

# ENGINEERING REPORT

## PROJECT NO. WC-0930

### WATER TRANSMISSION MAIN AND BOOSTER STATION NO. 9 IMPROVEMENTS

FROM BOOSTER STATION NO. 9  
7626 W RENO AVENUE  
TO MELROSE LANE

#### PREPARED FOR

---

**Oklahoma City Water Utilities Trust**  
420 W Main St, Suite 500  
Oklahoma City, Oklahoma 73102

#### PREPARED BY

---

**Tetra Tech**  
7645 East 63<sup>rd</sup> Street, Suite 301  
Tulsa, Oklahoma 74133

**P** 918-249-3909  
tetratech.com

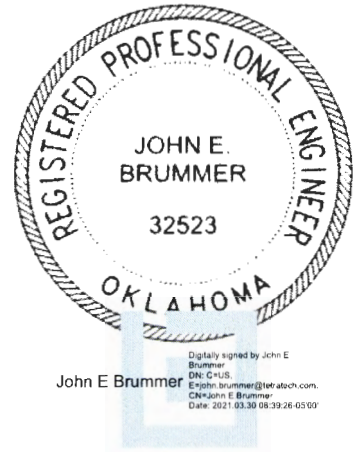
**THE OKLAHOMA CITY WATER UTILITIES TRUST**

*ENGINEERING REPORT*


**Project No. WC-0930**  
WATER TRANSMISSION MAIN  
FROM BOOSTER STATION NO. 9, 7626 WEST RENO AVENUE  
TO MELROSE LANE


Prepared by:  
TETRA TECH  
7645 East 63<sup>rd</sup> Street, Suite 301  
Tulsa, Oklahoma 74133  
Phone 918.249.3909


John Brummer, P.E.  
Design Engineer



Recommended for Receipt

  
Crystal Kowalik, P.E., Interim Engineering Manager

  
Chris Browning, General Manager

  
Eric Wenger, P.E., City Engineer

**RECEIVED** by the Trustees and signed by the Chairman of the Oklahoma City Water  
Utilities Trust this \_\_\_\_\_ day of \_\_\_\_\_, 2021

ATTEST:

**OKLAHOMA CITY WATER UTILITIES TRUST**

\_\_\_\_\_  
Secretary

\_\_\_\_\_  
Chairman

**CONCURRED** by the Council and signed by the Mayor of The City of Oklahoma City  
this \_\_\_\_\_ day of \_\_\_\_\_, 2021.

ATTEST:

**THE CITY OF OKLAHOMA CITY**

\_\_\_\_\_  
City Clerk

\_\_\_\_\_  
Mayor

**REVIEWED** for form and legality.

  
\_\_\_\_\_  
Assistant Municipal Counselor

# EXECUTIVE SUMMARY

---

**Scope:**

Tetra Tech was selected by the Oklahoma City Water Utilities Trust (OCWUT) to design a 42" Water Transmission Main from Booster Station No. 9 at 7626 W. Reno Ave. to near 7500 Melrose Lane.

**Summary:**

Project WC-0930 will install 3,926 linear feet of 42" Water Transmission Main from the discharge side of existing Booster Pump Station No. 9 to a location near 7424 Melrose Lane, connecting to project WC-0855. The new water transmission main will be installed beginning approximately 25 feet west of the existing Booster Station No. 9 property. From there, the water line will extend to the north across eastbound lanes of Reno to the median extending east approximately 450 feet, then extend north across westbound Reno Ave. At this point the pipeline will parallel 48-inch water line project WC-0853 on the south and east side of 7725 Reno Ave property in a new easement. The pipeline will turn east at the north end of the 7725 Reno Ave for approximately 550 feet. The alignment will extend north along the east property line approximately 850 feet to a point on the south side of Melrose Lane near 7500 Melrose Lane where it will connect to project WC-0855. The majority of this water main will require acquisition of new easements (*See Project Location Map, Appendix B & C*). The design will utilize steel pipe.

**Cost Estimate:**

Welded Steel Pipe, 3,926 linear feet	\$3,714,200
Backup Generator, 1 MW	\$1,188,100
Contingency	10%
Total Estimated Construction Cost	\$5,390,000

**Schedule:**

- OCWUT Approval – April 2021
- 90% plans completed – May 2021
- Final plan to be completed – July 2021
- Easement acquisition anticipated to be complete – June 2021
- Advertise Project – August 2021
- Construction Contract – September 2021
- Construction completed – September 2022

**Recommendations:**

Tetra Tech recommends that the Oklahoma City Water Utilities Trust receive the Engineering Report and authorize Tetra Tech to continue with Final Plans and Specifications.



## TABLE OF CONTENTS

---

<b>1 INTRODUCTION .....</b>	<b>1</b>
<b>2 CONCEPT OF PROJECT (DESIGN).....</b>	<b>1</b>
2.1 TRANSMISSION MAIN.....	1
2.1.1 ALIGNMENT.....	1
2.1.2 INTERCONNECTION TO 48" WC-0853 PROJECT .....	3
2.1.3 STANDBY POWER GENERATOR .....	4
2.2 Survey .....	4
2.3 Engineering Design.....	4
2.3.1 WATER TRANSMISSION MAIN .....	4
2.3.2 BACKUP GENERATOR.....	5
2.3.3 Generator Enclosure and Screening Wall .....	6
2.3.4 System Interconnection .....	7
2.4 Utilities.....	7
2.5 Permits .....	7
2.6 Land Acquisition/Easements.....	8
<b>3 COST ESTIMATE.....</b>	<b>8</b>
<b>4 RECOMMENDATIONS .....</b>	<b>8</b>

## LIST OF TABLES

---

Table 1 – Estimated Easements Required .....	8
--	---

## LIST OF FIGURES

---

Figure 1 – Alignment Alternatives Map.....	2
Figure 2 – Interconnect Schematic.....	3

## APPENDICES

---

Appendix A – Project Location Map	
Appendix B – Construction Drawings	
Appendix C – Opinion of Probable Construction Cost	
Appendix D – Potholing Locations	

# 1 INTRODUCTION

The scope of this project is to provide the design and engineering services for interconnecting the Hefner and Draper service areas to allow the transfer of treated water between the two systems. This interconnection will be completed by constructing approximately 3,926 linear feet of new 42" water transmission main. The scope of this project also includes installing isolation valves on the new 42" water transmission main, modifying the existing Booster Pump Station No. 9 with a permanent, onsite backup generator, and performing SCADA upgrades to incorporate operational monitoring and controls of the new power generation system. See Project Location Map, Appendix A.

## 2 CONCEPT OF PROJECT (DESIGN)

### 2.1 TRANSMISSION MAIN

OCWUT determined the pipe size should be 42-inches in diameter based on a master plan study completed by others. The pipe will be constructed of welded steel pressure class 250 psi (150 psi operating pressure and an additional 100 psi surge pressure allowance.)

The pipe will be connected to a 30-inch ductile iron (DIP) water main (project WC-0853) on the south side of W. Reno Avenue on the discharge side of Booster Pump Station 9 and will be routed east and then north to a point near 7500 Melrose Lane where it will connect to the 42-inch DIP water main of the WC-0855 project. The 42 inch water main will parallel a 48-inch main (WC-0853) for approximately 2,100 feet north of West Reno Ave on the 7725 Reno property.

#### 2.1.1 ALIGNMENT

Two alternative alignments were identified and evaluated based on cost, future maintenance access, number of easements required, and other factors. Alignment 1 was ultimately selected due to the WC-0853 project alignment allowing its 48-inch line to run parallel to the 42-inch transmission in a common easement and in a combined construction contract. This alignment also requires the fewest number of easements.

Alignment 1 connects to the existing 30-inch discharge line from Booster Pump Station No. 9, on the south side of W. Reno Ave. The new main will cross W Reno Ave. at a northeast direction, then it parallels the north right-of-way of W. Reno Avenue to the east edge of the 7725 Reno 1, LLC, property. At this southeast corner of the 7725 Reno 1, LLC, property is where three butterfly valves and valve vaults will be located (two are a part of this project and one is a part of project WC-0853). The valves and vaults are shifted to this location to avoid being placed in 7725 Reno 1, LLC's parking lot. The main then turns north and parallels the east side of the 7725 Reno 1, LLC, property where it runs in a turf area between a storm channel and driveway. At the northern end of this segment, the line enters a fenced parking lot extending to a point on the north side of the 7725 Reno 1, LLC, property at Lucent Drive. This segment also includes a crossing under an existing double concrete box culvert. The line then turns east along Lucent Drive to the northeast corner of 7725 Reno 1, LLC, property where it turns north and crosses the Union Pacific Railroad tracks and Pratt Properties Inc. to Melrose Lane. The pipeline connects to the 42" DIP water transmission main (project WC-0855) at Melrose Lane and include a butterfly valve and vault just before the connection. Alignment 1 is indicated as Alternative 1 in Figure 1. 60% construction drawings for Alignment 1 are included in Appendix B.

The estimated capital construction cost for Alignment 1 is \$3,714,200. Positive considerations for Alignment 1 included a limited number of utility conflicts and it requires the least number of permanent easements. Negative considerations includes a slightly higher estimated construction cost, the access is more limited in the fenced area, and it must cross under a large storm culvert.

Alignment 2 starts the same as that for Alignment 1. It connects to the existing 30-inch discharge line from Booster Pump Station No. 9, on the south side of W. Reno Ave. The new main will cross W. Reno Ave. at a northeast direction, then it parallels the north right-of-way of W. Reno Ave. to the east edge of the 7725 Reno 1, LLC, property. At this southeast corner of the 7725 Reno 1, LLC, property is where butterfly valves and valve vaults would be located (for this project and project WC-0853). The line then continues east to a point on the west side of the Francis Tuttle Technology property, after crossing a concrete drainage channel. The alignment then turns north and continues along the west side of the Francis Tuttle property to the north edge of the property. It then turns east along the north side of the property to a point where it turns north across a triangular-shaped property owned by 7725 Reno 1, LLC. It then continues north and along the west edge of the 7-Eleven, Inc. property to the Union Pacific Railroad right-of-way. The route continues across the railroad tracks and north along the west edge of Pratt Properties, Inc. to Melrose Lane. The pipeline connects to the 42" DIP water transmission main (project WC-0855) at Melrose Lane and include a butterfly valve and vault just before the connection. Alignment 2 is indicated as Alternative 2 in Figure 1.

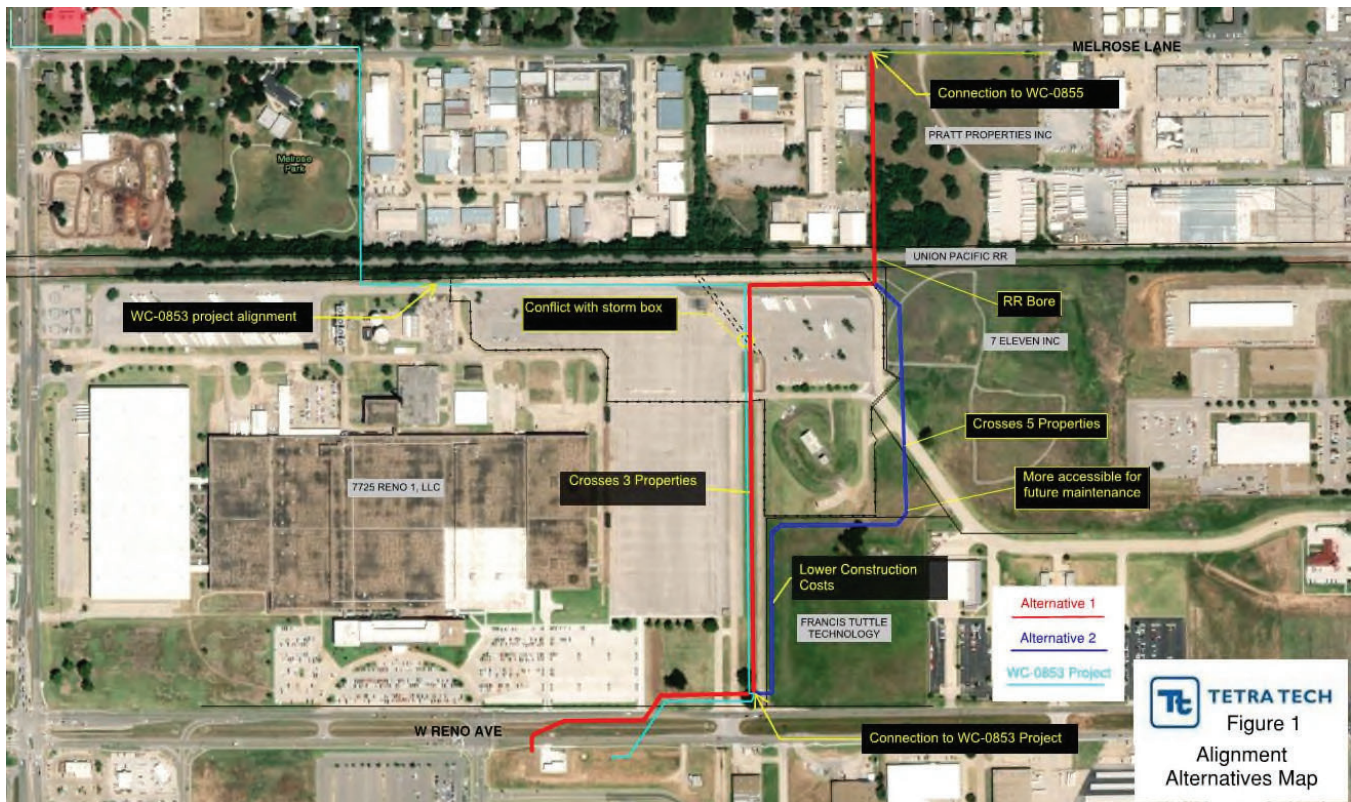


Figure 1 – Alignment Alternatives Map

The estimated capital construction cost for Alignment 2 is \$3,650,000. Positive considerations for Alignment 2 included the lowest estimated construction cost, it is mainly constructed under unpaved surfaces for cheaper future maintenance, it had the shortest expected construction duration, and it had relatively few utility conflicts. The main negative consideration was the fact that it would require the largest number of permanent easements and wouldn't have the advantage of the shared easement on the 7725 Reno property.

## 2.1.2 INTERCONNECTION TO 48" WC-0853 PROJECT

An interconnection of the 42-inch transmission main (project WC-0930) and the 48-inch transmission main (project WC-0853) will provide flexibility in water delivery between the Hefner and Draper service areas. The operating scenarios this interconnect allows are as follows:

1. Pump from the discharge side of Booster 9 north up Council Road toward Hefner Water Treatment Plant and service area.
2. Pump from the suction side of Booster 9 north up Council Road toward Hefner WTP
3. Pump from the suction side of Booster 9 to the east to Overholser Dual Use Pump Station.
4. Simultaneously pump from the discharge side of Booster 9 north up Council Road to Hefner WTP **AND** from the suction side of Booster 9 to the east to Overholser Dual Use Pump Station.
5. Delivering water from Hefner WTP to Overholser through the Council Road pipeline.

A pressure reducing and sustaining valve will be required for this functionality. This valve will be placed on the 42-inch line between the discharge side of the booster pump station 9 and this interconnect.

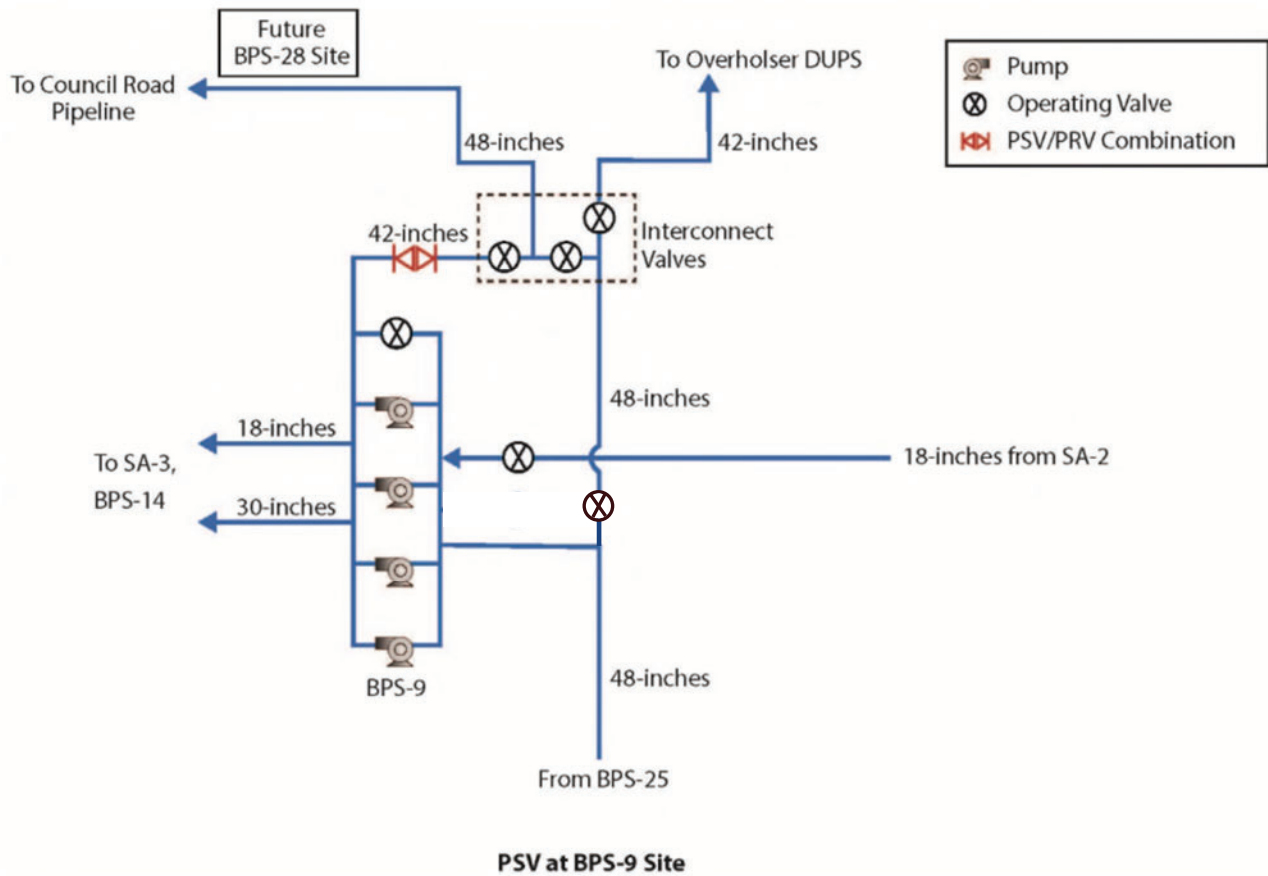


Figure 2 – Interconnect Schematic

### 2.1.3 STANDBY POWER GENERATOR

The existing station BPS 9 has four horizontal centrifugal split-case pumps, each 350-hp, and each is mated to a 400-hp rated variable frequency drive (VFD). The station is currently served by a single source 480V, 3-phase, utility power from OG&E. BPS 9 currently does not have a standby generator; instead, the station power switchboard has a NEMA 3R terminal box located just outside and north of the building for manual connection to a portable generator. The scope of the current project is to install a permanent standby natural gas generator as evaluated and summarized in Sections 2.3.2, 2.3.3, and 2.3.4, below.

