifice: Stainless steel, interchangeable.
6. Factory-Applied Finish: Baked enamel.
7. Maximum Inlet Pressure: 150 psig.
8. Relief Pressure Setting: 60 psig.

C. Fuel Safety Valves:

1. Listed and labeled for diesel and gasoline service by an NRTL acceptable to authorities having jurisdiction.
2. Body: Brass, bronze, or cast steel.
3. Springs: Stainless steel.
4. Seat and Diaphragm: Nitrile rubber.
5. Orifice: Stainless steel, interchangeable.
6. Factory-Applied Finish: Baked enamel.
7. Manual override port.
8. Maximum Inlet Pressure: 60 psig.
9. Maximum Outlet Pressure: 3 psig.

D. Emergency Shutoff Valves (Shear Valves):

1. Listed and labeled for diesel and gasoline and biofuel service by an NRTL acceptable to authorities having jurisdiction. A fusible link trips the valve closed to shut off fuel in the event of fire. If the dispenser is pulled over or dislodged by collision, the top of the valve breaks off at the integral shear groove, activating poppets and shutting off the flow of fuel supply to the dispenser.
2. Integral Test Port: 3/8" test port to allow the piping system to be air-tested without breaking any piping connections.
3. Double poppet valve.
4. Body: ASTM A 126, cast iron.
5. Disk: FPM.
6. Poppet Spring: Stainless steel.
7. Stem: Plated brass.
8. O-Ring: FPM.
9. Packing Nut: PTFE-coated brass.
10. Fusible link to close valve at 165 deg F.
11. Thermal relief to vent line pressure buildup due to fire.

12. Maximum Operating Pressure: 0.5 psig.
13. Valve to have bosses for mounting to stabilizer bars.

E. Pressure/Vacuum (P/V) Vents

1. P/V Vents shall be specifically approved for gasoline vapor venting. P/V vents shall be UL2583 listed and meet the requirements of EPA 40 CFR part 63 for Gasoline Dispensing Facilities.
 - a. P/V vent body: UV-resistant polymer,
 - b. Seals: UL Listed elastomers,
 - c. Screens: Stainless steel
 - d. Rain cap: UV-resistant polymer
 - e. Pressure setting: 2.5" to 6.0" WC
 - f. Vacuum setting: -6.0" to -10.0" WC
 - g. Pressure leak rate: $\leq .05$ CFH at +2" WC
 - h. Vacuum leak rate: $\leq .21$ CFH at -4" WC
 - i. Maximum flow rate: 8,000 SCFH at 2 PSI
 - j. Operating temperature: -22° to 122° F (-30° to 50° C)
2. In-Line Vaults for P/V Vents
 - a. In-line vault body: Galvanized, powder coated or painted for exterior exposed service. Cast ductile iron, or steel vault body. Body shall have a drain with a plug.
 - b. In-line vault cover: Stainless steel constructed with gasket and security screws.
 - c. Provide with rain cap to be installed at the top of the exposed stack end when using in-line vault.

2.11 MECHANICAL LEAK-DETECTION VALVES

- A. Listed and labeled for diesel and gasoline service by an NRTL acceptable to authorities having jurisdiction.
1. Body: ASTM A 126, cast iron.
 2. O-Rings: Elastomeric compatible with fuel oil.
 3. Piston and Stem Seals: PTFE.
 4. Stem and Spring: Stainless steel.
 5. Piston Cylinder: Burnished brass.
 6. Indicated Leak Rate: Maximum 3 gph at 10 psig.
 7. Leak Indication: Reduced flow.

2.12 LEAK-DETECTION AND MONITORING SYSTEM

- A. Provide dispenser sump sensors as specified in Section 231327 – “Facility Above Ground Fuel Storage Tanks.”

2.13 DISPENSERS

- A. Dispenser: Gasboy Model 9853KX single hose or double hose as indicated on drawings dispenser with pulse output, side load.
- B. Hose Retractor: basis of design is Franklin HRTRVR or equal with 20 feet of 1/8" stainless steel aircraft cable, hose attachments, cradle support, counterweight, and baseplate. Provide with 2" galvanized sch. 40 pipe column. Baseplate is to be for anchoring to fuel island concrete.
- C. Nozzles: High Flow Pressure Activated 1" Truck Nozzle with green cover for diesel and red cover for gasoline. Bus nozzles shall be Emco Wheaton Posilok Fuel Nozzle with drybreak fitting. Provide with swivels and breakaway fittings.
- D. Hoses: Nitrile synthetic rubber with Fluorothermoplastic barrier layer, synthetic rubber cover, Temperature Range: -40°F to 140°F. Provide with breakaway fitting and threaded ends.

2.14 ELECTRICAL

- A. Electrical conduit and conductors shall conform to Division 26 Specifications and general notes shown on the electrical drawings.

2.15 SLEEVES

- A. Steel Pipe: ASTM A 53, Type E, Grade B, Schedule 40, galvanized, plain ends. Waterstop/anchor collar ring welded all around sleeves for cast in place service. Sleeves shall be cut for wall thickness.
- B. Cast Iron: Cast or fabricated "wall pipe" equivalent to ductile-iron pressure pipe, with plain ends and integral Waterston, unless otherwise indicated.

2.16 STEEL PIPE HANGERS AND SUPPORTS

- A. Description: MSS SP-58, Types 1 through 58, factory-fabricated components. Refer to Part 3 "Hanger and Support Applications" Article for where to use specific hanger and support types.
- B. Galvanized, Metallic Coatings: Pregalvanized or hot dipped.
- C. Nonmetallic Coatings: Plastic coating, jacket, or liner.
- D. Padded Hangers: Hanger with fiberglass or other pipe insulation pad or cushion for support of bearing surface of piping.