## 2.2 SURVEY

---

Topographic survey and section line corner survey has been performed along the alignment and at BPS 9. Additionally, verification of the ground data has been completed with standard surveying methods plus all known above and below ground utilities identified by Tetra Tech's subcontractor, Lemke Land Surveying, that are adjacent to and crossing the proposed pipeline alignment. Call OKIE along with the City of Oklahoma City were contacted to locate the utilities prior to the topographic survey. The utility information from utility markings and available utility atlas maps have been collected and integrated with the topographic survey. Section line corner(s) survey has been completed to establish control for the project and to prepare legal descriptions and acquire permanent and temporary construction easements as needed. Existing permanent easements were identified along the alignment. An easement description was prepared for the property adjacent to the pump station for siting the backup generator.

## 2.3 ENGINEERING DESIGN

---

### 2.3.1 WATER TRANSMISSION MAIN

The proposed 42" water transmission main will connect at a new tee to be installed approximately 25 feet west of Booster Pump Station 9 on an existing ductile iron main. The connection will consist of a 30" x 30" Tee on the existing 30" DIP water main. Then a 30" x 42" Reducer will branch off the 30" x 30" Tee to begin the new 42" water main. At the northern end of the project, the main will terminate near 7500 Melrose Lane and connect to project WC-0855 (See construction drawings, Appendix B). The 42" water transmission main will begin with a new tee connection, 42" x 30 reducer and 42" butterfly valve and vault. The main will then be bored under eastbound lanes of W. Reno Ave. to the north and then turn to the east in the grass median for about 450'. At this point, the transmission main will be installed in a bored casing under westbound W. Reno Ave and will head east in a combined easement with the 48" main (WC-0853 project) on the 7725 Reno 1, LLC property. The two parallel mains will run east along the south edge of the property approximately 450 feet where the two lines will be interconnected with a series of 3 valve vaults allowing for the desired flow routing options (see plan sheet 12 in Appendix B). The alignment minimizes the amount of concrete pavement removal and traffic disruptions. After paralleling the 48" main for approximately 1,600 feet north in a grassy area and parking lot, the alignments diverge with the 42" turning east and the 48" turning west for approximately 550 feet. The 42" main then turns east with two 45 degree elbows and runs along the north edge of the private drive for approximately 550 feet. At this point, the main turns again to the north through a bored and jacked steel casing under the UPRR tracks and continues 825 feet to near 7500 Melrose along the west edge of the Pratt Properties parcel to a 42" valve vault. Utility relocations and disruptions avoided to the maximum extent possible, and for this reason, the horizontal and vertical alignments are designed to avoid all conflicts.

This project's 42" water transmission main will be designed in concert with the 48" WC-0853 project and bid in the same construction package. Both projects will be bid as welded steel to reduce the need for large thrust blocks and anticipated reduced cost. Findings from a pending geotechnical investigation will determine the coatings and



corrosion protection design requirements. All fittings will be welded steel except for the butterfly valves, which are ductile iron. The minimum depth of cover to the top of the pipe will be five (5) feet. A steel casing pipe will be used for all borings when required. Borings will occur across Reno Ave. near the beginning of the project, under a concrete box culvert near the middle of the project, and at the UPRR railroad track crossing. The joints of all carrier pipe within steel casing will be restrained.

Tetra Tech is coordinating geotechnical investigations with the 48" WC-0853 designer for soil conditions, railroad crossing method recommendation (required by UPRR), trenching and backfill recommendation, and soil corrosivity testing for coating and corrosion protection design. Soil borings will be taken at 15 locations along the alignment.

The proposed horizontal boring plan across Reno, UPRR tracks, and Melrose eliminates the need for any major street closures. All driveway crossings shall be designed to not preclude property access. Construction traffic control plans will be included within the final construction contract documents

## **2.3.2 BACKUP GENERATOR**

Tetra Tech evaluated the two most common types of backup generators for commercial use. Based on the sizing requirements due to the large pump motors, it was recommended to install a new, permanent, 1 MW, natural gas fired generator with automatic transfer switch and walk-in enclosure. The specifications will include the requirement of having the generator manufacturer produce an Operations and Maintenance manual that will be submitted to the City after the install of the generator. This option was selected and continued into further design. 60% construction plans for the proposed generator site are attached in Appendix B.

### **2.3.2.1 Generator Sizing**

BPS 9 has four (3-duty and 1-standby) 350-hp pumps, each rated for 5,800 GPM at 173 feet of total dynamic head. All pumps are identical units, Fairbanks Morse, 10-inch Impeller Curve #2823A, Frame 449T, with 1800 RPM, Toshiba induction motor. Each pump is provided with a VFD to control speed and hence the discharge pressure. The current mode of operation is to maintain a set discharge pressure which is based on the need to maintain adequate pressure near BPS 14 and the west end of W. Reno Avenue.

With three pumps in operation, the firm capacity of BPS 9 is approximately 20 MGD at 92% speed and 23 MGD at 100% speed. Since BPS 9 is an inline booster pump, the discharge pressure is a function of the suction pressure. Assuming a suction pressure of 65 psig, the estimated discharge pressure is approximately 133 psig at 20 MGD and 146 psig at 23 MGD. It is important to note that this estimated pressure assumes BPS 9 discharge is entirely conveyed through the 18-inch and 30-inch along West W. Reno Avenue to BPS 14 and the West Reno Service area. With the proposed WC-0930 W. Reno Crossing and connection to the proposed 48-inch transmission main (WC-0853), the discharge hydraulics will be different, and the discharge pressure will be lower to convey the same firm capacity of the station due to lower pipe friction losses.

The proposed generator is sized to support the firm capacity of the station. The generator will be sized to operate up to three existing 350-hp pumps simultaneously. The starting current in an induction motor is significantly higher than the running current; therefore, to minimize the generator size, it is proposed to start the pumps in staggered sequence. With the use of existing VFDs, the starting currents seen by a generator are further reduced, lessening the impact of starting loads on the generator. Along with the three pump motors, there are approximately 50 kW of heating load, 30 kW of cooling load and 10 kVA of remaining building loads. In summary, the proposed generator will be sized to handle the following loads:

- Existing three pumps, each 350 hp for a total connected load of 1,050 hp.
- 80 kW of building HVAC load.

- 10 kVA of other miscellaneous building load.

### **2.3.2.2 Generator Fuel Source**

There are two fuel options for this site: diesel or natural gas. Each fuel source has its own pros and cons as summarized below.

### **2.3.2.3 Diesel Generators**

Typically, diesel generators have a smaller footprint than natural gas generators since the diesel engine can provide more starting capacity per kW. A smaller footprint would help to meet some existing site constraints. However, diesel fuels will have the following disadvantages:

- Due to existing site layout and busy traffic along W. Reno Avenue, diesel fuel delivery to the site will involve difficult maneuvering inside the fenced area and may require temporary lane closure along W. Reno Ave.
- During a major natural disaster with an areawide impact, the availability and transport of diesel fuel may be difficult.
- Though diesel generators have a smaller footprint than natural gas generators, they require additional space for fuel storage, secondary containment, and the need to maintain a Spill Prevention Control and Countermeasure Plan (SPCC Plan).
- Diesel engines require more in-depth regular maintenance than natural gas engines.
- Diesel fuel is not recommended for long-term, on-site storage.

### **2.3.2.4 Natural Gas Generators**

Natural gas generators are slightly larger for the same load capacity due to their lower starting capacity per kW. However, such generators can be directly connected to the utility fuel source and will not require separate fuel delivery and storage. Natural gas units burn relatively cleaner and generally require a lower level of maintenance than diesel generators.

There is an 8-inch, high-pressure gas line running within the median of W. Reno Avenue. There is also a 4-inch line that runs along the south side of W. Reno Avenue and runs in front of the BPS 9 station. This 4-inch line runs west, past BPS 9 to serve the Outlet Mall. ONG is planning on supplying the backup generator from the 4-inch line on the south side of W Reno Avenue. The proposed 1 MW generator will require a natural gas supply of 13 MMBTU/hour at an inlet pressure of 3.8 psig. Tetra Tech contacted Oklahoma Natural Gas (ONG) and submitted the elevated pressure service request. ONG reviewed the request and confirmed gas service availability to supply the proposed load.

### **2.3.2.5 On-Site Location**

The proposed location for the generator is a new lot immediately to the east of the Booster Pump Station 9 building. See sheet 15 of the 60% construction plans provided in Appendix B for the proposed location.

## **2.3.3 Generator Enclosure and Screening Wall**

The proposed generator will be provided with an all-weather enclosure. There are two types of enclosures that can be utilized for this exterior-mounted generator. The two types are a standard walk-in enclosure and a sound attenuating enclosure. The standard walk-in enclosure encapsulates the generator with minimal space for maintenance access. This type of enclosure requires the smallest footprint on the site. The sound attenuating

enclosure provides baffling on the intake and exhaust of the enclosure. This baffling redirects the air such that direct flow air paths do not occur, reducing the wind noise and the overall noise of the generator during operation. The addition of these baffles extends the enclosure footprint by a factor of approximately 1/3.

Since the station is in a commercial area with significant physical separation from populated areas, and given the existing site constraints for additional space, Tetra Tech recommended that a standard weather-proof, walk-in type enclosure be selected.

Due to the generator enclosure, the need for a separate screening wall is reduced. Accommodating a screening wall within the existing site will not be practical due to space constraints for site access, site parking and line maintenance activities. Therefore, Tetra Tech did not recommend installing a separate screening wall.

### 2.3.4 System Interconnection

The existing power distribution system does not include a permanent generator. There are two key interlocked circuit breakers that allow the operators to decide between utility power or a portable generator. With the installation of a permanent on-site generator, the key interlocked circuit breakers will be replaced with an automatic transfer switch (ATS) that can switch between the utility versus generator feed automatically.

## 2.4 UTILITIES

---

Call OKIE was used to determine utility companies within the project limits. All known utilities have been indicated on the construction drawings. The pipeline has been designed to minimize the impact to existing utilities. Sensitive utilities including fiber optics and gas mains have been avoided. Utility coordination has been limited to virtual meetings and are ongoing. Tetra Tech has performed potholing of some critical crossing to determine depths and verify dimensions to minimize conflicts. Potholing location exhibits and information is presented in Appendix D. The major utilities within the project limits are: water, sanitary sewer, storm sewer, fiber optics, underground telephone, overhead and underground electric, natural gas and petroleum products lines. Another utility coordination meeting is planned utilizing the latest set of collective plans, (project WC-0853) and this project (project WC-0930).

## 2.5 PERMITS

---

The 42" water transmission main is proposed to be constructed across the Union Pacific Railroad (UPRR) right-of-way. A permit application has been initiated with UPRR for the crossing. The UPRR requires a geotechnical report supporting the method of installation with the soil conditions and will require track and ground monitoring during construction. The design of the crossing will meet all requirements of UPRR.

The proposed 42" water transmission main will also require an ODEQ "Permit to Construct". To ensure ODEQ's permit review does not delay bidding, Tetra Tech will coordinate with the 48" WC-0853 designer to prepare the permit application and furnish all other information required by ODEQ to OCWUT immediately upon reaching final design.

Guernsey has determined that a U.S. Army Corps of Engineers Section 404 Permit (404-D) will not be necessary for this project. No work is planned within the buffer zones of any waters of the state. There will be no dredging or fill materials impacting waters of the state specified in the plans or due to the construction activities.

The contractor will be responsible for obtaining all construction related permits from the appropriate local departments, including but not limited to work zone permits and traffic control permits.



## 2.6 LAND ACQUISITION/EASEMENTS

Permanent easements will need to be acquired from adjacent properties owners (see Table 1). The location of the permanent easements are indicated on the preliminary construction drawings (See Appendix B).

Table 1 – Estimated Easements Required

PROPERTY OWNER	ESTIMATED EASEMENT (SQ FT)
7725 Reno 1, LLC	166,800
Pratt Properties	29,250

Immediately upon receipt of this Preliminary Engineering Report, legal descriptions and all other documentation required by OCWUT Right-of-Way staff will be prepared and submitted in coordination and conjunction with the other projects. Tetra Tech will also provide any additional assistance needed during the easement acquisition process.

## 3 COST ESTIMATE

The opinion of probable construction cost for the proposed 42-inch water transmission main is \$3,714,200. This equates to \$946 per linear foot. The opinion of probable construction cost (OPCC) for the backup generator, electrical work, and SCADA integration is \$1,188,100. The current total OPCC assumes a 10% contingency. This contingency is planned to reduce in the final cost estimate. With the contingency added, the total construction cost estimate for the proposed project is \$5,390,000. The breakdown for each cost estimate is attached in Appendix C.

## 4 RECOMMENDATIONS

Tetra Tech recommends the Oklahoma City Water Utilities Trust receive the Engineering Report and authorize the consultant to proceed with Final Plans and Specifications.

## APPENDIX A – PROJECT LOCATION MAP

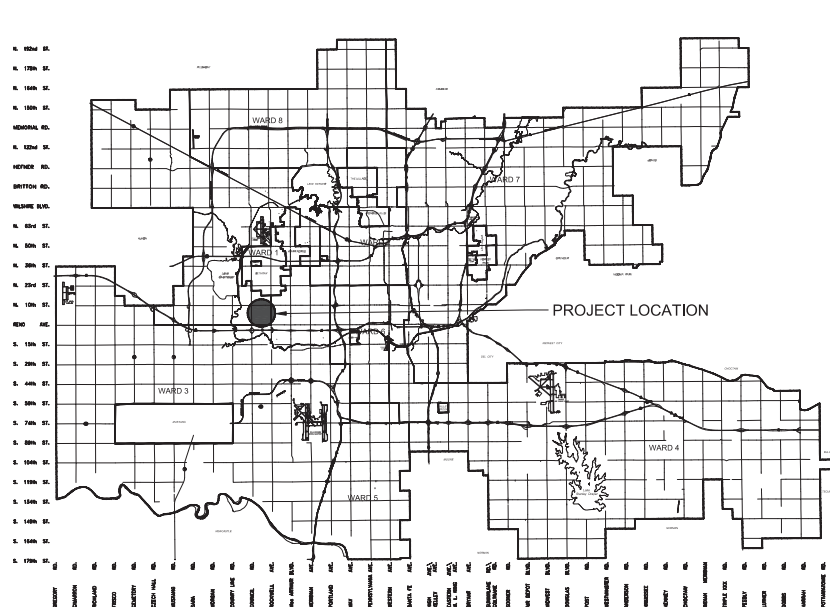


**Project Location Map**

Section: 32  
Township: 11N  
Range: 4W  
Oklahoma County

## APPENDIX B – CONSTRUCTION DRAWINGS





DAVID HOLT, Mayor

COUNCIL MEMBERS:

JAMES GREINER	Ward 1
JAMES COOPER	Ward 2
LARRY MCATEE	Ward 3
TODD STONE	Ward 4
DAVID GREENWELL	Ward 5
JOBETH HAMON	Ward 6
NIKKI NICE	Ward 7
MARK K. STONECIPHER	Ward 8

CRAIG FREEMAN City Manager

ERIC J. WENGER, P.E. City Engineer



OKLAHOMA CITY WATER UTILITIES TRUST

VACANT, Chairman, Independent Trustee  
JESSICA MARTÍNEZ-BROOKS, Vice Chairman, independent Trustee

LARRY McATEE, Council Trustee

DAVID HOLT, Mayor Trustee

MARK K. STONECIPHER, Surrogate Trustee  
CRAIG FREEMAN, City Manager Trustee

CRAIG FREEMAN, City Manager Trustee  
LAURA A. JOHNSON, Surrogate Trustee

CHRIS BROWNING, General Manager

[illegible]

ONE CALL UTILITY LOCATION NUMBER

DIAL 811, OR  
1-800-522-6543

THIS NUMBER IS TO BE USED FOR INFORMATION ON THE LOCATION OF ALL UNDERGROUND UTILITIES. CONTACT THIS NUMBER AND OTHER NUMBERS SPECIFIED IN THE PLANS PRIOR TO ANY EXCAVATION.

UTILITIES DEPARTMENT  
CAPITAL IMPROVEMENT DESIGN

PREPARED BY

---

JOHN BRUMMER, P.E.



**TETRA TECH**  
525 CENTRAL PARK DR., SUITE 403  
OKLAHOMA CITY, OK 73105  
PHONE: 405-606-8600 FAX: 405-606-8601  
CA NO. 2388 Expires 6-30-21

DATE \_\_\_\_\_

RECOMMENDED FOR APPROVAL

CRYSTAL KOWALIK, P.E.  
ENGINEERING MANAGER

DATE \_\_\_\_\_

CHRIS BROWNING  
GENERAL MANAGER

DATE \_\_\_\_\_

ERIC J. WENGER, P.E.  
CITY ENGINEER

DATE \_\_\_\_\_

PROJECT NO. WC-0930

PROJECT NO. WC-0930  
WATER TRANSMISSION MAIN AND  
BOOSTER STATION NO. 9 IMPROVEMENTS

7626 WEST RENO AVENUE  
TO  
MELROSE LANE



**TETRA TECH**

www.tetrattech.com  
525 Central Park Dr., Suite 403  
Oklahoma City, OK 73105  
PHONE: 405.606-8600 FAX: 405.606-8601  
CA No. 2388 Expires 6-30-21

60% PRELIMINARY PLANS

THIS DOCUMENT IS  
PRELIMINARY IN NATURE  
AND IS NOT FINAL, SIGNED  
AND SEALED DOCUMENT

[illegible]

- ALL CONSTRUCTION AND MATERIALS SHALL BE IN ACCORDANCE WITH THE DRAWINGS, SPECIFICATIONS AND THE STANDARD SPECIFICATIONS FOR CONSTRUCTION OF PUBLIC IMPROVEMENTS AND SPECIAL SPECIFICATIONS THEREOF, OKLAHOMA CITY, OKLAHOMA, AND SHALL BE UNDER THE SUPERVISION OF THE PUBLIC WORKS DEPARTMENT.
5. ANY CONSTRUCTION ITEMS THAT ARE NOT LISTED IN THE SUMMARY OF QUANTITIES SHALL BE CONSIDERED INCIDENTAL CONSTRUCTION ITEMS. THE COST OF INCIDENTAL CONSTRUCTION ITEMS SHALL BE INCLUDED IN THE COST OF OTHER BID ITEMS.
6. NEW PIPING WITH A DIAMETER OF ANCHORS OR GREATER THAT IS PLACED DIRECTLY UNDER PAVEMENT (CRUSHED ROCK OR HARD SURFACE) SHALL BE BEDDED AND BACKFILLED WITH FLOWABLE FILL. FLOWABLE FILL SHALL MEET THE MINIMUM REQUIREMENTS OF OKLAHOMA DEPARTMENT OF TRANSPORTATION STANDARDS FOR CONTROLLED LOW-STRENGTH MATERIAL (CLSM).
7. CONTRACTOR SHALL BE RESPONSIBLE TO OBTAIN AND DOCUMENT THE LOCATION OF ALL EXISTING UTILITY LINES, PIPING AND STRUCTURES REGARDLESS OF WHETHER OR NOT THEY ARE SHOWN ON THE DRAWINGS. DURING CONSTRUCTION, CONTRACTOR SHALL CARRY OUT OPERATIONS IN A MANNER THAT WILL PREVENT DAMAGE TO ALL EXISTING UTILITIES OR STRUCTURES. ANY SUCH DAMAGE SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR AND SHALL BE REPAIRED AT THE CONTRACTOR'S EXPENSE.
8. ANY AND ALL MISCELLANEOUS REMOVAL ITEMS NOT LISTED SEPARATELY AS PART OF A LISTED PAY ITEM SHALL BE CONSIDERED INCIDENTAL TO OTHER PAY ITEMS.
9. ALL EXCESS SOIL, ROCK, DEBRIS AND OTHER WASTE MATERIAL SHALL BECOME THE CONTRACTOR'S PROPERTY AND SHALL BE DISPOSED OF IN ACCORDANCE WITH FEDERAL, STATE AND LOCAL LAWS AND REGULATIONS. OWNER HAS RIGHT TO SALVAGE ANY EXISTING MATERIAL, EQUIPMENT OR PARTS THEREOF OR ANY SURPLUS PRODUCT, MATERIAL, EQUIPMENT OR PARTS THEREOF PURCHASED THROUGH THE PROJECT. THE CONTRACTOR SHALL HAVE ALL UTILITIES IDENTIFIED AND PROTECTED DURING CONSTRUCTION. THE OWNER SHALL NOT ACCEPT ANY RESPONSIBILITY FOR DAMAGE TO OR COSTS TO THE CONTRACTOR'S EQUIPMENT WHETHER OR NOT THEY ARE SHOWN ON THE DRAWINGS. IF THERE IS ANY INTERFERENCE FROM ALIGNMENT OR ELEVATION IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO NOTIFY THE ENGINEER SUCH THAT THE CONFLICT CAN BE RESOLVED. A LIST OF UTILITIES WHICH MAY BE ENCOUNTERED IS SHOWN BELOW. IT IS NOT INTENDED TO BE ALL-INCLUSIVE.
- ATAI TRANSCONTINENTAL CABLE  
PHONE: (405) 852-3796
- OKLAHOMA NATURAL GAS  
PHONE: (405) 656-6400
- NORTHWESTERN BELL TELEPHONE  
PHONE: (405) 636-6725
- OKLAHOMA GAS & ELECTRIC  
PHONE: (405) 272-6741
- COX COMMUNICATIONS CALL OKIE  
PHONE: (405) 600-6269 PHONE: (405) 522-6545
- CITY OF OKLAHOMA CITY  
WATER UTILITIES  
PHONE: (405) 297-2054  
PHONE: (405) 297-2068
10. CONTRACTOR SHALL BE RESPONSIBLE FOR ALL FITTINGS AND SPECIALS NECESSARY TO LOWER OR CONNECT TO EXISTING, NEW OR MODIFIED VARY PIPING. IF AN EXISTING FITTING IS TAKEN OUT OF SERVICE TO MAKE A TIE-UP, CONTRACTOR SHALL NOTIFY THE OWNER WHO SHALL BE RESPONSIBLE FOR THE OPERATION OF ALL VALVES. DURING SUCH TIMES WHEN LINES ARE OUT OF SERVICE, THE OWNER'S INSPECTOR SHALL BE PRESENT AT THE PROJECT. CONTRACTOR SHALL SUBMIT TO THE OWNER A DETAILED PLAN FOR EACH ACTIVITY THAT REQUIRES THE LOSS OF SERVICE OF A LINE OR STRUCTURE AT LEAST 14 DAYS BEFORE THE ACTIVITY. CONTRACTOR SHALL BE RESPONSIBLE FOR MINIMIZING DOWNTIME AND THE PLANNED DOWNTIME SHALL BE INCLUDED IN THE PLAN. CONTRACTOR SHALL RESTORE SERVICE AS QUICKLY AS POSSIBLE UNDER ANY AND ALL CIRCUMSTANCES.
11. ALL DIMENSIONS OR ELEVATIONS WITH A OR ATTRIBUTED TO AN EXISTING ITEM SHALL BE CONFIRMED BY THE CONTRACTOR. ADJUSTMENTS TO ACCOMMODATE DIFFERENCES IN ACTUAL ELEVATIONS OR DIMENSIONS TO THOSE SHOWN SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR. ADJUSTMENTS SHALL BE SUBMITTED TO THE ENGINEER FOR APPROVAL BEFORE THE WORK PROGRESSES.
12. CONTRACTOR SHALL EXPOSE ALL EXISTING PIPING THAT SHALL BE MODIFIED OR CONNECTED TO NEW PIPING. CONTRACTOR SHALL CONFIRM THE TYPE OF PIPING AND JOINTS IN USE, DIMENSIONS AND LOCATIONS (BOTH HORIZONTALLY AND VERTICALLY), AND GATHER ALL OTHER INFORMATION REQUIRED FOR PROPER FILING AND INSTALLATION OF ALL NEW PIPES, FITTINGS AND VALVES. CONTRACTOR SHALL BE RESPONSIBLE TO CONFORM THE NEW PIPINGS TO THE CONDITIONS FOUND AT NO ADDITIONAL COST TO THE OWNER.
13. NEW BURIED LINES WITH ELEVATIONS SHOWN AT FITTINGS, VALVES, ETC., SHALL BE LAID AT A CONSTANT GRADE BETWEEN THE GIVEN ELEVATIONS (OR AS ADJUSTED DURING CONSTRUCTION).
14. CONTRACTOR SHALL MAINTAIN ALL WATER DISTRIBUTION FACILITIES IN SERVICE AT ALL TIMES EXCEPT THOSE TO BE REMOVED OR TEMPORARILY REMOVED FROM SERVICE TO ALLOW CONNECTIONS OR MODIFICATIONS AS SHOWN ON THE DRAWINGS OR ADDRESSED IN THE SPECIFICATIONS.
15. ALL UNRESTRAINED BURIED FITTINGS, SUCH AS BENDS, TEES, ETC., ON WATER LINES UNDER PRESSURE, POTABLE WATER LINES, SEWAGE/WATER FOR FLOW, MAN, AND DRAIN LINES, SHALL BE BLOCKED FOR PROTECT USING THRUST BLOCKS AS SHOWN ON THE DRAWINGS. THE COST OF THE THRUST RESTRAINTS SHALL BE INCLUDED IN OTHER PAY ITEMS.
16. CONTRACTOR SHALL PLACE ALL PIPE IN A DRY TRENCH. ALL TRENCH DEWATERING SHALL BE INCIDENTAL TO OTHER PAY ITEMS.
17. CONTRACTOR SHALL SUBMIT A TRENCH EXCAVATION PLAN FOR ALL EXCAVATIONS IN EXCESS OF 20-FOOT DEPTH THAT HAVE BEEN PREPARED AND SIGNED AND SEALED BY A PROFESSIONAL ENGINEER LICENSED IN OKLAHOMA.
18. PRIOR TO INITIATING ANY EXCAVATIONS, CONTRACTOR SHALL BRACE OR SUPPORT ANY UTILITY WITHIN 25' OF EXCAVATION TO THE SATISFACTION OF THE OWNER AND THE UTILITY.
19. TRENCH, IN ALL AREAS OF EXCAVATION SHALL BE REMOVED, STOCKPILED, AND RESTORED AFTER CONSTRUCTION OPERATIONS. IN ACCORDANCE WITH THE SPECIFICATIONS, CONTRACTOR SHALL COVER ALL DISTURBED AREAS OUTSIDE OF ROADWAYS OR OTHER PAVED AREAS WITH SOO AND SHALL BE RESPONSIBLE FOR THE SOOED AREAS UNTIL GROWTH IS ESTABLISHED.
20. A GEOTECHNICAL INVESTIGATION WAS PREPARED FOR THE OWNER TO ASSIST IN THE DESIGN OF THIS PROJECT. LOCATIONS OF SOIL BORINGS ARE SHOWN ON A DRAWING IN THE GEOTECHNICAL REPORT. THE GEOTECHNICAL REPORT IS AVAILABLE IF REQUESTED AT THE OFFICE OF TETRA TECH, INC., 746 E. 83RD STREET, SUITE 301, TULSA, OK 74133. CONTRACTOR SHALL USE THE INFORMATION PROVIDED IN THE GEOTECHNICAL REPORT AT THEIR OWN RISK AND SHALL BE RESPONSIBLE FOR ALL INTERPRETATIONS OF THE INFORMATION. CONTRACTOR SHALL BE RESPONSIBLE TO CONDUCT ANY ADDITIONAL SUBSURFACE INVESTIGATIONS WHICH THEY DEEM NECESSARY TO PROPERLY CHARACTERIZE THE SUBSURFACE CONDITIONS WHICH MAY AFFECT THE CONSTRUCTION OF THE PROJECT.
21. CONTRACTOR SHALL MAINTAIN A DETERIORATED CONDITION AROUND EXCAVATION AS NECESSARY TO PREVENT ANY UPLIFTING AS IMPROVEMENTS ARE CONSTRUCTED.
22. CONTRACTOR SHALL NOT ALLOW CONSTRUCTION TRAFFIC OVER ANY EXISTING OR NEW PIPING OR ELECTRICAL/CONTROL LINES WITHOUT PROVIDING APPROPRIATE PROTECTION. CONTRACTOR SHALL PROTECT ALL EXISTING LINES AND UTILITIES FROM DAMAGE AND ALL SHALL REMAIN IN SERVICE AT ALL TIMES EXCEPT AS PROVIDED IN THE SPECIFICATIONS OR AS NOTED ON THE DRAWINGS. ANY DISRUPTION OF SERVICE SHALL BE AT THE CONTRACTOR'S RISK AND EXPENSE.
23. CONTRACTOR SHALL SUBMIT A CONSTRUCTION SAFETY PLAN TO THE ENGINEER PRIOR TO COMMENCEMENT OF WORK. THE SAFETY PLAN SHALL ADDRESS BUT NOT BE LIMITED TO ISSUES SUCH AS TRAFFIC CONTROL, WORKSITE SAFETY, MANHOLE VENTILATION, WORKER EQUIPMENT, FIRST AID, HYGIENE, AND OTHER RELATED TOPICS. CONTRACTOR WILL BE EXPECTED TO PERFORM THE WORK IN A MANNER THAT BEST PROTECTS THE SAFETY OF WORKERS, INSPECTORS, BYSTANDERS, AND OTHERS WHO MAY BE IN THE VICINITY OF THE PROJECT. THE ATTENTION OF THE CONTRACTOR IS DIRECTED TO SPECIFICATION SECTION 01000 FOR ADDITIONAL SAFETY REQUIREMENTS.
24. THE HORIZONTAL & VERTICAL CONTROL DATUM ARE DERIVED FROM THE OKLAHOMA CITY GPS CONTROL NETWORK WHICH IS BASED ON THE OKLAHOMA STATE PLANE COORDINATE SYSTEM, NAD 83, ZONE 86, NORTH ZONE. THE VERTICAL DATUM IS NAVD 88.
25. CONSTRUCTION RELATED, BUT NOT LIMITED TO, EARTHWORK, EXCAVATION, EMBANKMENT, BORROW, TRENCH CONSTRUCTION, DEWATERING, TRENCH EXCAVATION AND BACKFILL, AND SURFACE SHALL BE IN ACCORDANCE WITH THE CITY OF OKLAHOMA CITY, OKLAHOMA DEPARTMENT OF PUBLIC WORKS STANDARD SPECIFICATIONS FOR CONSTRUCTION OF PUBLIC IMPROVEMENTS. IF ANY CONFLICTS EXIST BETWEEN WHAT IS LISTED IN THE PLAN AND THE INFORMATION NOTED IN THE CITY'S STANDARDS, THE CITY STANDARDS SHALL BE USED.
26. "NO TRESPASSING" SIGNS SHALL BE INSTALLED EVERY 50 FEET (2 PER SIDE) ALONG THE ENTIRE FENCE LENGTH. THE SIGNS SHALL CONTACT THE FOLLOWING INFORMATION: "TAMPERING WITH A PUBLIC WORKS SUPPLY IS A FEDERAL CRIME" AND "IF YOU SEE A PROBLEM CONTACT THE FOLLOWING."  
OKLAHOMA CITY DEPARTMENT OF UTILITIES  
420 W. MAIN, OKLAHOMA CITY, OK. (405) 297-3334
27. THE CONTRACTOR SHALL FOLLOW OSHA 29 CFR 1910 AND 1926 STANDARDS AS A MINIMUM DURING CONSTRUCTION.
28. THE CONTRACTOR SHALL ESTABLISH THE CONSTRUCTION STAGING AREA ADJACENT TO THE PROJECT SITE AS PROVIDED SUBJECT TO OWNERS TO OWNERS APPROVAL.
29. UNLESS NOTED OTHERWISE, ALL STAINLESS STEEL SHALL BE MINIMUM 316.
30. SPARE SLEW KITS OR WEAR ITEMS SHALL BE PROVIDED WITH EQUIPMENT. A MINIMUM OF TWO SPARE SLEW KITS SHOULD BE PROVIDED WITH EQUIPMENT DELIVERY.
31. ALL PIPING, TANKS AND EQUIPMENT MUST BE IDENTIFIED PRIOR TO PLACING THE SYSTEM BACK IN SERVICE PER AWWA STANDARDS.
32. ALL BURIED DUCTILE IRON PIPE AND FITTINGS SHALL BE INSTALLED WITH POLYETHYLENE ENCASEMENT AS SPECIFIED, MINIMUM 1/8" MIN. THICKNESS.
33. CONTRACTOR SHALL BE RESPONSIBLE FOR CONSTRUCTION STAKING BY OKLAHOMA LICENSED SURVEYOR.

[illegible]

[illegible]

**PROJECT LOCATION MAP**  
SECTION: 32  
TOWNSHIP: 11N  
RANGE: 4W  
OKLAHOMA COUNTY

**SHEET INDEX**  
**LOCATION MAP**

G-002

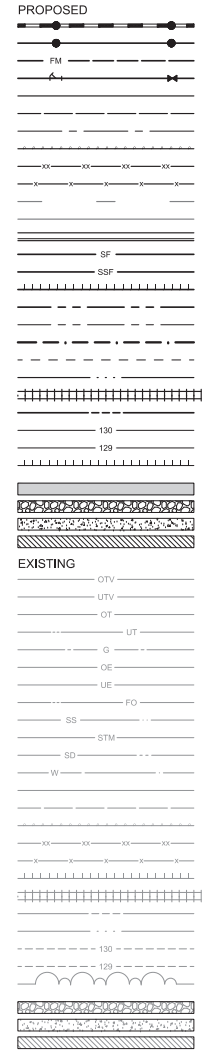
OKLAHOMA CITY WATER UTILITIES TRUST	APR.	DATE	DESCRIPTION	BY
OK-CITY - PERMIT INFORMATION SYSTEM				
AND IMPROVEMENTS TO				
BOOKSTATION NO. 8				

PROJ:	71300-0200
DESN:	0
DRWN:	1
CHKD:	0

VAC-0020

## SITE

## PROPOSED



STORM SEWER  
SANITARY SEWER  
SANITARY SEWER (FORCE MAIN)  
WATER  
ASPHALT  
GRAVEL  
ROAD CENTERLINE  
GUARD RAIL  
STEEL FENCE  
WOOD FENCE  
STRIPING - ROAD CENTERLINE  
STRIPING - PARKING  
CURB & GUTTER  
SEDIMENT CONTROL FENCE  
SEDIMENT CONTROL SUPER FENCE  
FLOOD HAZARD AREA  
PROPERTY LINE  
RIGHT OF WAY LINE (R-O-W)  
LIMITS OF CONSTRUCTION  
EASEMENT  
POND / LAKE EDGE  
RAIL ROAD TRACK  
WETLANDS BOUNDARY  
PROPOSED CONTOUR MAJOR  
PROPOSED CONTOUR MINOR (LABEL OPTIONAL)  
PROPOSED CONTOUR DEPRESSION  
  
ASPHALT PAVED SURFACE  
RIPRAP  
CONCRETE  
BUILDING OUTLINE  
  
CATY - OVERHEAD  
CATY - UNDERGROUND  
COMM - OVERHEAD  
COMM - UNDERGROUND  
GAS  
ELECTRIC - OVERHEAD  
ELECTRIC - UNDERGROUND  
FIBER OPTIC  
SANITARY SEWER  
STEAM  
STORM SEWER  
WATER  
ASPHALT  
GRAVEL  
GUARD RAIL  
STEEL FENCE  
WOOD FENCE  
FLOOD HAZARD AREA  
RAIL ROAD TRACK  
WETLANDS BOUNDARY  
POND / LAKE EDGE  
CONTOUR MAJOR  
CONTOUR MINOR (LABEL OPTIONAL)  
VEGETATION  
RIPRAP  
CONCRETE  
BUILDING OUTLINE

WC-0930

Sheet 4 of XX





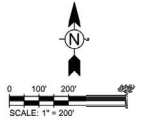
[illegible]

525 Central Park Dr., Suite 403  
Oklahoma City, OK. 74105  
PHONE- 405 606-9800 FAX- 405 606-9801  
www.telratech.com

G-004

PROJ:	11352-1800
DESN:	JE
DRWN:	T
CHKD:	JE

Copyright 2020 Tetra Tech, Inc. All rights reserved. This drawing is the property of Tetra Tech, Inc. and is not to be reproduced or used in any manner without the written consent of Tetra Tech, Inc.