2.17 TRAPEZE PIPE HANGERS

- A. Description: MSS SP-69, Type 59, shop- or field-fabricated pipe-support assembly made from structural-steel shapes with MSS SP-58 hanger rods, nuts, saddles, and U-bolts.

2.18 METAL FRAMING SYSTEMS

- A. Description: MFMA-3, shop- or field-fabricated pipe-support assembly made of steel channels and other components.
- B. Coatings: Manufacturer's standard finish, unless bare metal surfaces are indicated.
- C. Nonmetallic Coatings: Plastic coating, jacket, or liner.
- D. Ambient air temperature.

2.19 FASTENER SYSTEMS

- A. Powder-Actuated Fasteners: Threaded-steel stud, for use in hardened portland cement concrete with pull-out, tension, and shear capacities appropriate for supported loads and building materials where used.
- B. Mechanical-Expansion Anchors: Insert-wedge-type stainless steel, for use in hardened portland cement concrete with pull-out, tension, and shear capacities appropriate for supported loads and building materials where used.

2.20 PAINTING

- A. Provide paint and coatings per Section 099123 – Painting.

2.21 PIPE STAND FABRICATION

- A. Pipe Stands, General: Shop or field-fabricated assemblies made of manufactured corrosion-resistant components to support roof-mounted piping.
- B. Compact Pipe Stand: One-piece plastic unit with integral-rod-roller, pipe clamps, or V-shaped cradle to support pipe, for roof installation without membrane penetration.
- C. Low-Type, Single-Pipe Stand: One-piece stainless-steel base unit with plastic roller, for roof installation without membrane penetration.
- D. High-Type, Single-Pipe Stand: Assembly of base, vertical and horizontal members, and pipe support, for roof installation without membrane penetration.
 - 1. Base: Stainless steel.
 - 2. Vertical Members: Two or more cadmium-plated-steel or stainless-steel, continuous-thread rods.
 - 3. Horizontal Member: Cadmium-plated-steel or stainless-steel rod with plastic or stainless-steel, roller-type pipe support.

- E. High-Type, Multiple-Pipe Stand: Assembly of bases, vertical and horizontal members, and pipe supports, for roof installation without membrane penetration.
 - 1. Bases: One or more plastic.
 - 2. Vertical Members: Two or more protective-coated-steel channels.
 - 3. Horizontal Member: Protective-coated-steel channel.
 - 4. Pipe Supports: Galvanized-steel, clevis-type pipe hangers.
- F. Curb-Mounting-Type Pipe Stands: Shop- or field-fabricated pipe support made from structural-steel shape, continuous-thread rods, and rollers for mounting on permanent stationary roof curb.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas for compliance with requirements for installation tolerances and other conditions affecting performance of diesel and gasoline piping.
- B. Examine installation of fuel-burning equipment and fuel-handling and storage equipment to verify actual locations of piping connections before installing diesel and gasoline piping.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 EARTHWORK

- A. Comply with requirements in Section 312000 "Earth Moving" for excavating, trenching, and backfilling.

3.3 PREPARATION

- A. Close equipment shutoff valves before turning off fuel oil to premises or piping section.
- B. Comply with NFPA 30 and NFPA 31 requirements for prevention of accidental ignition.

3.4 OUTDOOR PIPING INSTALLATION

- A. Steel Piping with Protective Coating:
 - 1. Apply joint cover kits to pipe after joining, to cover, seal, and protect joints.
 - 2. Repair damage to PE coating on pipe as recommended in writing by protective coating manufacturer. Review protective coating damage with Architect prior to repair.
 - 3. Replace pipe having damaged PE coating with new pipe.
- B. Install double-containment, diesel and gasoline pipe at a minimum slope of 1 percent downward toward sumps.
- C. Install vent pipe at a minimum slope of 1 percent downward toward storage tank sump.

- D. Assemble and install entry boots for pipe penetrations through sump sidewalls for liquid-tight joints.
- E. Install metal pipes and tubes, fittings, valves, and flexible connectors at piping connections to AST.
- F. Install fittings for changes in direction in rigid pipe.
- G. Install system components with pressure rating equal to or greater than system operating pressure.
- H. Install P/V vents inside In-Line Vaults no more than four feet above grade for ground level service.
- I. Ductile iron pipe is for buried vault ventilation and buried tank vents. Do not use ductile iron pipe for fuel handling.

3.5 INDOOR PIPING INSTALLATION, INCLUDING VAULTS

- A. Drawing plans, schematics, and diagrams indicate general location and arrangement of piping systems. Install piping as indicated unless deviations to layout are approved on Coordination Drawings.
- B. Arrange for pipe spaces, chases, slots, sleeves, and openings in building structure during progress of construction to allow for mechanical installations.
- C. Install piping in concealed locations unless otherwise indicated.
- D. Install piping free of sags and bends.
- E. Install fittings for changes in direction and branch connections.
- F. Comply with requirements for equipment specifications for roughing-in requirements.
- G. Prohibited Locations:
 - 1. Do not install diesel and gasoline piping in or through HVAC ducts and plenums, clothes or trash chutes, chimneys or gas vents (flues), ventilating ducts, or dumbwaiter or elevator shafts.
 - 2. Do not install diesel and gasoline piping in walls or partitions.
- H. Use eccentric reducer fittings to make reductions in pipe sizes. Install fittings with level side down.
- I. Connect branch piping from top or side of horizontal piping.
- J. Install unions in pipes NPS 2 and smaller at final connection to each piece of equipment and elsewhere as indicated. Unions are not required on flanged devices.