PROJ: 2020-0000  
DESN: JR  
DRWN: JR  
CHKD: JR

WC-0930

Sheet 6 of 12

OKLAHOMA CITY WATER UTILITIES TRUST  
WC-0930 - RETAIL IMPROVEMENTS  
AND IMPROVEMENTS TO  
BOOSTER STATION NO. 9

NO.	DATE	DESCRIPTION

AERIAL LOCATION MAP  
C-101

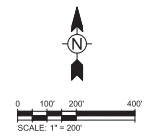
**TETRA TECH**  
TETRA TECH, INC.  
4500 N. MAYA AVE., SUITE 100  
OKLAHOMA CITY, OK 73127  
PH: 405.233.1234 FAX: 405.233.1235

CONTROL TABLE				
TAG	DESCRIPTION	NORTHING	EASTING	ELEV
1	BRASS CAP C3405, SW COR SEC. 32	169194.592	2071473.932	1222.26
2	FOUND MAG NAIL C6E391	169194.434	2071473.566	1222.25
3	BM - 4	169191.67	2071477.478	1238.27
4	CUT "X"	169217.837	2071402.389	1221.44
5	CUT "X"	169192.176	2071425.875	1222.81
6	CUT "X"	169102.643	2071415.582	1221.36
7	CUT "X"	169209.615	207204.053	1219.98
8	CUT "X"	169243.047	207265.583	1220.77
9	CUT "X"	169265.449	2073276.559	1220.16
10	CUT "X"	169205.468	2074117.226	1212.98
11	FOUND MAG NAIL, S/4 CORNER SEC.32	169204.244	2074123.217	1209.18
12	CUT "X"	169197.978	2074128.524	1209.13
13	CUT "X"	169208.346	2074132.345	1209.30
14	BRASS CAP, OKC GPS #344	169216.263	2076344.718	1214.30
15	CUT "X"	169242.886	2076679.484	1215.83
16	FOUND MAG NAIL NW 1/4 WASHCA 103, SE COR SEC. 32	169242.192	2076222.983	1215.19
17	CUT "X"	169204.855	2076766.223	1215.17
18	FOUND MAG NAIL	169174.976	2076338.318	1214.92
19	CUT "X"	170435.877	2074816.443	1225.25
20	800 MAG NAIL	171088.756	2074889.225	1234.56
21	CUT "X"	171876.055	2074249.321	1233.92
22	CUT "X"	171839.485	2074050.532	1233.91

## EXISTING EASEMENTS

- (A) 25' ROAD EASEMENT; BOOK 5164, PAGE 719  
(B) 25' ROAD EASEMENT; BOOK 5230, PAGE 722  
(C) 15' CITY OF OKLAHOMA CITY EASEMENT; BOOK 7970, PAGE 239  
(D) 30' OKLAHOMA COUNTY EASEMENT; BOOK 1928, PAGE 192  
(E) 10' OKLAHOMA GAS AND ELECTRIC EASEMENT; BOOK 10583, PAGE 539  
(F) 40' CITY OF OKLAHOMA CITY EASEMENT; BOOK 3307, PAGE 518  
(G) 15' OKLAHOMA NATURAL GAS EASEMENT; BOOK 9743, PAGE 1970

- (H) 10' OKLAHOMA NATURAL GAS EASEMENT; BOOK 10628, PAGE 1583
- (I) 15' OKLAHOMA NATURAL GAS EASEMENT; BOOK 13765, PAGE 585
- (J) 20' CITY OF OKLAHOMA CITY SAN. SEWER EASEMENT; BOOK 10752, PAGE 151
- (K) 20' CITY OF OKLAHOMA CITY SAN. SEWER EASEMENT; BOOK 10396, PAGE 46
- (L) ACCESS EASEMENT; BOOK 10396, PAGE 40
- (M) SWBT EASEMENT; BOOK 4861, PAGE 1304



525 Central Park Dr., Suite 403  
Oklahoma City, OK. 74105  
PHONE: 405.606-9800 FAX: 405.606-9801

CONTROL  
& EXISTING EASEMENTS

C-102

[illegible]

WC-0930 - WATER TRANSMISSION MAIN  
AND IMPROVEMENTS TO  
BOOSTER STATION NO. 9

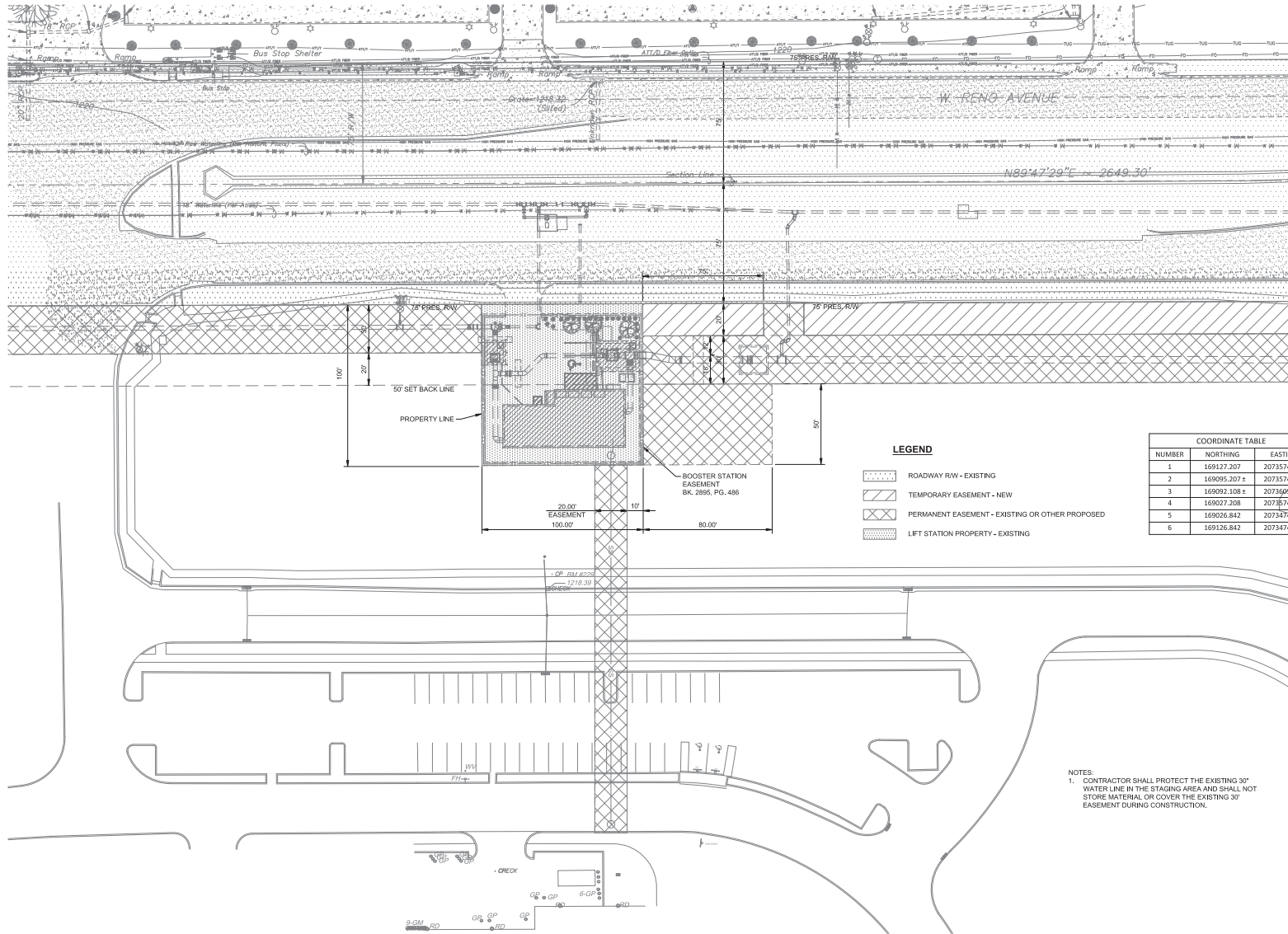
ROJ:	11352-18001
ESN:	JB
RWN:	Tt
HKD	JB

VC-0930





12/20/21 3:20:08 PM - P:\11522205-1152-1801\CAD\SETFILES\WC-0930-EASEMENT.DWG - GUARD, STEVEN



#### LEGEND

- ROADWAY R/W - EXISTING
- TEMPORARY EASEMENT - NEW
- PERMANENT EASEMENT - EXISTING OR OTHER PROPOSED
- LIFT STATION PROPERTY - EXISTING

COORDINATE TABLE		
NUMBER	NORTHING	EASTING
1	169137.207	2073574.471
2	169095.207 ±	2073574.568 ±
3	169092.108 ±	2073605.690 ±
4	169027.208	2073674.836
5	169026.842	2073474.837
6	169126.842	2073474.471

- NOTES:
- CONTRACTOR SHALL PROTECT THE EXISTING 30" WATER LINE IN THE STAGING AREA AND SHALL NOT STORE MATERIAL OR COVER THE EXISTING 30" EASEMENT DURING CONSTRUCTION.



**TETRA TECH**  
www.tetratech.com  
525 Central Park Dr., Suite 403  
Tulsa, Oklahoma 74103  
PHONE: 405.606.4800 FAX: 405.606.4801

**NEW EASEMENTS**  
**C-103**

**OKLAHOMA CITY WATER UTILITIES TRUST**  
WC-0930 - WATER TRANSMISSION MAIN  
AND IMPROVEMENTS TO  
BOOSTER STATION NO. 9

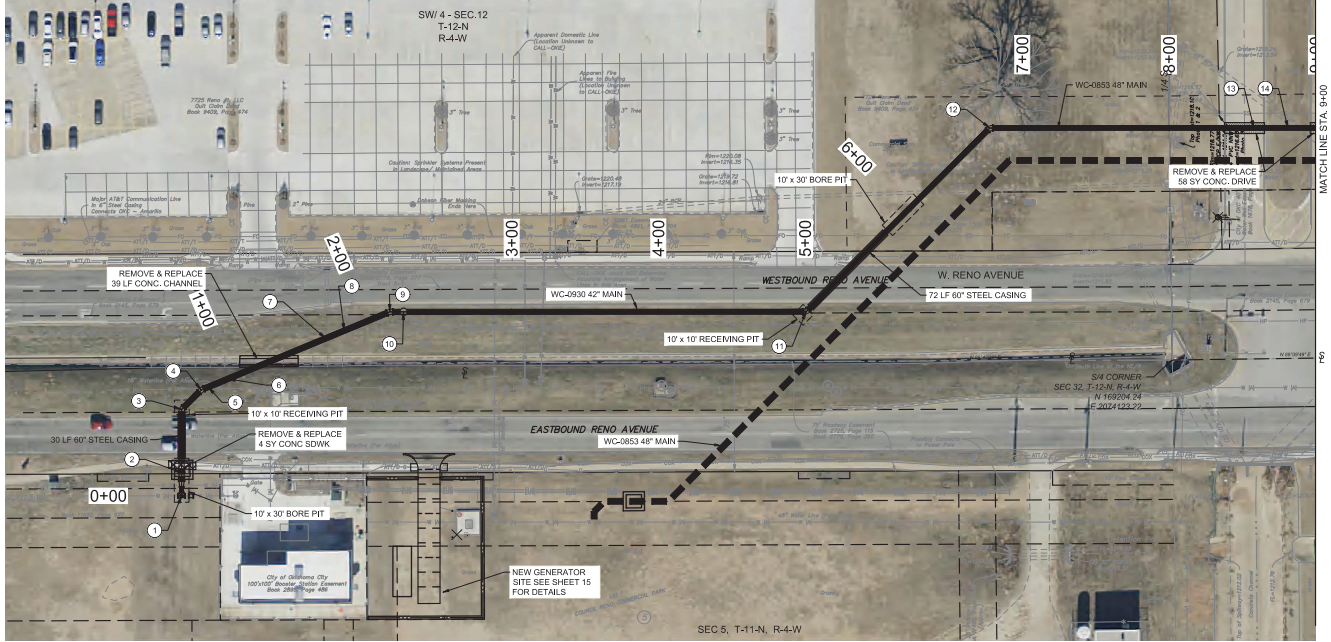
PROJ: 11352-18001  
DESN: JB  
DRWN: TJ  
CHKD: JB

**WC-0930**  
Sheet 8 of XX

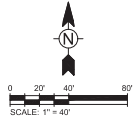
Copyright: Tetra Tech

12/20/21, 1:32:38 PM - P:\11352205-11352-000\CAD\SHETFILES\G-09 TO C-111 PLAN AND PROFILE DWG - GUARD, STEVEN

- 1 STA. 0+00.00  
1-36" x 36" x 36" TEE (RJ)  
1-36" SOLID SLEEVE (RJ)  
1-42" x 36" REDUCER (RJ)  
N 16911.85  
E 2073447.76
- 2 STA. 0+15.77  
1-42" VALVE VAULT  
N 169127.42  
E 2073447.75
- 3 STA. 0+58.91  
1-42" x 45" BEND (RJ)  
N 169170.56  
E 2073447.79
- 4 STA. 0+77.69  
1-42" x 22.5" BEND (RJ)  
N 169183.84  
E 2073461.07
- 5 STA. 0+92.96  
1-42" x 22.5" BEND (RJ)  
N 169185.86  
E 2073465.94
- 6 STA. 0+97.48  
1-42" x 22.5" BEND (RJ)  
N 169191.41  
E 2073479.35
- 7 STA. 1+09.64  
1-42" x 22.5" BEND (RJ)  
N 16919.03  
E 2073546.02
- 8 STA. 1+83.30  
1-42" x 22.5" BEND (RJ)  
N 169224.28  
E 2073558.64
- 9 STA. 2+16.99  
1-42" x 22.5" BEND (RJ)  
N 169237.19  
E 2073589.76
- 10 STA. 2+26.32  
1-42" RELIEF VALVE VAULT  
N 169237.15  
E 2073599.09
- 11 STA. 5+00.75  
1-42" x 45" BEND (RJ)  
N 169237.15  
E 2073873.53
- 12 STA. 6+77.89  
1-42" x 45" BEND (RJ)  
N 169302.40  
E 2073968.79
- 13 STA. 8+57.81  
1-42" x 22.5" BEND (RJ)  
N 169302.40  
E 2074178.80
- 14 STA. 8+81.15  
1-42" x 22.5" BEND (RJ)  
N 169302.40  
E 2074202.04



SE/4 - SEC.32  
T-12-N  
R-4-W

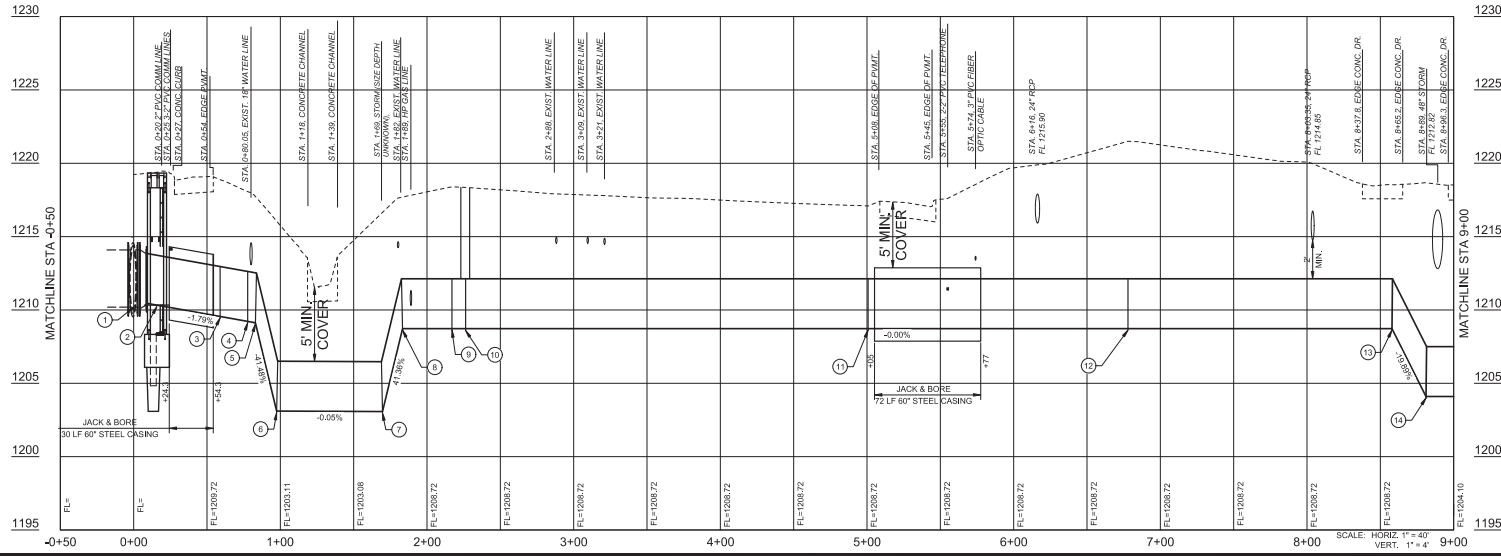


**TETRA TECH**

525 Central Park Dr., Suite 403  
Folsom, CA 95630  
PHONE: 405.606.8000 FAX: 405.606.8001

**PLAN & PROFILE**  
STA. 0+00 TO STA. 9+00  
**C-106**

BY	DATE	DESCRIPTION
ACS		



SCALE: HORIZ. 1" = 40'  
VERT. 1" = 4'