- K. Do not use diesel and gasoline piping as grounding electrode.
- L. Install sleeves and sleeve seals for piping penetrations of walls, ceilings, and floors.
- M. Install escutcheons for piping penetrations of walls, ceilings, and floors.

3.6 VALVE INSTALLATION

- A. Install manual diesel and gasoline shutoff valves on branch connections to dispenser.
- B. Install valves in accessible locations.
- C. Install oil safety valves at inlet of each dispenser.
- D. Install one-piece, bronze ball valve with hose end connection at low points in diesel and gasoline piping.
- E. Install emergency shutoff valves (shear valves) at dispensers.

3.7 PIPING JOINT CONSTRUCTION

- A. Ream ends of pipes and tubes and remove burrs.
- B. Remove scale, slag, dirt, and debris from inside and outside of pipe and fittings before assembly.
- C. Threaded Joints: Thread pipe with tapered pipe threads according to ASME B1.20.1. Cut threads full and clean using sharp dies. Ream threaded pipe ends to remove burrs and restore full ID. Join pipe fittings and valves as follows:
 - 1. Apply appropriate tape or thread compound to external pipe threads unless dry seal threading is specified.
 - 2. Damaged Threads: Do not use pipe or pipe fittings with threads that are corroded or damaged. Do not use pipe sections that have cracked or open welds.
- D. Welded Joints: Construct joints according to AWS D10.12/D10.12M, using qualified processes and welding operators according to "Quality Assurance" Article.
 - 1. Bevel plain ends of steel pipe.
 - 2. Patch factory-applied protective coating as recommended by manufacturer at field welds and where damage to coating occurs during construction.
- E. Brazed Joints: Construct joints according to AWS's "Brazing Handbook," "Pipe and Tubing" Chapter.
- F. Flanged Joints: Install gasket material, size, type, and thickness for service application. Install gasket concentrically positioned.
- G. Flared Joints: Comply with SAE J513. Tighten finger tight then use wrench according to fitting manufacturer's written instructions. Do not overtighten.

- H. Ductile-Iron Piping, Grooved Joints: Cut-groove pipe. Assemble joints with grooved-end, ductile-iron-piping couplings, gaskets, lubricant, and bolts in accordance with coupling manufacturer's written instructions.

3.8 FIBERGLASS PIPE INSTALLATION

- A. Pipe and fittings shall be protected from damage due to impact and point loading. Pipe shall be properly supported to avoid damage due to flexural strain. The contractor shall not allow dirt, debris or other extraneous materials to get into pipe and fittings. All factory machined areas shall be protected from sunlight until installed.
- B. The piping system shall be installed in accordance with the manufacturer's current published installation procedures.
- C. All joints installed or constructed in the field shall be assembled by employees of the contractor who have been trained by the pipe manufacturer.

3.9 HANGER AND SUPPORT INSTALLATION

- A. Pipe hanger and support and equipment support materials and installation requirements are specified in "maximum spacing" below are from MSS SP-69 (water service).
- B. Install hangers for horizontal steel piping with the following maximum spacing and minimum rod sizes:
 - 1. NPS 1-1/4 and Smaller: Maximum span, 84 inches; minimum rod size, 3/8 inch.
 - 2. NPS 1-1/2: Maximum span, 108 inches; minimum rod size, 3/8 inch.
 - 3. NPS 2: Maximum span, 10 feet; minimum rod size, 3/8 inch.
 - 4. NPS 2-1/2: Maximum span, 11 feet; minimum rod size, 1/2 inch.
 - 5. NPS 3: Maximum span, 12 feet; minimum rod size, 1/2 inch.
 - 6. NPS 4: Maximum span, 13 feet; minimum rod size, 5/8 inch.
- C. Support vertical steel pipe at each floor and at spacing not greater than 15 feet.
- D. Install hangers for horizontal, drawn-temper copper tubing with the following maximum spacing and minimum rod sizes:
 - 1. NPS 3/4 and Smaller: Maximum span, 60 inches; minimum rod size, 3/8 inch.
 - 2. NPS 1: Maximum span, 72 inches; minimum rod size, 3/8 inch.
 - 3. NPS 1-1/4: Maximum span, 84 inches; minimum rod size, 3/8 inch.
 - 4. NPS 1-1/2 and NPS 2: Maximum span, 96 inches; minimum rod size, 3/8 inch.
 - 5. NPS 2-1/2: Maximum span, 108 inches; minimum rod size, 1/2 inch.
 - 6. NPS 3: Maximum span, 10 feet; minimum rod size, 1/2 inch.
 - 7. NPS 4: Maximum span, 11 feet; minimum rod size, 5/8 inch.
- E. Lateral and Longitudinal Bracing: Locate per drawings.

3.10 LEAK-DETECTION AND MONITORING SYSTEM INSTALLATION

- A. See Section 231327 "Facility Above Ground Fuel Storage Tanks".