Bar Measures 1 inch, otherwise drawing not to scale



**OKLAHOMA CITY WATER UTILITIES TRUST**  
WC-0930 - WATER TRANSMISSION MAIN  
AND IMPROVEMENTS TO  
BOOSTER STATION NO. 9

PROJ:	11352-18001
DESIGN:	JB
DRWN:	TI
CHKD:	JB

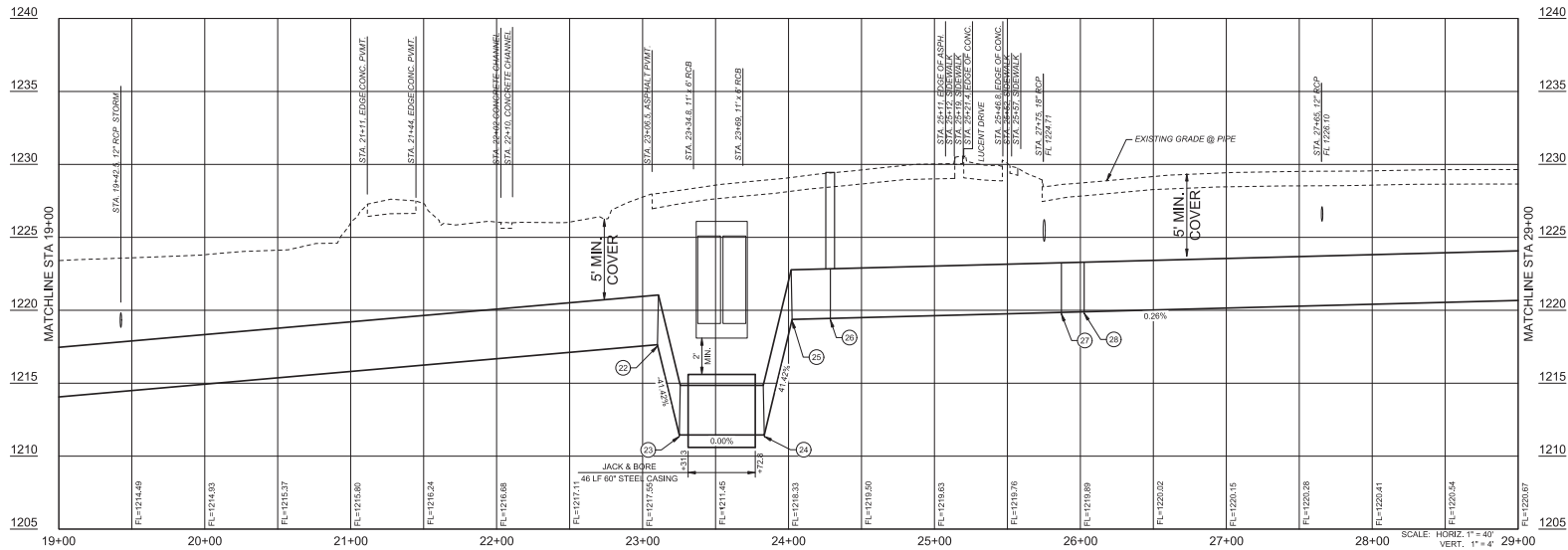
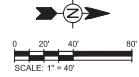
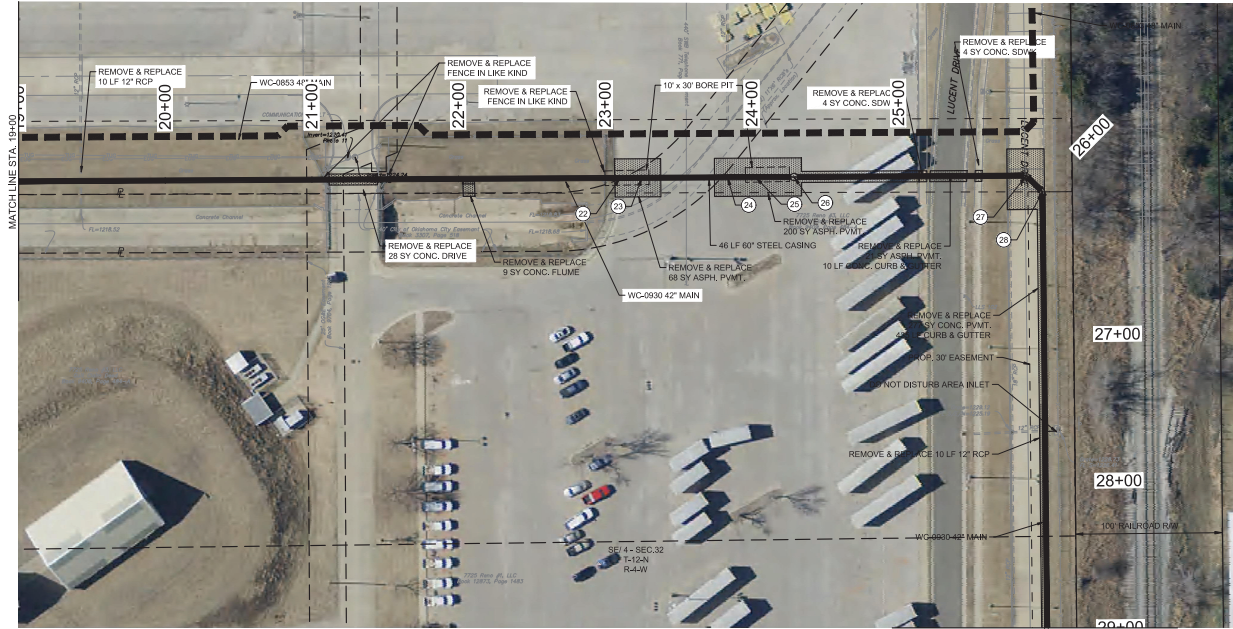
Copyright: Tetra Tech





1/2/2021 1:35:01 PM - P:\11352205-11352-000\CAD\DWG\FILES\C-108 TO C-111 PLAN AND PROFILE.DWG - GUARD, STEVEN

- 22 STA 23+10.19  
1-42" x 45" BEND (RJ)  
N 170889.27  
E 2074296.50
- 23 STA 23+22.72  
1-42" x 45" BEND (RJ)  
N 170704.20  
E 2074296.52
- 24 STA 23+83.39  
1-42" x 45" BEND (RJ)  
N 170772.65  
E 2074296.19
- 25 STA 24+07.41  
1-42" x 45" BEND (RJ)  
N 170781.77  
E 2074296.08
- 26 STA 24+28.66  
1-MR RELIEF VALVE VAULT  
N 170807.91  
E 2074295.94
- 27 STA 25+86.37  
1-42" x 45" BEND (RJ)  
N 170965.22  
E 2074295.05
- 28 STA 26+02.82  
1-42" x 45" BEND (RJ)  
N 170977.35  
E 2074300.03



Bar Measures 1 inch, otherwise drawing not to scale



OKLAHOMA CITY WATER UTILITIES TRUST  
WC-0930 - WATER TRANSMISSION MAIN  
AND IMPROVEMENTS TO  
BOOSTER STATION NO. 9

PROJ: 11352-18001  
DES: JB  
DRWN: JB  
CHKD: JB

Sheet 13 of XX

PLAN & PROFILE  
STA. 19+00 TO STA. 29+00

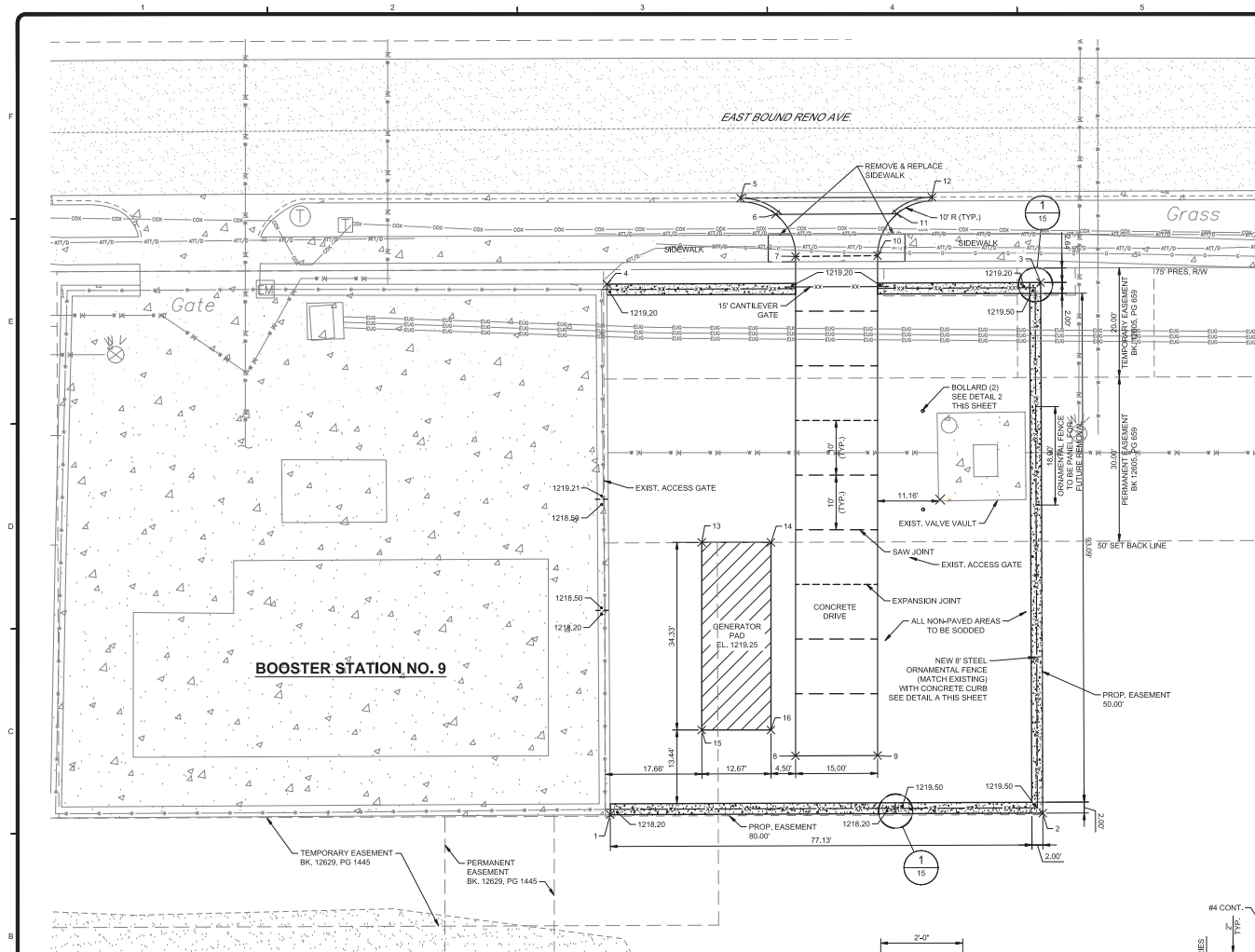
C-108

**TETRA TECH**  
www.tetratech.com  
525 Central Park Dr., Suite 403  
Oklahoma City, OK 73102  
PHONE: 405.506.8000 FAX: 405.604.8001





12/20/21 1:38:45 PM - P:\11352200-11352-000\CAD\DWG\TILE\WC-0930-11-GENERATOR SITE.DWG - GUARD, STEVEN

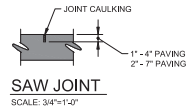


#### LEGEND

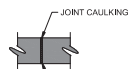
- 1250 --- EXISTING CONTOURS (1' INTERVAL)
- - - 1251.25 PROPOSED SPOT GRADES
- [Symbol] FENCE CURB
- [Symbol] STRUCTURE
- - - 1/2" EXPANSION JOINT
- - - SAW JOINT

#### POINT TABLE

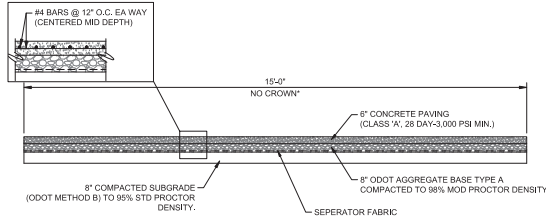
PTS	DESCRIPTION	Elevation	Northing	Easting
1	SW COR. FENCE CURB	1218.200	169027.4850	2073575.0800
2	SE COR. FENCE CURB	1219.500	169027.7744	2073554.2134
3	NE COR. FENCE CURB	1219.500	169124.8670	2073553.8091
4	NW COR. FENCE CURB	1219.200	169124.5780	2073574.4740
5	PC 10' R BEG. CONC. CURB	1218.210	169140.3128	2073598.9356
6	PI 10' R END CONC. CURB	1218.450	169137.3367	2073605.3492
7	PT 10' R CONC. DRIVE	1218.750	169129.6251	2073608.9827
8	PI SW COR. CONC. DRIVE	1219.250	169038.2500	2073608.9827
9	PI SE COR. CONC. DRIVE	1219.250	169038.3048	2073623.9827
10	PC 10' R CONC. DRIVE	1218.750	169129.7795	2073623.9827
11	PC 10' R BEG. CONC. CURB	1218.380	169137.4364	2073627.5515
12	PT 10' R END CONC. CURB	1218.090	169140.4867	2073633.9243
13	NW COR. GENERATOR PAD	1219.500	169077.3205	2073591.8157
14	NE COR. GENERATOR PAD	1219.500	169077.3205	2073604.4827
15	SW COR. GENERATOR PAD	1219.500	169042.9905	2073591.8157
16	SE COR. GENERATOR PAD	1219.500	169042.9905	2073604.4827



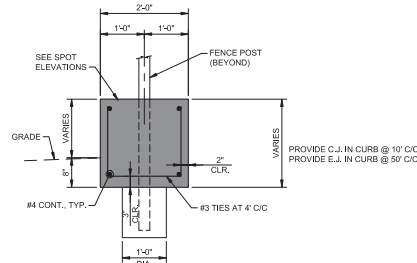
SAW JOINT  
SCALE: 3/4\"/>



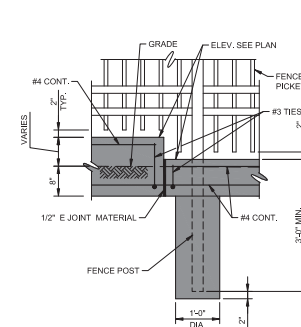
EXPANSION JOINT  
SCALE: 3/4\"/>



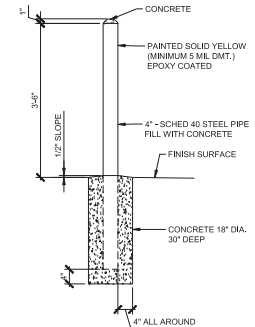
TYPICAL SECTION - CONCRETE



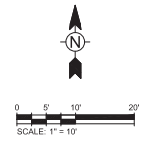
A FENCE CURB  
SCALE: 3/4\"/>



1 CURB STEP  
SCALE: 3/4\"/>



2 TYPICAL BOLLARD DETAIL  
SCALE: 3/4\"/>



www.tetratech.com  
525 Central Park Dr., Suite 403  
Folsom, CA 95630  
PHONE: 402-606-8000 FAX: 402-606-8001

## PLAN GENERATOR SITE C-110

BY	
DATE	
DESCRIPTION	
REVISION	

OKLAHOMA CITY WATER UTILITIES TRUST  
WC-0930 - WATER TRANSMISSION MAIN  
AND IMPROVEMENTS TO  
BOOSTER STATION NO. 9

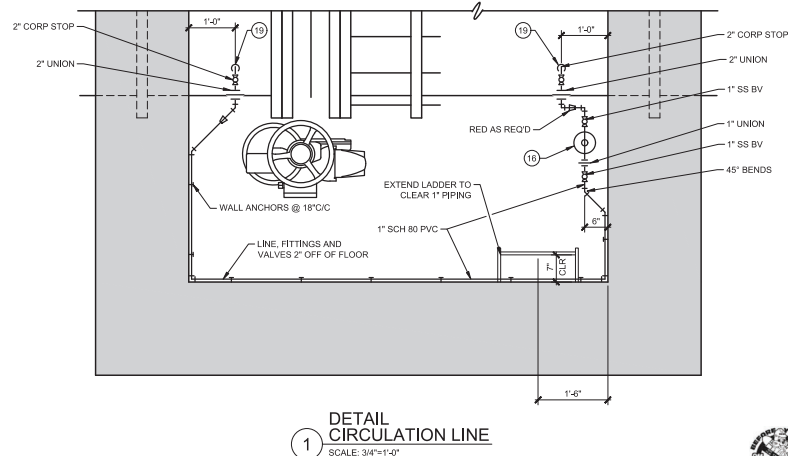
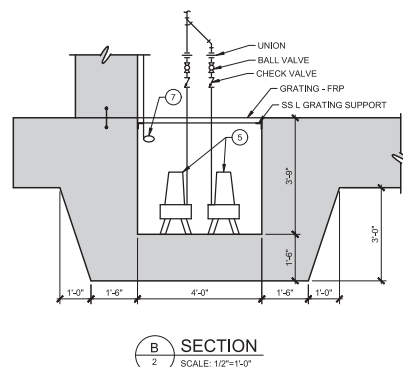
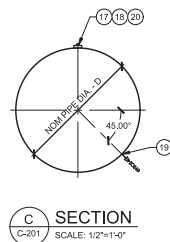
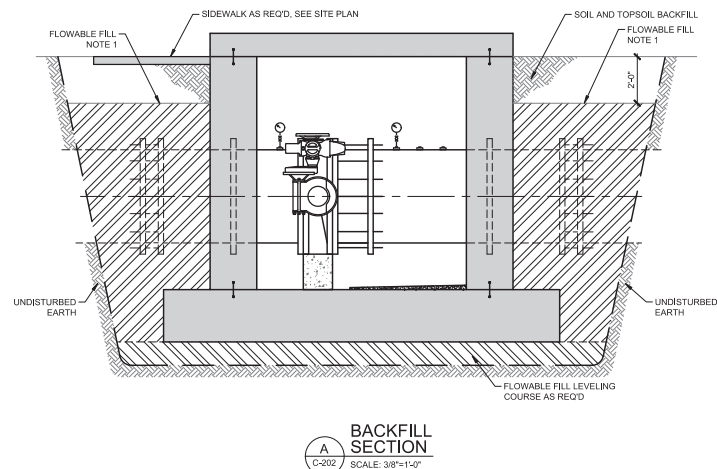
PROJ: 11352-18001  
DES: JB  
DRWN: TJ  
CHKD: JB