3.11 LABELING AND IDENTIFYING

- A. Nameplates, pipe identification, valve tags, and signs are specified in Section 230550 "Identification for Piping And Equipment."
- B. Equipment Nameplates and Signs: Install engraved plastic-laminate equipment nameplates and signs on or near each service regulator, service meter, and earthquake valve.
 - 1. Text: In addition to identifying unit, distinguish between multiple units; inform operator of operational requirements; indicate safety and emergency precautions; and warn of hazards and improper operations.
- C. Install detectable warning tape directly above diesel and gasoline piping, 12 inches below finished grade, except 6 inches below subgrade under pavements and slabs. Terminate tracer wire in an accessible area, and identify as "tracer wire" for future use with plastic-laminate sign.
 - 1. Piping: Over underground diesel and gasoline distribution piping.

3.12 FIELD QUALITY CONTROL

- A. Pressure Test Piping: Pressure tests shall be as required by the manufacturer to meet warranty requirements. Steel pipe minimum hydrostatic or pneumatic test-pressures measured at highest point in system unless indicated otherwise by manufacturer:
 - 1. Perform tests as required for Factory Warranty.
 - 2. Diesel and Gasoline Distribution Piping: Minimum 50 psig for minimum 60 minutes.
 - 3. Diesel and Gasoline, Flexible Double-Containment Piping: Follow manufacturer's requirements to meet warranty.
 - a. Primary pipe: Minimum 50 psig compressed air for minimum 60 minutes with no pressure loss. Soap all joints.
 - b. Secondary containment interstitial space: Minimum 5 psig compressed air for minimum 60 minutes. After the pressure has stabilized, disconnect the air supply and monitor the system for leakage. The line needs to remain pressurized for a minimum of one hour with no pressure loss detected in order for the piping to pass.
 - 4. Isolate storage tanks if test pressure in piping will cause pressure in storage tanks to exceed 10 psig.
 - 5. Vent Piping
 - a. Minimum 5 psig for minimum 60 minutes.
 - b. Fiberglass piping tests: A hydrostatic pressure test shall be conducted on the completed piping system. The piping system shall be subjected to 10 pressurization cycles from 0 psig to 5 psig. After the 10 cycles, the pressure shall be held on the system for a minimum of 1 hour and the line inspected for leaks. Test pressures shall

not exceed 5 psig. All pipe joints shall be watertight. All joints that are found to leak, by observation or during testing shall be replaced by the contractor and retested. Should hydrostatic testing be impractical, testing with air or inert gas is acceptable.

6. Soap all joints to detect leaks during compressed air tests. Extreme caution should be used when testing with air. Follow all safety precautions and testing recommendations of the pipe manufacturer.
- B. Inspect and test diesel and gasoline piping according to NFPA 31, "Tests of Piping" Paragraph; and according to requirements of authorities having jurisdiction.
- C. Test leak-detection and monitoring system for accuracy by manually operating sensors and checking against alarm panel indication.
- D. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
- E. Bleed air from diesel and gasoline piping using manual air vents.
- F. Diesel and gasoline piping and equipment will be considered defective if it does not pass tests and inspections.
- G. Prepare and submit test and inspection reports for the Operation and Maintenance Manual.

3.13 PIPING SCHEDULE

- A. Aboveground diesel and gasoline piping shall be the following:
 1. NPS 5/8 to NPS 1 1/2": Steel pipe, steel or malleable-iron threaded fittings, and threaded joints.
 2. NPS 2 and Larger: Steel pipe, steel fittings, and welded or flanged joints.
 3. Flanges in vaults and trenches: ANSI Class 300 Raised Face.
 4. Flanges indoor above grade: ANSI Class 150 Raised Face.
- B. Underground diesel and gasoline piping: flexible double wall piping.
- C. Underground carrier (access) pipe: Corrugated flexible pipe.
- D. Direct buried vent piping shall be Fiberglass pipe and fittings.
- E. Ventilation piping for exhaust fans shall be the following:
 1. Ductile Iron Pipe

3.14 PAINTING

- A. Paint all piping per Section 099123 – Painting.

3.15 ELECTRICAL

- A. Electrical conduit and conductor installation shall conform to Division 26 Specifications and general notes shown on the electrical drawings.

3.16 DISPENSER

- A. Install dispenser over sump.
- B. Install leak detector in sump.
- C. Provide shut-off valve and safety valve (shear valve) in sump.

3.17 SHUTOFF VALVE SCHEDULE

- A. Valves for aboveground distribution piping NPS 2 and smaller shall be one of the following:
 - 1. One-piece, bronze ball valve with bronze trim.
 - 2. Two-piece, full-port, bronze ball valves with bronze trim.
- B. Distribution piping valves for pipe NPS 2-1/2 and larger shall be the following:
 - 1. Two-piece, full-port, bronze ball valves with bronze trim.
- C. Valves in branch piping for dispenser shall be one of the following:
 - 1. One-piece, bronze ball valve with bronze trim.
 - 2. Two-piece, full-port, bronze ball valves with bronze trim.

3.18 HANGER AND SUPPORT APPLICATIONS

- A. Specific hanger and support requirements are specified in Sections specifying piping systems and equipment.
- B. Comply with MSS SP-69 for pipe hanger selections and applications that are not specified in piping system Sections.
- C. Use hangers and supports with galvanized, metallic coatings for piping and equipment that will not have field-applied finish.
- D. Use nonmetallic coatings on attachments for electrolytic protection where attachments are in direct contact with copper tubing.
- E. Use padded hangers for piping that is subject to scratching.