WC-0930  
Sheet 15 of XX



Bar Measures 1 inch, otherwise drawing not to scale





## BACKGROUND PLAN AND ONE LINE SYMBOLS

SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION
	CONTROL SWITCH (SEL. OR P.B.) SEE CIRCUITS FOR SPECIFIC TYPE		TAG NO. (BALLOON) FOR DEVICE INDICATED
	FLLOAT SWITCH - FLOW SWITCH		TEMPERATURE - HUMIDISTAT SWITCH (SUBSCRIPT NO. OF STAGES)
	LIMIT (PROXIMITY TYPE) PRESSURE - VACUUM SWITCH		CAPACITOR, 3 PHASE, SIZE AS INDICATED
	ELECTRICAL OR MECHANICAL ALTERNATOR (SEE WIRING)		DISCONNECT SWITCH (F) = FUSED, (C) = CIRCUIT BREAKER
	OVERLOAD SWITCH OR DEVICE		MAGNETIC STARTER (BACKGROUND DRAWINGS ONLY)
	TERMINAL BOX		COMBINATION MAGNETIC STARTER FUSED UNLESS NOTED (CIRCUIT BREAKER)
	SOLENOID VALVE		COMBINATION LIGHTING CONTACTOR WITH HAND-OFF-AUTO SWITCH
	PHOTOCELL LINE VOLTAGE		MANUAL STARTER (R) = REVERSING
	AS NOTED (LIGHTING PANEL, CONTROL PANEL, DISTRIBUTION PANEL, ETC.), WALL MOUNTED		CONTROL PANEL
	JUNCTION BOX		UNIT HEATER, 1/8 HORSEPOWER
	TRANSFORMER		LIGHTING ARRESTOR
	CONDUIT WITH CONDUIT SEAL FITTING		LOW VOLTAGE HOME RUNS 120/208V, 120/240V (SEE NOTE 2 ON STANDARD NOTE SHEET)
	CONDUIT EXPOSED		NEMA 4
	CONDUIT CONCEALED		NEMA 4X
	DIRECT BURIED CONDUIT		NEMA 7
	DIRECT BURIED CABLE		NEMA 9
	OVERHEAD LINE		KEYLOCK
	UNDERGROUND DUCT BANK		SMOKE DETECTOR
	EXISTING UNDERGROUND DUCT BANK		EXIT LIGHT
	CONCRETE ENCASED DUCT BANK WITH CABLE LOCATIONS, AND SPARE DUCTS AS INDICATED ON DRAWINGS		FLUORESCENT LUMINAIRE
	CABLE REEL		INCANDESCENT LUMINAIRE
	MULTI-STACK ALARM LIGHTS		HIGH INTENSITY DISCHARGE LIGHT
	SELECTOR SWITCH / PUSHBUTTON, FUNCTIONS AS SHOWN IN WIRING DIAGRAMS		EMERGENCY BATTERY PACK
	LOW VOLTAGE DISCONNECT SWITCH		DESK INTERCOM SET
	LOW VOLTAGE FUSE (BELOW 600V)		CAMERA
	HIGH VOLTAGE FUSE (ABOVE 600V)		DOMO CAMERA (PAN, TILT, ZOOM)
	ALL STARTERS SHALL BE FULL VOLTAGE, NON-REVERSING UNLESS OTHERWISE INDICATED. (FVR) FULL VOLTAGE REVERSING (RV) REDUCED VOLTAGE (RS, 2W) TWO SPEED, TWO WINDING 600V, 3 POLE MOLDED CASE CIRCUIT BREAKER, FRAME & RATING AS SHOWN		DRAW OUT CIRCUIT BREAKER (ABOVE 600 VOLT)
	SINGLE PHASE, FRACTIONAL HP MOTOR TO LOCATION INDICATED (SEE NOTE 2 ON STANDARD NOTE SHEET)		CIRCUIT BREAKER WITH STAB CONNECTION
	DEVICE SYMBOL WITH TYPE DEVICE		CURRENT TRANSFORMER AND RATIO, WITH NUMBER REQUIRED SHOWN
	THREE PHASE LOAD WITH IDENTIFICATION		

## WIRING DEVICE SCHEDULE

SYMBOL	DESCRIPTION	NEMA TYPE
	125V, 2P, DUPLEX, 3W	5-20 R
	SIMPLEX RECEPTACLE	
	QUAD RECEPTACLE	
	20A, 120/277V SWITCH	SPST

## CONTROL CIRCUIT &amp; PILOT DEVICE LEGEND

SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION
	PRESSURE ACTUATED SWITCH		SELECTOR SWITCH - NORMALLY OPEN
	FLOW ACTUATED SWITCH		FLLOAT ACTUATED SWITCH
	LIMIT SWITCH - NORMALLY OPEN		TEMP. ACTUATED SWITCH
	LIMIT SWITCH - NORMALLY CLOSED		LIMIT SWITCH - NORMALLY CLOSED
	LATCHING CABLE SWITCH		LIMIT SWITCH - NORMALLY OPEN - HELD CLOSED
	MOMENTARY PUSHBUTTON OPERATOR-NORMALLY CLOSED		TIME DELAY FUSE
	MOMENTARY PUSHBUTTON OPERATOR-NORMALLY OPEN		PUSHBUTTON OPERATOR WITH MUSHROOM HEAD
	CONTROL RELAY CONTACT - NORMALLY OPEN		FIELD LOCATED STOP BUTTON
	TIMING RELAY INSTANTANEOUS CONTACT		CONTROL RELAY CONTACT - NORMALLY CLOSED
	CONTROL RELAY COIL		TIMING RELAY INSTANTANEOUS CONTACT
	TWO COIL LATCHING RELAY		SELECTOR SWITCH OPERATOR WITH FUNCTION SHOWN
	TIMED CLOSED CONTACT ON ENERGIZATION		TIMED OPEN CONTACT ON ENERGIZATION
	TIMED OPEN CONTACT ON DE-ENERGIZATION		TIMED CLOSED CONTACT ON DE-ENERGIZATION
	ZERO SPEED OR ANTI-PLUGGING SWITCH		PUSH-TO-TEST INDICATING LIGHT
	MAINTAINED STOP-START PUSHBUTTON OPERATOR		MAINTAINED STOP - MOMENTARY START PUSHBUTTON (JOG)
	MAINTAINED PUSH - PULL OPERATOR		SOLENOID OR CLUTCH
	LOCAL TERMINALS WITH EXTERNAL WIRING		ELAPSED TIME INDICATOR
	TIMING RELAY COIL		120VAC TRANSFORMER
	TIMING RELAY COIL (OFF DELAY)		PUSHBUTTON OPERATOR WITH MUSHROOM HEAD
	INDICATING LIGHT		THERMAL OVERLOAD
	PUSH-TO-TEST INDICATING LIGHT		FIELD LOCATED
	SECONDARY TRANSFORMER		TERMINAL POINT
	MOLDED CASE CIRCUIT BREAKER		TERMINAL
	GENERAL DISCONNECT SWITCH		LOW VOLTAGE FUSE
			FUSIBLE TERMINAL BLOCK
			CONTROL POWER TRANSFORMER
			RECEPTACLE

NOTE: THE PLC I/O ADDRESS SHALL BE USED AS THE WIRING TAG SCHEME FOR ALL PANEL AND FIELD CONTROL WIRING. COORDINATE WITH ELECTRICAL CONTRACTOR.

## I.S.A. STANDARD LETTER FUNCTIONS

SYMBOL	FIRST LETTER	SUCCEEDING LETTERS
A	ANALYSIS, ANALOG	ALARM
B	BURNER, FLAME	BATCH
C	CONDUCTIVITY, COMMAND	CONTROL (FEEDBACK TYPE)
D	DENSITY, SPECIFIC GRAVITY	
E	VOLTAGE	PRIMARY ELEMENT
F	FLOW RATE	RATIO
G	GAGING	GLASS
H	HAND, MANUAL	HIGH
I	CURRENT	INDICATE
J	POWER	SCAN
K	TIME, TIME SCHEDULE	CONTROL (NO FEEDBACK)
L	LEVEL, LIGHT	LOW
M	MOISTURE, HUMIDITY	MIDDLE, MODULATE
N		
O	OVERLOAD	ORifice
P	PRESSURE, VACUUM	POINT
Q	QUANTITY	TOTALIZE, INTEGRATE
R	RADIOACTIVITY	RECORD, PRINT, RECEIVE
S	SPEED, FREQUENCY, SOLENOID	
T	TEMPERATURE, TURBIDITY	TRANSMIT, TRANSFORM
U	MULTIVARIABLE	MULTIFUNCTION
V	VIBRATION, VISCOSITY	VALVE, DAMPER, LOUVER
W	WEIGHT, FORCE	
X		RELAY, COMPUTE
Y		DRIVE, ACTUATE
Z	POSITION	

## PROTECTIVE RELAY LEGEND

DEVICE NO.	DESCRIPTION
2	SYNC. TIMER 0-5 MIN.
25	SYNCHRONIZING
27	SHORT TIME UNDERVOLTAGE
32	REVERSE POWER RELAY
38	TEMPERATURE
40	LOSS OF EXCITATION
43	SELECTOR SWITCH
47	PHASE SEQUENCE & UNDERVOLTAGE
49	THERMAL
50S1	INSTANTANEOUS AND VERY INVERSE
51	VERY INVERSE
51G	INVERSE GROUND FAULT
51N	NEUTRAL OVERCURRENT
51V	OVERCURRENT RELAY WITH VOLTAGE RESTRAINT
52/CS	CONTROL SWITCH
59	INSTANTANEOUS OVERVOLTAGE
60	VOLTAGE BALANCE
62	TIME DELAY
64	SHORT TIME LOW PICK UP OVERVOLTAGE
67	DIRECTIONAL OVERCURRENT
69	LOCKOUT CONTROL SWITCH
78	OUT OF STEP
81	OVERUNDER FREQUENCY RELAY
83	MULTI-CONTACT AUXILIARY
86/HR	MULTI-CONTACT AUX., HAND RESET
87	DIFFERENTIAL OVERCURRENT

## SYMBOL LEGEND

SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION
PT	POTENTIAL TRANSFORMER	W	WATTMETER
CT	CURRENT TRANSFORMER	AP	ALARM POINT
A	AMMETER	CPT	CONTROL POWER TRANSFORMER
V	VOLTMETER	(2) (3)	NUMBER OF DEVICES REQUIRED
PF	POWER FACTOR METER	ETI	ELAPSED TIME METER



1/21/2021 1:42:25 PM - P:\11352200-11352-000\CAD\BETHELE-002 NOTES.DWG - GUNARD, STEVEN

## NOTES:

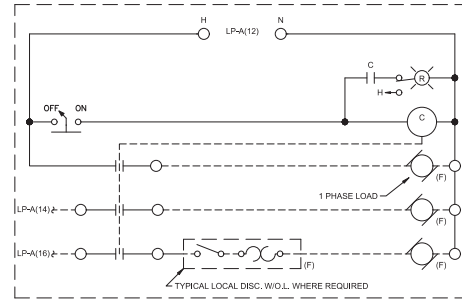
- FIELD VERIFY CONDUIT ROUTING AT THE PLANT WITH OWNER. CORE HOLES AS REQUIRED TO SUIT INSTALLATION OF THE CONDUITS SHOWN. PATCH WITH NONSHRINK GROUT.
- TURN OVER TO OWNER AT PROJECT COMPLETION OPERATION AND MAINTENANCE MANUALS (QUANTITY AS SPECIFIED) TO OWNER.
- IN ADDITION TO PATCH CABLES SUPPLIED FOR THE PROJECT, FURNISH 30'-0"FT LONG SINGLEMODE DUPLEX FIBER OPTIC PATCH CABLES (ST-ST) CONNECTORS, AND 30'-0"FT CAT-5E PATCH CABLES FOR OWNERS USE. TURN OVER CABLES TO OWNER.
- MULTIMODE FIBER OPTIC PATCH CABLES, AND ETHERNET PATCH CABLES SUPPLIED IN THE PROJECT SHALL BE COLORED PURPLE.
- FIBER OPTIC PATCH PANELS SHALL BE THE PRODUCT OF CORNING CABLE SYSTEMS, (RACK OR SURFACE MOUNTED AS SHOWN), ST STYLE CONNECTORS, WITH QUANTITY OF BULKHEADS AS SHOWN.