- F. Horizontal-Piping Hangers and Supports: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
1. Adjustable, Steel Clevis Hangers (MSS Type 1): For suspension of noninsulated or insulated stationary pipes, NPS 1/2 to NPS 30.
 2. Yoke-Type Pipe Clamps (MSS Type 2): For suspension of 120 to 450 deg F pipes, NPS 4 to NPS 16, requiring up to 4 inches of insulation.
 3. Carbon- or Alloy-Steel, Double-Bolt Pipe Clamps (MSS Type 3): For suspension of pipes, NPS 3/4 to NPS 24, requiring clamp flexibility and up to 4 inches of insulation.
 4. Steel Pipe Clamps (MSS Type 4): For suspension of cold and hot pipes, NPS 1/2 to NPS 24, if little or no insulation is required.
 5. Pipe Hangers (MSS Type 5): For suspension of pipes, NPS 1/2 to NPS 4, to allow off-center closure for hanger installation before pipe erection.
 6. Adjustable, Swivel Split- or Solid-Ring Hangers (MSS Type 6): For suspension of noninsulated stationary pipes, NPS 3/4 to NPS 8.
 7. Adjustable, Steel Band Hangers (MSS Type 7): For suspension of noninsulated stationary pipes, NPS 1/2 to NPS 8.
 8. Adjustable Band Hangers (MSS Type 9): For suspension of noninsulated stationary pipes, NPS 1/2 to NPS 8.
 9. Adjustable, Swivel-Ring Band Hangers (MSS Type 10): For suspension of noninsulated stationary pipes, NPS 1/2 to NPS 2.
 10. Split Pipe-Ring with or without Turnbuckle-Adjustment Hangers (MSS Type 11): For suspension of noninsulated stationary pipes, NPS 3/8 to NPS 8.
 11. Extension Hinged or 2-Bolt Split Pipe Clamps (MSS Type 12): For suspension of noninsulated stationary pipes, NPS 3/8 to NPS 3.
 12. U-Bolts (MSS Type 24): For support of heavy pipes, NPS 1/2 to NPS 30.
 13. Clips (MSS Type 26): For support of insulated pipes not subject to expansion or contraction.
 14. Pipe Saddle Supports (MSS Type 36): For support of pipes, NPS 4 to NPS 36, with steel pipe base stanchion support and cast-iron floor flange.
 15. Pipe Stanchion Saddles (MSS Type 37): For support of pipes, NPS 4 to NPS 36, with steel pipe base stanchion support and cast-iron floor flange and with U-bolt to retain pipe.
 16. Adjustable, Pipe Saddle Supports (MSS Type 38): For stanchion-type support for pipes, NPS 2-1/2 to NPS 36, if vertical adjustment is required, with steel pipe base stanchion support and cast-iron floor flange.
 17. Single Pipe Rolls (MSS Type 41): For suspension of pipes, NPS 1 to NPS 30, from 2 rods if longitudinal movement caused by expansion and contraction might occur.
 18. Adjustable Roller Hangers (MSS Type 43): For suspension of pipes, NPS 2-1/2 to NPS 20, from single rod if horizontal movement caused by expansion and contraction might occur.
 19. Complete Pipe Rolls (MSS Type 44): For support of pipes, NPS 2 to NPS 42, if longitudinal movement caused by expansion and contraction might occur but vertical adjustment is not necessary.
 20. Pipe Roll and Plate Units (MSS Type 45): For support of pipes, NPS 2 to NPS 24, if small horizontal movement caused by expansion and contraction might occur and vertical adjustment is not necessary.
 21. Adjustable Pipe Roll and Base Units (MSS Type 46): For support of pipes, NPS 2 to NPS 30, if vertical and lateral adjustment during installation might be required in addition to expansion and contraction.
- G. Vertical-Piping Clamps: Unless otherwise indicated and except as specified in piping system Sections, install the following types:

1. Extension Pipe or Riser Clamps (MSS Type 8): For support of pipe risers, NPS 3/4 to NPS 20.
 2. Carbon- or Alloy-Steel Riser Clamps (MSS Type 42): For support of pipe risers, NPS 3/4 to NPS 20, if longer ends are required for riser clamps.
- H. Hanger-Rod Attachments: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
1. Steel Turnbuckles (MSS Type 13): For adjustment up to 6 inches for heavy loads.
 2. Steel Clevises (MSS Type 14): For 120 to 450 deg F piping installations.
 3. Swivel Turnbuckles (MSS Type 15): For use with MSS Type 11, split pipe rings.
 4. Malleable-Iron Sockets (MSS Type 16): For attaching hanger rods to various types of building attachments.
 5. Steel Weldless Eye Nuts (MSS Type 17): For 120 to 450 deg F piping installations.
- I. Building Attachments: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
1. Steel or Malleable Concrete Inserts (MSS Type 18): For upper attachment to suspend pipe hangers from concrete ceiling.
 2. Top-Beam C-Clamps (MSS Type 19): For use under roof installations with bar-joist construction to attach to top flange of structural shape.
 3. Side-Beam or Channel Clamps (MSS Type 20): For attaching to bottom flange of beams, channels, or angles.
 4. Center-Beam Clamps (MSS Type 21): For attaching to center of bottom flange of beams.
 5. Welded Beam Attachments (MSS Type 22): For attaching to bottom of beams if loads are considerable and rod sizes are large.
 6. C-Clamps (MSS Type 23): For structural shapes.
 7. Top-Beam Clamps (MSS Type 25): For top of beams if hanger rod is required tangent to flange edge.
 8. Side-Beam Clamps (MSS Type 27): For bottom of steel I-beams.
 9. Steel-Beam Clamps with Eye Nuts (MSS Type 28): For attaching to bottom of steel I-beams for heavy loads.
 10. Linked-Steel Clamps with Eye Nuts (MSS Type 29): For attaching to bottom of steel I-beams for heavy loads, with link extensions.
 11. Malleable Beam Clamps with Extension Pieces (MSS Type 30): For attaching to structural steel.
 12. Welded-Steel Brackets: For support of pipes from below, or for suspending from above by using clip and rod. Use one of the following for indicated loads:
 - a. Light (MSS Type 31): 750 lb.
 - b. Medium (MSS Type 32): 1500 lb.
 - c. Heavy (MSS Type 33): 3000 lb.
 13. Side-Beam Brackets (MSS Type 34): For sides of steel or wooden beams.
 14. Plate Lugs (MSS Type 57): For attaching to steel beams if flexibility at beam is required.
 15. Horizontal Travelers (MSS Type 58): For supporting piping systems subject to linear horizontal movement where headroom is limited.
- J. Comply with MSS SP-69 for trapeze pipe hanger selections and applications that are not specified in piping system Sections.

- K. Comply with MFMA-102 for metal framing system selections and applications that are not specified in piping system Sections.
- L. Use powder-actuated fasteners or mechanical-expansion anchors instead of building attachments where required in concrete construction.

3.19 HANGER AND SUPPORT INSTALLATION

- A. Steel Pipe Hanger Installation: Comply with MSS SP-69 and MSS SP-89. Install hangers, supports, clamps, and attachments as required to properly support piping from building structure.
- B. Trapeze Pipe Hanger Installation: Comply with MSS SP-69 and MSS SP-89. Arrange for grouping of parallel runs of horizontal piping and support together on field-fabricated trapeze pipe hangers.
 - 1. Pipes of Various Sizes: Support together and space trapezes for smallest pipe size or install intermediate supports for smaller diameter pipes as specified above for individual pipe hangers.
 - 2. Field fabricate from ASTM A 36/A 36M, steel shapes selected for loads being supported. Weld steel according to AWS D1.1.
- C. Fiberglass Pipe Hanger Installation: Comply with applicable portions of MSS SP-69 and MSS SP-89. Install hangers and attachments as required to properly support piping from building structure.
- D. Metal Framing System Installation: Arrange for grouping of parallel runs of piping and support together on field-assembled metal framing systems.
- E. Fiberglass Strut System Installation: Arrange for grouping of parallel runs of piping and support together on field-assembled fiberglass struts.
- F. Thermal-Hanger Shield Installation: Install in pipe hanger or shield for insulated piping.
- G. Fastener System Installation:
 - 1. Install powder-actuated fasteners for use in lightweight concrete or concrete slabs less than 4 inches thick in concrete after concrete is placed and completely cured. Use operators that are licensed by powder-actuated tool manufacturer. Install fasteners according to powder-actuated tool manufacturer's operating manual.
 - 2. Install mechanical-expansion anchors in concrete after concrete is placed and completely cured. Install fasteners according to manufacturer's written instructions.
- H. Pipe Stand Installation:
 - 1. Pipe Stand Types except Curb-Mounting Type: Assemble components and mount on smooth roof surface. Do not penetrate roof membrane.
 - 2. Curb-Mounting-Type Pipe Stands: Assemble components or fabricate pipe stand and mount on permanent, stationary roof curb. Refer to Division 07 Section "Roof Accessories" for curbs.

- I. Install hangers and supports complete with necessary inserts, bolts, rods, nuts, washers, and other accessories.
- J. Equipment Support Installation: Fabricate from welded-structural-steel shapes.
- K. Install hangers and supports to allow controlled thermal and seismic movement of piping systems, to permit freedom of movement between pipe anchors, and to facilitate action of expansion joints, expansion loops, expansion bends, and similar units.
- L. Install lateral bracing with pipe hangers and supports to prevent swaying.
- M. Install building attachments within concrete slabs or attach to structural steel. Install additional attachments at concentrated loads, including valves, flanges, and strainers, NPS 2-1/2 and larger and at changes in direction of piping. Install concrete inserts before concrete is placed; fasten inserts to forms and install reinforcing bars through openings at top of inserts.
- N. Load Distribution: Install hangers and supports so piping live and dead loads and stresses from movement will not be transmitted to connected equipment.
- O. Pipe Slopes: Install hangers and supports to provide indicated pipe slopes and so maximum pipe deflections allowed by ASME B31.1 (for power piping) and ASME B31.9 (for building services piping) are not exceeded.

END OF SECTION 231113

SECTION 231327 - FACILITY ABOVEGROUND AUTOMOTIVE FUEL STORAGE TANKS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Horizontal, double wall steel, Fuel ASTs.

1.3 DEFINITIONS

- A. AST: Aboveground storage tank.

1.4 GOVERNING STANDARDS

- A. U.L. 142, Underwriters Laboratories, Inc., “Steel Aboveground Tanks for Flammable and Combustible Liquids”.
- B. NFPA 30, National Fire Protection Association, “Flammable and Combustible Liquids Code”.
- C. NFPA 30A, National Fire Protection Association, “Code for Motor Fuel Dispensing Facilities and Repair Garages”.
- D. Uniform Fire Code, International Fire Code Institute
- E. PEI/RP-200, Petroleum Equipment Institute, “Recommended Practices for Installation of Aboveground Storage Systems for Motor-Vehicle Fueling”

1.5 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Include construction details, material descriptions, and dimensions of individual components and profiles.
 - 2. Include rated capacities, operating characteristics, electrical characteristics, and furnished specialties and accessories.
 - 3. Automotive fuel storage tank accessories.
 - 4. Manufacturer’s current installation instructions.