## GENERAL CONSTRUCTION NOTES:

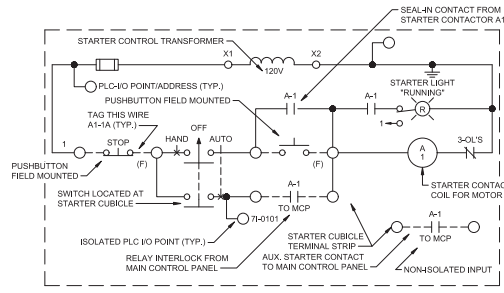
- ELECTRICAL MATERIALS AND EQUIPMENT ITEMS SHOWN IN LIGHT LINE WEIGHTS ON THE DRAWINGS ARE EXISTING ITEMS TO REMAIN. ELECTRICAL MATERIALS AND EQUIPMENT ITEMS SHOWN IN HEAVY LINE WEIGHTS ARE NEW THIS CONTRACT.
- ITEMS SHOWN OR NOTED TO BE DEMOLISHED ON THE DRAWINGS ARE EXISTING ITEMS TO BE REMOVED FROM SITE BY CONTRACTOR UNLESS NOTED TO BE TURNED OVER TO OWNER.
- FOR ITEMS INDICATED AS "FIELD LOCATE", THE CONTRACTOR SHALL FIELD VERIFY FOR INTERFERENCE AND FOR LOCATIONS OF MOUNTING FLANGES, CONNECTION POINTS, ETC.
- INSTALL A SINGLE CONDUCTOR INSULATED (THWN) COPPER GROUND WIRE IN EACH CONDUIT, SIZE AS SHOWN ON DRAWINGS, OR AS A MINIMUM PER THE NATIONAL ELECTRICAL CODE, WHICHEVER IS LARGER. THIS GROUND WIRE SHALL BE CONNECTED AT EACH END TO THE EQUIPMENT GROUND.
- CONDUIT ROUTINGS SHOWN ON BACKGROUND PLANS ARE INTENDED ROUTINGS ONLY. EXACT CONDUIT ROUTINGS FOR CONDUITS, AND LENGTH SHALL BE FIELD LOCATED AND VERIFIED BY THE CONTRACTOR. COORDINATE CONDUIT ROUTING IN FINISHED AREAS WITH OWNER. CONDUIT TO BE CONCEALED IN THESE AREAS.
- ETHERNET AND FIBER OPTIC TERMINATIONS (SC STYLE) SHALL BE PERFORMED BY A QUALIFIED CONTRACTOR, (NOT THE INSTALLING CONTRACTOR). THE CABLES SHALL BE TESTED, NO SPLICING SHALL BE PERMITTED OF FIBER OPTIC CABLES, BETWEEN PANELS. FIBERS SHALL BE TERMINATED AT PATCH PANELS, INCLUDING SPARES.
- REFER TO THE CABLE MANUFACTURER'S RECOMMENDATIONS FOR MINIMUM BEND RADIUS FOR FIBER OPTIC CABLES, INSTALL NEW PULL BOXES (PB) AS REQUIRED FOR CONDUITS. SIZE PULL BOXES AS REQUIRED PER FIBER OPTIC CABLE MANUFACTURERS RECOMMENDATIONS.
- CONDUITS/RACEWAYS, PULL BOXES AND JUNCTION BOXES TO BE INSTALLED WITH 316 STAINLESS STEEL CHANNEL, STRUT, MINIMUM STRUT LENGTH TO BE 12 INCHES, WHERE POSSIBLE.
- PANELS SHALL BE MOUNTED OFF WALLS WITH STRUT, CONDUITS SHALL BE MOUNTED ON STRUT INCLUDING SINGLE RUNS.
- CONDUIT ENTERING CONTROL PANELS AND ELECTRICAL EQUIPMENT ENCLOSURES SHALL BE FILLED WITH DUCT SEAL, INCLUDING OPENINGS IN BOTTOM OF PANELS, AND EQUIPMENT.
- REPAIR SIDEWALKS AND ROADWAYS DUE TO SITE WORK ADDITIONS. THE EXTENT OF THE REPAIR REQUIRED SHALL BE FIELD VERIFIED PRIOR TO BIDS IN CONJUNCTION WITH THE WORK SHOWN IN THE CONTRACT DOCUMENTS. PRIOR TO TRENCHING, FIELD LOCATE EXISTING GAS LINES, TELEPHONE LINES, SPRINKLER LINES, ETC. COORDINATE WITH OWNER.
- CABLES (INCLUDING FIBER, ETHERNET, CONTROL WIRE, ETC.) WHERE PASSING THROUGH A PULL BOX SHALL BE LABELED AND COMPLETELY IDENTIFIED WITH IDENTIFICATION NUMBERS AND ORIENTATION/DESTINATION. THIS ALSO INCLUDES ALL CABLE BUNDLES ENTERING CONTROL PANELS, PULL BOXES, ETC.
- PULL CORDS SHALL BE INSTALLED IN CONDUITS CONTAINING NETWORK CABLES, AND FIBER OPTIC CABLES.
- CORE HOLES AS REQUIRED TO SUIT INSTALLATION OF CONDUIT AND WIRING/CABLING AS SHOWN. FIELD VERIFY EXACT EXTENT OF WORK REQUIRED.
- FURNISH PULL BOXES FOR FIBER OPTIC CABLE, COORDINATE EXACT BENDING RADIUS WITH MANUFACTURER.
- NEW CONDUITS INSTALLED THIS CONTRACT WITH FIBER OPTIC CABLES ARE TO BE LABELED WITH PHENOLIC TAGS (AT BEGINNING TO END) TO INDICATE THE NUMBER OF STRANDS, ORIENTATION AND DESTINATION. TAGS TO BE COLOR CODED ORANGE FOR MULTIMODE.
- WHERE NEW CONDUITS SHOWN TO BE INSTALLED PASS UNDER ROADWAYS, CONDUITS SHALL BE CONCRETE ENCASED.
- PRIOR TO EXCAVATION, FIELD LOCATE EXISTING UTILITIES. COORDINATE WITH OWNER.
- AREAS WHERE CAMERAS ARE SHOWN TO BE INSTALLED SHALL BE CLASSIFIED AS NEMA 4, UNLESS CALLED OUT OTHERWISE.
- THE ASSOCIATED INSTRUMENTATION DRAWINGS SHOW EXISTING WIRES AND TERMINAL NUMBERS REQUIRED TO PROPERLY INTERFACE WITH NEW EQUIPMENT. THIS INFORMATION WAS COLLECTED FROM AS-BUILT DRAWINGS AND EXTENSIVE FIELD VERIFICATION. THE INFORMATION SHALL BE USED AS A GUIDE IN RE-TERMINATION. IT SHALL REMAIN THE CONTRACTOR'S RESPONSIBILITY TO EXAMINE THE WIRING AND TO REVISE TO SUIT AS REQUIRED. CHANGES IN THE CONTRACT OR COST WILL NOT BE GRANTED FOR THIS COORDINATION. IT IS THE CONTRACTOR'S RESPONSIBILITY TO EXAMINE PROPOSED WORK SHOWN.
- CONDUIT ROUTINGS SHOWN ON BACKGROUND PLANS ARE PROPOSED ROUTINGS ONLY. EXACT CONDUIT ROUTINGS AND LENGTH SHALL BE FIELD LOCATED AND VERIFIED BY THE CONTRACTOR. COORDINATE CONDUIT ROUTING IN FINISHED AREAS WITH OWNER. CONDUIT TO BE CONCEALED IN THESE AREAS.
- RACEWAYS, PULL BOXES AND JUNCTION BOXES TO BE INSTALLED WITH 316 STAINLESS STEEL FASTENERS SUPPORTS, AND THREADED ROD, ETC. CHANNEL, STRUT TO ALSO BE STAINLESS STEEL. MINIMUM STRUT LENGTH TO BE 12 INCHES, WHERE POSSIBLE. TYPICAL FOR NEMA 12, 4, AND 7 AREAS.
- WIRING FOR STARTERS SHALL BE IN ACCORDANCE WITH NEMA CLASS B STANDARDS. SUBMIT ENGINEERED SHOP DRAWINGS FOR ALL STARTERS SHOWN TO BE WIRED.
- WIRE NUMBERS (1, 3, 5, ETC.) SHALL BE PREFIXED WITH STARTER TAG NUMBERS. THE WIRE NUMBER AFTER THE PREFIX SHALL BE THE MANUFACTURER'S WIRE NUMBERING SYSTEM. WIRE MARKERS SHALL BE USED AT EACH WIRE TERMINATION POINT.
- CONTROL WIRES SHALL BE TAGGED WITH THE PLC IO ADDRESS.
- IN AREAS WHERE EQUIPMENT AND CONDUIT IS REMOVED, REPAIR WALL AND FLOOR SURFACES AS REQUIRED TO MATCH SURROUNDING AREA. WHERE DEVICES ARE REMOVED FROM CONCEALED BOXES, FURNISH AND INSTALL A BLANK COVER ON THE BOX.
- FIBER OPTIC CABLE SHALL BE AS CALLED OUT ON SYSTEM CONFIGURATION DRAWINGS. SINGLE MODE, ALL DIELECTRIC, SUITABLE FOR INSTALLATION UNDERGROUND IN WET CONDUIT.

## GENERAL NOTES:

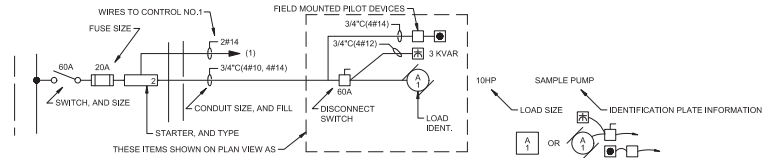
- PRIOR TO SUBMITTING A BID FOR THE WORK DETAILED UNDER THIS CONTRACT, BIDDER SHALL VISIT THE WASTEWATER TREATMENT PLANT. THE BIDDER SHALL FULLY ACQUAINT HIMSELF WITH EXISTING FIELD CONDITIONS AT EACH SITE. NO BULLETINS WILL BE WRITTEN FOR WORK DUE TO LACK OF VERIFICATION OF EXISTING SITE CONDITIONS AND WIRING.
- NO WIRES SHALL BE TERMINATED TO TERMINAL STRIPS, OR OTHER EQUIPMENT WITHOUT FIRST VERIFYING SIGNAL TYPE. DAMAGES RESULTING IN LACK OF VERIFICATION SHALL BE BORNE BY THE CONTRACTOR. CONTRACTOR SHALL COORDINATE SIGNAL TYPE AND VOLTAGE WITH IO CARDS SHOWN.
- WITHIN CONTROL PANELS, NAMEPLATES SHALL BE PROVIDED TO INDICATE DIFFERENT VOLTAGE LEVELS WITHIN PANELS. ALSO, A NAME TAG (YELLOW BACKGROUND, RED LETTERING) SHALL BE LOCATED ON THE FRONT OF EVERY PANEL, INDICATING THAT WHEN MAIN PANEL DISCONNECTED 120V IS STILL PRESENT FROM FIELD DEVICES (YELLOW WRING/ISOLATED INPUT CARDS.)
- PHENOLIC TAGS ON FACE OF CONTROL PANELS TO HAVE WHITE BACKGROUND AND BLACK LETTERING (EXCEPT WARNING TAGS, YELLOW BACKGROUND RED LETTERING).
- PROVIDE SAFETY COVERS ON ALL 480V MOLDED CASE MAIN CIRCUIT BREAKERS TO INSULATE THE INCOMING CABLES AND SIDE CONDUCTORS FROM CONTACT. (TYP. FOR CONTROL PANELS.) PROVIDE BREAKER LOCKS FOR PUMP CIRCUIT BREAKERS (MCP/AND MAIN PANEL BREAKERS).
- REFER TO WIRING DIAGRAMS FOR ADDITIONAL INFORMATION ON ISOLATED IO. A COMMON NEUTRAL MAY BE USED FOR SEVERAL ISOLATED INPUTS FROM THE SAME STARTER, PROVIDE NEUTRAL JUMPERS WIRES WITHIN THE PANEL AS REQUIRED.
- ELECTRICAL MATERIALS AND EQUIPMENT ITEMS SHOWN IN LIGHT LINE WEIGHTS ON THE DRAWINGS ARE EXISTING ITEMS TO REMAIN. ELECTRICAL MATERIALS AND EQUIPMENT ITEMS SHOWN IN HEAVY LINE WEIGHTS ARE NEW THIS CONTRACT.
- ITEMS SHOWN CROSSHATCHED (OR NOTED TO BE DEMOLISHED) ON THE DRAWINGS ARE EXISTING ITEMS TO BE REMOVED, FROM SITE BY CONTRACTOR.
- INSTALL A SINGLE CONDUCTOR INSULATED (RHW, THHN, OR XHHW) COPPER GROUND WIRE IN EACH CONDUIT, SIZE AS SHOWN ON DRAWINGS, OR AS A MINIMUM PER THE NATIONAL ELECTRICAL CODE. THIS GROUND WIRE SHALL BE CONNECTED AT EACH END TO THE EQUIPMENT GROUND. THIS ALSO INCLUDES INSTRUMENTATION DEVICES SUCH AS LEVEL, PRESSURE, FLOW TRANSMITTERS, LIMIT SWITCHES, CONDUITS, NETWORK AND IO CABLES.
- THE FOLLOWING EXAMPLE COMPONENT IDENTIFICATION SHALL BE USED AS APPROPRIATE:  
(F) FIELD MOUNTED, NOT AT STARTER OR OTHER CONTROL PANELS  
(S) STARTER PANEL, MOUNTED (MCP/AT MAIN CONTROL PANEL)  
(1) AT CONTROL PANEL NO.1  
(2) AT CONTROL PANEL NO.2  
(TCP) AT TEMPERATURE CONTROL PANEL
- REFER TO DETAIL SHEETS, CONTRACTOR SHALL FURNISH AND INSTALL HARDWARE AND APPURTENANCES (I.E. PIPE TAPS, WETVELL BUBBLER TUBES, VALVES, COPPER TUBING, BALL VALVES, PNEUMATIC PIPING, SPOOL PIECES, ETC.) FOR FIELD DEVICES SHOWN (FLOWMETERS, PRESSURE TRANSMITTERS, LEVEL TRANSMITTERS, ETC.). WORK SHALL BE COORDINATED WITH OTHER TRADES (MECHANICAL INSTRUMENTATION, ETC.) CONTRACTOR SHALL BE RESPONSIBLE FOR SYSTEM COORDINATION AND INSTALLATION.
- ETHERNET AND FIBER OPTIC TERMINATIONS SHALL BE PERFORMED BY A QUALIFIED REPRESENTATIVE OF CABLE MANUFACTURER. THE CABLES SHALL BE TESTED. NO SPLICING SHALL BE PERMITTED OF FIBER OPTIC CABLES, BETWEEN PANELS. FIBERS SHALL BE TERMINATED AT PATCH PANELS, INCLUDING SPARES.
- REFER TO THE CABLE MANUFACTURER'S RECOMMENDATIONS FOR MINIMUM BEND RADIUS FOR FIBER OPTIC CABLES, INSTALL NEW PULL BOXES (PB) AS REQUIRED FOR CONDUITS. SIZE PULLBOXES AS REQUIRED PER FIBER OPTIC CABLE MANUFACTURERS RECOMMENDATIONS.
- CONDUIT ENTERING CONTROL PANELS AND ELECTRICAL EQUIPMENT ENCLOSURES SHALL BE FILLED WITH DUCT SEAL, INCLUDING OPENINGS IN BOTTOM OF PANEL.
- CABLES (INCLUDING FIBER, ETHERNET, CONTROL WIRE, ETC.) WHERE PASSING THROUGH A PULLBOX SHALL BE LABELED AND COMPLETELY IDENTIFIED WITH IDENTIFICATION NUMBERS AND ORIENTATION/DESTINATION. THIS ALSO INCLUDES ALL CABLE BUNDLES ENTERING CONTROL PANELS, PULLBOXES, ETC.
- CONTROL WIRES SHALL BE TAGGED WITH THE PLC IO ADDRESS IN THE FIELD AND AT THE PANEL.
- THE FIELD DEVICES SHOWN ON THE PAID'S, ELECTRICAL BACKGROUNDS, AND DETAILS SHEETS MAKEUP THE FIELD DEVICE EQUIPMENT REQUIREMENTS. NOT ALL FIELD DEVICES REQUIRED ARE SHOWN ON THE PAID'S.
- UPS SELECTED SHALL BE COMPATIBLE WITH ISOLATION TRANSFORMERS. (TYP.)
- REFER TO IO DRAWING LAYOUT FOR ADDITIONAL SIGNALS NOT SHOWN ON PAID FLOW DIAGRAMS.



**TYPICAL 120V POLE CONTACTOR**  
(EXAMPLE CIRCUIT)



**EXAMPLE PUMP**  
(TAG A1)  
(EXAMPLE CIRCUIT)



**MCC LEGEND EXAMPLE**



ELECTRICAL  
LEGEND & NOTES

E-002

OKLAHOMA CITY WATER UTILITIES TRUST  
WC-0930 - WATER TRANSMISSION MAIN  
AND IMPROVEMENTS TO  
BOOSTER STATION NO. 9

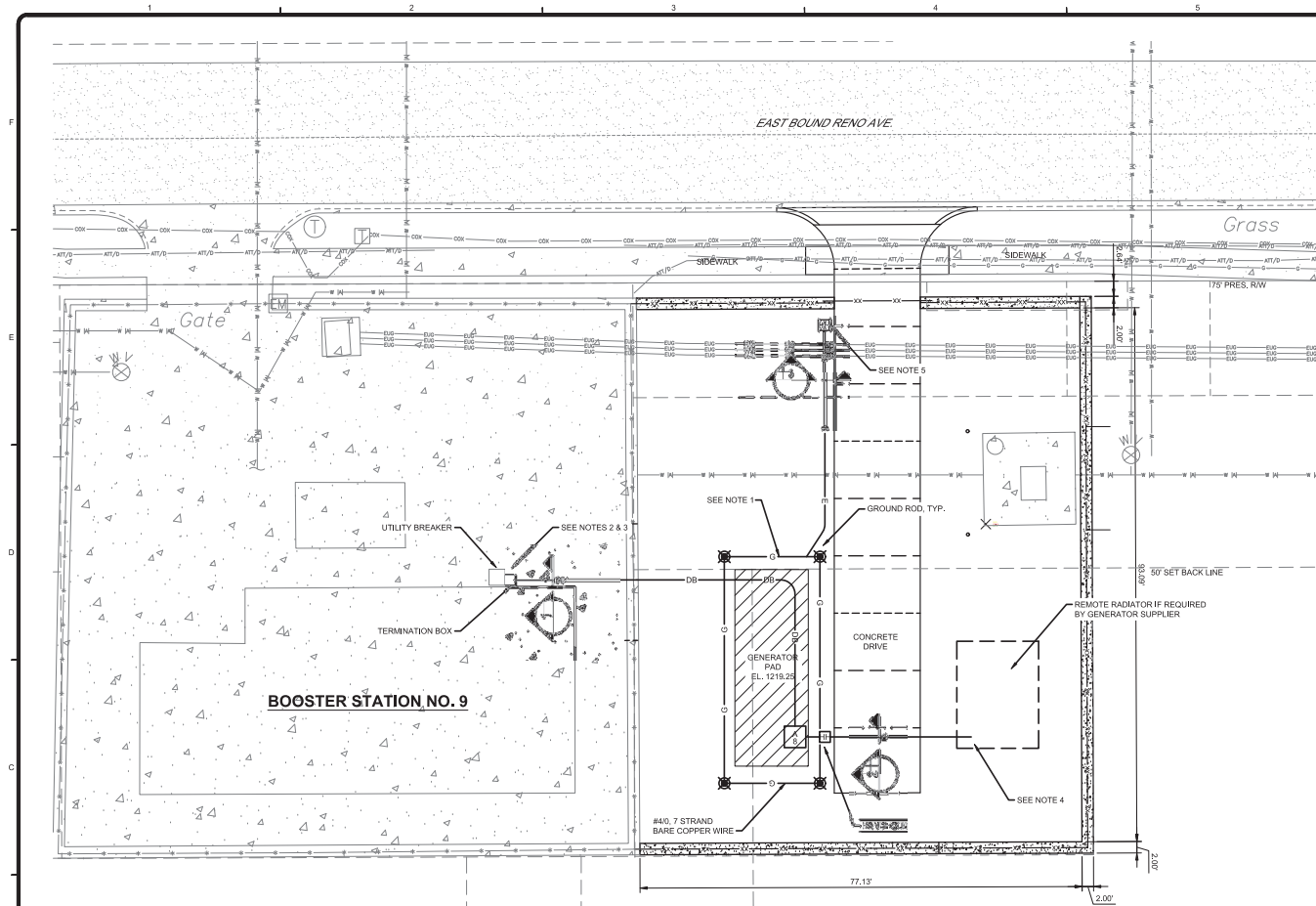
PROJ: 11352-18001  
DESIGN: JB  
DRAWN: TJ  
CHKD: JB

WC-0930  
Sheet E-002 of XX



Bar Measures 1 inch, otherwise drawing not to scale

1/21/2021 1:17:48 PM - P:\11522200-11352-1801\CAD\SETFILES\E-101 GENERATOR SITE PLAN.DWG - GUARD, STEVEN



1. 6" (3#500KCMIL, 18250)  
2. 6" (3#500KCMIL, 18250)  
3. 6" (3#500KCMIL, 18250)  
4. 6" (3#500KCMIL, 18250)  
5. 6" (3#500KCMIL, 18250)  
6. 6" (3#500KCMIL, 18250)  
7. 1" (4#10)  
8. 1" (2#14)  
9. 2" (4#10)
1. 2" (PULL LINE)  
2. 2" (PULL LINE)
1. 2" (4#10)