B. Shop Drawings:

1. Include plans, elevations, sections, and anchors, and lifting or supporting points.
2. Indicate dimensions, components, and location and size of each field connection.
3. Shop Drawing Scale: 1/4 inch per foot.
4. Demonstrate compliance with requirements and dimensions from plans.
5. Wiring diagrams for interconnection of tank gauging, inventory recording, pump control, leak detection, dispensers, E-Stops, and other devices required to comply city, state, and NFPA requirements.

1.6 INFORMATIONAL SUBMITTALS

- A. Site Survey: Plans, drawn to scale, on which fuel storage tanks are shown and coordinated with other services and utilities.
- B. Qualification Data: For qualified professional engineer.
- C. Seismic Qualification Data: For ASTs, accessories, and components, from manufacturer.
 1. Basis for Certification: Indicate whether withstand certification is based on actual test of assembled components or on calculation.
 2. Dimensioned Outline Drawings of Equipment Unit: Identify center of gravity and locate and describe mounting and anchorage provisions.
 3. Detailed description of equipment anchorage devices on which the certification is based and their installation requirements.
- D. Brazing certificates.
- E. Welding certificates.
- F. Field quality-control reports.
- G. Sample Warranty: For special warranty.

1.7 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For fuel equipment and accessories to include in emergency, operation, and maintenance manuals.

1.8 QUALITY ASSURANCE

- A. EPA Compliance: Comply with EPA and state and local authorities having jurisdiction. Include recording of fuel storage tanks and monitoring of tanks.
- B. Steel Support Welding Qualifications: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."
- C. Follow UL-142 standards and practices.

1.9 WARRANTY

- A. Special Warranty: Manufacturer agrees to repair or replace components of Fuel storage tanks that fail in materials or workmanship within specified warranty period.
 - 1. Storage Tanks:
 - a. Failures include, but are not limited to, the following when used for storage of Fuel at temperatures not exceeding 150 deg F:
 - 1) Structural failures including cracking, breakup, and collapse.
 - 2) Corrosion failure including external and internal corrosion of steel tanks.
 - b. Warranty Period: 30 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Seismic Performance: Factory-installed support attachments for AST shall withstand the effects of earthquake motions determined according to ASCE/SEI 7 and 2018 Edition of the International Building Code.
 - 1. The term "withstand" means "the unit will remain in place without separation of any parts when subjected to the seismic forces specified."
 - 2. Design Loads:
 - a. Importance Factor: 1
 - b. Sds: 0.318
 - c. Sd1: 0.177
 - d. Ss: 0.307
 - e. S1: 0.112
 - f. Seismic Design Category: C
 - g. Site Class: D
 - h. Elevation: in below grade vault.

2.2 HORIZONTAL, STEEL, DOUBLE WALL, FUEL AST

- A. Description: UL 142, double-wall, horizontal, cylindrical, steel tank; with enclosed, secondary-containment, and interstitial space with capacity greater than tank capacity.
- B. Construction: Fabricated with welded, carbon steel; suitable for operation at atmospheric pressure and for storing diesel and gasoline with specific gravity up to 1.1 and with maintained temperature up to 150 deg F. Minimal material thickness of the tanks shall be per UL-142 requirements. Tanks shall withstand an air pressure test of 3 to 5 psi.
 - 1. Design & Operating Pressure: Atmospheric.
 - 2. Design & Operating Temperature: Ambient.
 - 3. Tank to be Built & Labeled per U.L. 142.

4. Tank to Bear Manufacturers & U.L. Labels Only.
5. Appurtenances:
 - a. See drawings for additional information. Provide as required for UL-142
 - b. Manways, 24" minimum diameter. Manways shall conform to Underwriters Laboratories 142 standard with regard to construction, bolting and gaskets.
 - c. Pump mounting plate
 - d. Vent
 - e. High level alarm
 - f. Fill connection with truck fitting and spill bucket, and overfill prevention. Fill shall have dip tube within three inches of tank bottom and strike plate under dip tube.
 - g. Top mounted water draw connection with dip tube.
 - h. Sounding and Gage Tubes: Extension of fitting into tank, terminating 6 inches above tank bottom and cut at a 45-degree angle.
 - i. Lifting Lugs: For handling and installation.
 - j. Emergency vents for inner tank and interstitial space.
 - k. Interstitial leak detection access.
 - l. Tanks will be installed in concrete vaults.
 - m. Where indicated on drawings provide tank top platform and guardrails for maintenance access. Guardrails shall be sufficient to support fuel pipes, conduits for pumps and control, and vent pipes. Project drawings show the location and size of guardrails required to fit inside vaults. Platform is to be supported on the tank top.
6. All Fittings to be Protected for Shipment.

C. Painting and Coating:

1. Apply manufacturer's standard prime coat to exterior steel surface of AST. The interior shall not be coated.
2. Shop Cleaning: After fabrication, blast clean according to SSPC-SP 6/NACE No. 3.
3. After cleaning, remove dust or residue from cleaned surfaces.
4. If surface develops rust before prime coat is applied, repeat surface preparation.
5. Apply manufacturer's standard prime coat to shop-cleaned, dry surface same day as surface preparation.
6. Apply manufacturer's standard two-component, epoxy finish coats.

- D. Supports: Manufacturer's standard structural steel welded to tank and sufficient to be installed on concrete floor. Provide means for anchoring tank if it will not stay in position by gravity. Design of the steel supports shall be per approved UL listing and be able to support the weight of the tank filled to capacity. Maximum height of saddle when measured from lowest portion of the tank shell to grade level shall be no more than 12 inches high.

- E. Capacities and Characteristics: see drawings.

- F. Fuel Grade: Diesel No. 2, Biodiesel, gasoline and E85 gasoline.

2.3 LIQUID-LEVEL GAGE SYSTEM

- A. Description: Calibrated liquid-level gage system complying with UL 180 with floats other sensors and remote annunciator panel. The Basis of Design is Franklin Fueling EVO 6000.

- B. Annunciator Panel: With visual and audible, high-tank-level and low-tank-level alarms; fuel indicator with registration in gallons; and overfill alarm. Include gage volume range that covers fuel storage capacity.
- C. Controls: Electrical, operating on 120-V ac.
- D. Provide with Port and Card for communication with the building automation system (BAS). Connection will utilize a CAT6 communications cable.
- E. See the drawings for addition requirements, sequence of operations and control points.
- F. The contractor shall engage ATS Inland Northwest 9507 E. Sprague, Spokane Valley, WA 99206, (509) 892-1000, for the remote monitoring of the fueling system and ventilation fans by the Building Automation System.

2.4 LEAK-DETECTION AND MONITORING SYSTEM

- A. Cable and Sensor System: Comply with UL 1238. The system shall be from the same manufacturer and in the same panel as the Liquid Level Gauge system. The Basis of Design is Franklin Fueling EVO 6000.
 - 1. Calibrated leak-detection and monitoring system with probes and other sensors and remote alarm panel for fuel storage tanks, vaults, dispenser sumps, transition sumps, remote fill sumps, and fuel piping.
 - 2. Include fittings and devices required for testing.
 - 3. Controls: Electrical, operating on 120-V ac.
 - 4. Calibrated liquid-level gage complying with UL 180 with floats or other sensors and remote annunciator panel.
 - 5. Remote Annunciator Panel: With visual and audible, high-tank-level and low-tank-level alarms; fuel indicator with registration in gallons; and overfill alarm. Include gage volume range that covers fuel storage capacity.
 - 6. Controls: Electrical, operating on 120-V AC.
- B. See the drawings for addition requirements, sequence of operations and control points.

2.5 SOURCE QUALITY CONTROL

- A. Pressure test and inspect fuel storage tanks, after fabrication and before shipment, according to ASME and the following:
 - 1. Double-Wall Steel ASTs: UL 142, STI F921, and STI R931.
- B. Affix standards organization's code stamp. Each tank shall bear the U.L. listing mark for, "Secondary Containment Aboveground Tank for Flammable Liquids".
- C. Air test at not less than 3 psi nor more than 5 psi. Primary tank to be tested alone. Secondary tank to be pressure tested with pressure in primary tank. This shall be accomplished by bleeding air from the primary tank into the secondary tank. At no time shall the pressure in the secondary

tank exceed the pressure in the primary tank. Tank to be examined with water & soap suds solution.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine roughing-in for aboveground fuel storage tanks to verify actual locations.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 FUEL AST INSTALLATION

- A. Install tank bases and supports.
- B. Concrete Bases: Level and grout tank supports. Anchor AST to concrete floor. Calculate anchors to resist seismic forces.
- C. Connect piping and vent fittings.
- D. Install ground connections.
- E. Install tank leak-detection and monitoring devices.
- F. Install steel ASTs according to STI R912.
- G. Install insulated and concrete-vaulted, steel ASTs according to STI R942.
- H. Fill storage tanks with fuel.

3.3 LIQUID-LEVEL GAGE SYSTEM INSTALLATION

- A. Install liquid-level gage system.

3.4 LEAK-DETECTION AND MONITORING SYSTEM INSTALLATION

- A. Install leak-detection and monitoring system. Install alarm panel inside building where indicated.
 - 1. Double-Wall, Fuel Storage Tanks: Install probes or use factory-installed integral probes in interstitial space.
 - 2. Single-Wall, Fuel Storage Tanks: Install probes as indicated.
 - 3. Double-Containment Fuel Piping: Install leak-detection sensor probes in fuel storage tank containment.
 - 4. Sumps: Install liquid sensors in sumps.
 - 5. Install liquid-level gage.
 - 6. Layout and plan interconnecting conduit and conductors for leak detection system.

3.5 LABELING AND IDENTIFYING

- A. Nameplates: indicate contents in 3" high black lettering on tank sidewall.

3.6 FIELD PAINTING OF AST

- A. Prepare and touch up damaged exterior surface of AST as specified in "Shop Painting of AST" Article.

3.7 FIELD QUALITY CONTROL

- A. Manufacturer's Field Service: Engage a factory-authorized service representative to test and inspect components, assemblies, and equipment installations, including connections.
- B. Perform the following tests and inspections:
 - 1. Tanks: Minimum hydrostatic or compressed-air test pressures for fuel storage tanks that have not been factory tested and do not bear the ASME code stamp or a listing mark acceptable to authorities having jurisdiction:
 - a. Inner Tanks: Minimum 3 psig and maximum 5 psig.
 - b. Interstitial Space: Minimum 3 psig and maximum 5 psig, or 5.3-in. Hg vacuum.
 - c. Where vertical height of fill and vent pipes is such that the static head imposed on the bottom of the tank is greater than 10 psig, hydrostatically test the tank and fill and vent pipes to a pressure equal to the static head thus imposed.
 - d. Maintain the test pressure for one hour.
- C. ASTs will be considered defective if they do not pass tests and inspections.
- D. Prepare test and inspection reports.

END OF SECTION 231323