#### NOTES:

1. PROVIDE GROUND MAT AROUND THE EXTERIOR OF THE GENERATOR ENCLOSURE. WIRE SHALL BE A MINIMUM OF 1" OUTSIDE THE PAD EDGE. PROVIDE TWO CONNECTIONS TO THE ENCLOSURE FROM THE MAT AT OPPOSITE ENDS. PROVIDE INDIVIDUAL CONNECTIONS TO THE DUCT BANK GROUND. THE GENERATOR FEED ENCLOSURE AND LOW VOLTAGE DISTRIBUTION PANELBOARD. REFER TO GROUND MAT DETAIL FOR MORE INFORMATION.
2. DUCT BANK SHALL STUB UP UNDERNEATH THE EXISTING TERMINATION BOX. REFER TO DETAIL ON E-501 FOR FURTHER DETAILS. CONNECT DUCT BANK GROUND TO ENCLOSURE. PROVIDE 600 VOLT RATED TERMINALS AS REQUIRED. INSIDE TERMINATION BOX, TO CONNECT GENERATOR FEED WIRE TO EXISTING GENERATOR BREAKER FEED.
3. PROVIDE ACCESSORIES FOR UTILITY BREAKER TO ALLOW FOR REMOTE CONTROL AND MONITORING. REFER TO ONE-LINE FOR FURTHER CLARIFICATION.
4. CONDUIT FROM GENERATOR TO HANDHOLE AND ON TO RADIATOR SHALL BE PROVIDED IF CONTRACTOR SUPPLIED GENERATOR REQUIRES A REMOTE UNIT. THE ELECTRICAL AND MECHANICAL CONNECTION OF A REMOTE RADIATOR SHALL BE INCLUDED IN THE BID IF CONTRACTOR'S GENERATOR SUPPLIER REQUIRES IT. THERE WILL BE NO CHANGE ORDERS FOR THE ADDITION OF A REMOTE RADIATOR.
5. CONTRACTOR SHALL PROVIDE POWER FEED CONNECTION FROM HANDHOLE TO GATE ACTUATOR. PROVIDE CARD ENTRY STAND AND PRESENCE LOOPS AS REQUIRED BY SPECIFICATION. PROVIDE INTERCONNECTING CONDUIT AND WIRE PER MFR. REQUIREMENTS AND NATIONAL ELECTRICAL CODE.



www.tetrattech.com  
525 Central Park Dr., Suite 403  
Folsom, CA 95630  
PHONE: 402.606.8000 FAX: 402.606.8001

## PLAN GENERATOR SITE E-101

DATE	DESCRIPTION	BY

OKLAHOMA CITY WATER UTILITIES TRUST  
WC-0930 - WATER TRANSMISSION MAIN  
AND IMPROVEMENTS TO  
BOOSTER STATION NO. 9

PROJ: 11352-18001  
DESIGN: JB  
DRAWN: TJ  
CHKD: JB

WC-0930  
Sheet E-101 of XX

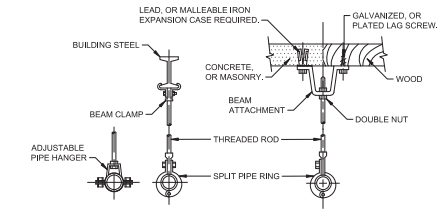


Bar Measures 1 inch, otherwise drawing not to scale

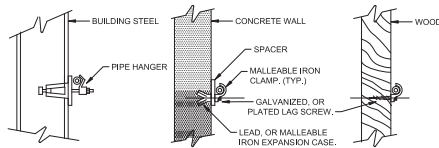




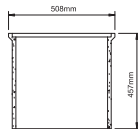
1/21/2021 1:50:42 PM - P:\11352200-11352-1800\CAD\DETAILS\E-501 DETAILS DVC - GUARD, STEVEN



**SINGLE CONDUIT HANGERS**  
NO SCALE



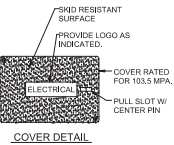
**VERTICAL AND HORIZONTAL CONDUIT RACKS AND HANGERS**  
NO SCALE



SECTION



PLAN



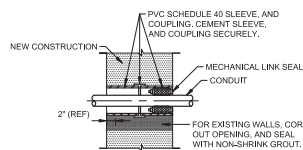
COVER DETAIL

**HANDHOLE DETAIL**

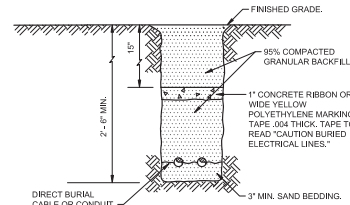
NO SCALE  
QUARTZITE COMPOSITE OR EQUAL

HANDHOLES FOR LOW VOLTAGE CABLES INSTALLED IN PARKING LOTS, SIDEWALKS, AND TURFED AREAS SHALL BE FABRICATED FROM AN AGGREGATE CONSISTING OF SAND AND WITH CONTINUOUS WOVEN GLASS STRANDS HAVING AN OVERALL COMPRESSIVE STRENGTH OF AT LEAST 80 MPA AND A FLEXURAL STRENGTH OF AT LEAST 34.5 MPA. PULLBOX AND HANDHOLE COVERS IN SIDEWALKS AND TURFED AREAS SHALL BE OF THE SAME MATERIAL AS THE BOX. CONCRETE PULLBOXES SHALL CONSIST OF PRECAST REINFORCED CONCRETE BOXES, EXTENSIONS, BASES, AND COVERS.

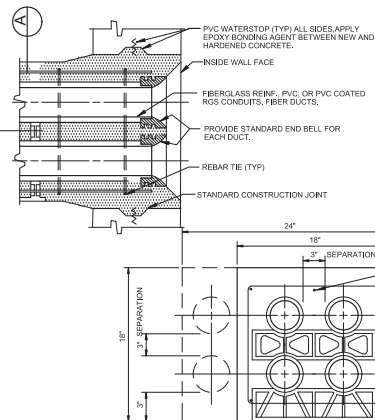
IN PAVED AREAS, FRAMES AND COVERS FOR HANDHOLE ENTRANCES IN VEHICULAR TRAFFIC AREAS SHALL BE FLUSH WITH THE FINISHED SURFACE OF THE PAVING. IN UNPAVED AREAS, THE TOP OF HANDHOLE COVERS SHALL BE APPROXIMATELY 15 MM ABOVE THE FINISHED GRADE.



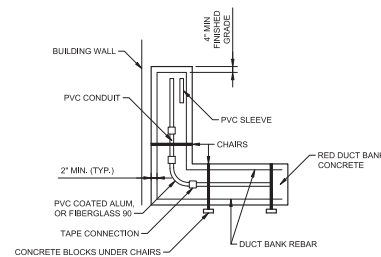
**EXTERIOR WALL CONDUIT SLEEVE DETAIL**  
NO SCALE



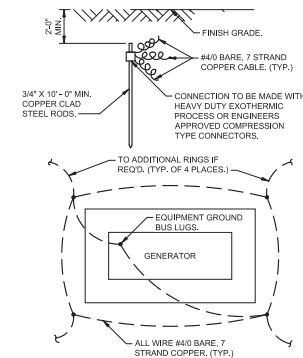
**TRENCHING DETAIL**  
NO SCALE



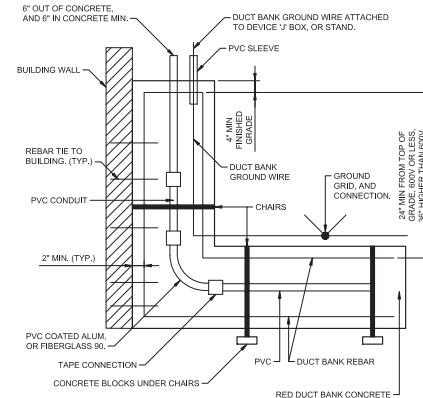
**DUCT DETAILS**  
NO SCALE



**DUCT BANK DETAIL NO STRIP**  
NO SCALE



**GROUND MAT**  
NO SCALE









## APPENDIX C – OPINION OF PROBABLE CONSTRUCTION COST

**Oklahoma City****42" Water Transmission Line and BPS 9 Improvements****WC-0930****Opinion of Probable Construction Costs**

Item	Description	Quantity	Unit	Unit Price	Base Price
<b>Pipeline</b>					
1	Color Audio/ Video Recording Pre-Construction & Post -Const. Video	1	LS	\$ 5,000.00	\$ 5,000.00
2	Stormwater management, sediment and erosion control	1	LS	\$ 30,000.00	\$ 30,000.00
3	Crushed Rock Foundations	200	CY	\$ 85.00	\$ 17,000.00
4	42" Steel Pipeline Open Cut	3,926	LF	\$ 360.00	\$ 1,413,400.00
5	42" Steel Pipeline Cathodic Protection	3,926	LF	\$ 4.00	\$ 15,800.00
6	Boring for 54-inch Steel Encasement Pipe	258	LF	\$ 1,060.00	\$ 273,500.00
7	54" Steel Pipe Encasement Min. Wall Thickness 0.438	148	LF	\$ 550.00	\$ 81,400.00
8	54" Steel Pipe Encasement Min. Wall Thickness 0.719	110	LF	\$ 550.00	\$ 60,500.00
9	42" Butterfly Valve	4	EA	\$ 75,000.00	\$ 300,000.00
10	42" x 45 Deg Bends (RJ)	11	EA	\$ 15,000.00	\$ 165,000.00
11	42" x 22.5 Deg Bends (RJ)	10	EA	\$ 10,500.00	\$ 105,000.00
12	30" Tee	1	EA	\$ 16,000.00	\$ 16,000.00
13	48" x 42" Reducer	2	EA	\$ 20,000.00	\$ 40,000.00
14	42" x 30" Reducer	2	EA	\$ 13,000.00	\$ 26,000.00
15	42" Harnessed Mechanical Coupling	3	EA	\$ 12,000.00	\$ 36,000.00
16	2" Combination Air/Vacuum valves and Vault	3	EA	\$ 15,000.00	\$ 45,000.00
17	42" Butterfly Valve Vault and Accessories Complete (includes concrete, gages, blow-offs, piping, fittings, sump pump, ladders, hatches, etc.)	4	EA	\$ 165,000.00	\$ 660,000.00
18	Connection to existing piping	5	EA	\$ 7,500.00	\$ 37,500.00
19	Dewatering	1	LS	\$ 10,000.00	\$ 10,000.00
20	Electrical Conduit, Wiring and Controls	1	LS	\$ 20,000.00	\$ 20,000.00
21	Remove and Replace Concrete Driveway/ Parking Lot	400	SY	\$ 110.00	\$ 44,000.00
22	Remove and Replace Asphalt Driveway/ Parking Lot	950	SY	\$ 85.00	\$ 80,800.00
23	Remove and Replace Street (Concrete Base, Asphalt Overlay)	380	SY	\$ 120.00	\$ 45,600.00
24	Remove and Replace Sidewalk	225	SY	\$ 75.00	\$ 16,900.00
25	Remove and Replace Concrete Curb and Gutter	425	LF	\$ 35.00	\$ 14,900.00
26	Remove and Replace Concrete Channel	35	LF	\$ 120.00	\$ 4,200.00

**Oklahoma City**  
**42" Water Transmission Line and BPS 9 Improvements**  
**WC-0930**  
**Opinion of Probable Construction Costs**

Item	Description	Quantity	Unit	Unit Price	Base Price
27	Remove and Replace 10" RCP	10	LF	\$ 75.00	\$ 800.00
28	Remove and Replace 12" RCP	50	LF	\$ 85.00	\$ 4,300.00
29	Seeding/Sodding	9697	SY	\$ 5.00	\$ 48,500.00
30	Remove and Replace Concrete Flume	9	CY	\$ 120.00	\$ 1,100.00
31	Remove and Replace Fence - Type 11 (8-FT Chain Link)	25	LF	\$ 38.00	\$ 1,000.00
32	Hydrostatic Pressure Testing, Disinfection, Dechlorination and Disposal	1	LS	\$ 25,000.00	\$ 25,000.00
33	Construction Staking and GIS As Built Survey	1	LS	\$ 25,000.00	\$ 25,000.00
34	6" Fire Hydrant Assembly	2	EA	\$ 5,000.00	\$ 10,000.00
35	Clearing and Grubbing	1	LS	\$ 20,000.00	\$ 20,000.00
36	Railroad Monitoring/Flagging	1	LS	\$ 15,000.00	\$ 15,000.00
Subtotal Pipeline					\$ 3,714,200.00
<b>Generator</b>					
37	Concrete Driveway	148	SY	90	\$ 13,400.00
38	Generator Pad	47	SY	\$ 100.00	\$ 4,700.00
39	Concrete Fence Curb	240	LF	35	\$ 8,400.00
40	8" Steel Ornamental Fence	240	LF	\$ 75.00	\$ 18,000.00
41	15' Cantilever Gate	1	EA	\$ 5,000.00	\$ 5,000.00
42	Concrete Bollard	2	EA	\$ 250.00	\$ 500.00
43	Generator and ATS	1	LS	\$ 955,000.00	\$ 955,000.00
44	Gas Service Line	100	LF	\$ 25.00	\$ 2,500.00
45	6" RMC	600	LF	\$ 126.50	\$ 75,900.00
46	2" RMC	475	LF	\$ 24.10	\$ 11,500.00
47	#500 kcmil	20	CLF	\$ 1,290.00	\$ 25,800.00
48	#250 kcmil	6	CLF	\$ 795.00	\$ 4,800.00
49	#10 AWG	16	CLF	\$ 82.50	\$ 1,400.00
50	#14 AWG	30	CLF	\$ 56.70	\$ 1,800.00
51	Trench and Ductbank	200	LF	\$ 175.00	\$ 35,000.00
52	Demolition (\$90/hr for 2 men)	80	HR	\$ 180.00	\$ 14,400.00

<b>Oklahoma City</b> <b>42" Water Transmission Line and BPS 9 Improvements</b> <b>WC-0930</b> <b>Opinion of Probable Construction Costs</b>					
Item	Description	Quantity	Unit	Unit Price	Base Price
53	SCADA Programming	1	LS	\$ 10,000.00	\$ 10,000.00
Subtotal Generator					\$ 1,188,100.00
	<b><u>Summary</u></b>				
	Pipeline Subtotal				\$ 3,714,200.00
	Generator Subtotal				\$ 1,188,100.00
	Contingency			10%	\$ 490,300.00
				<b>Total</b>	<b>\$ 5,390,000.00</b>



## APPENDIX D – POTHOLING LOCATIONS



## SIDEWINDER UTILITY LOCATORS

General Location Description:

Reno Ave & Frontier Dr

## Utility Location Information

SUL Marking Date: 10-30-20

Client: Tetra Tech

City: OKC

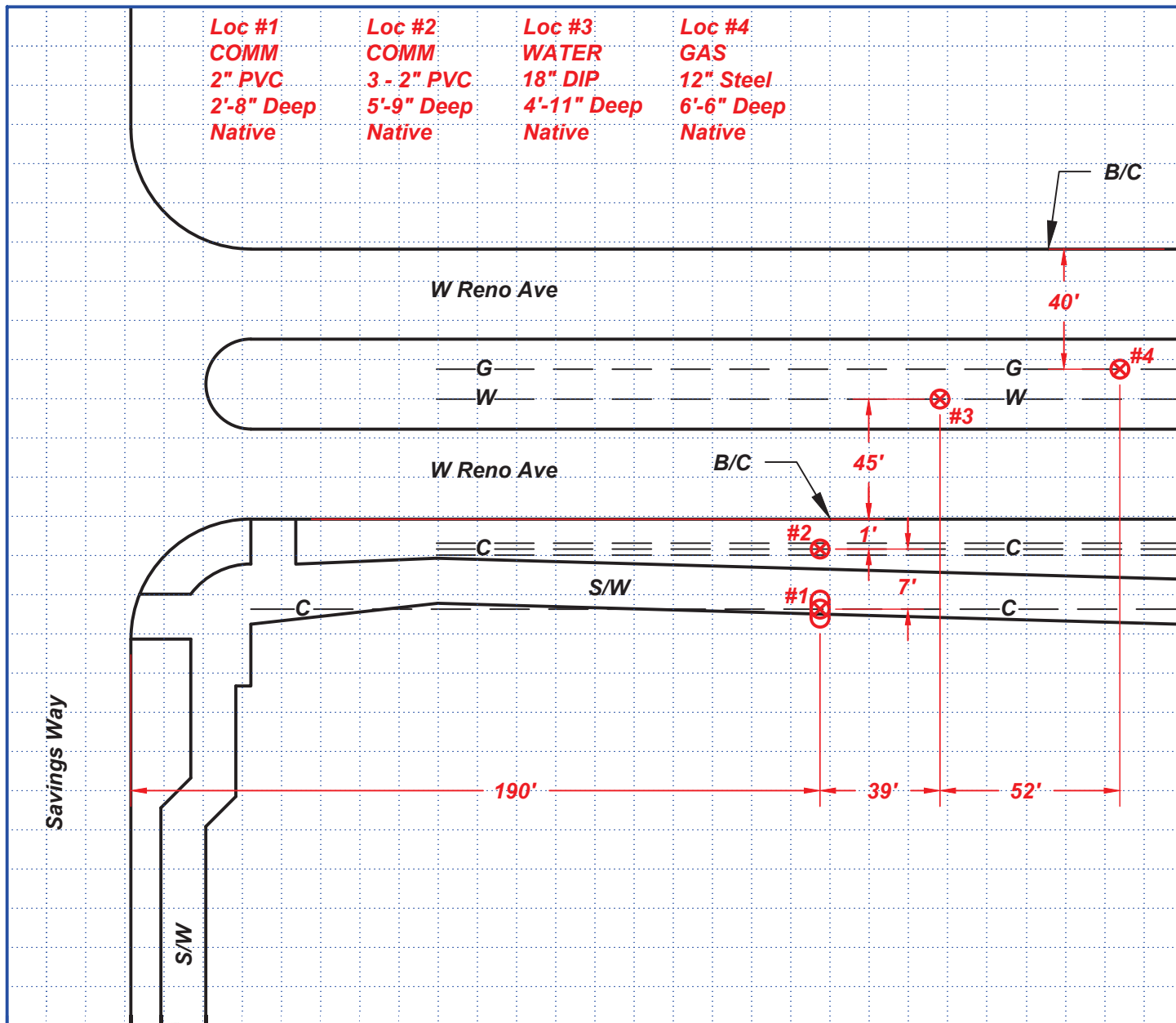
Location No. 1-4 of 12

Project No. 200-11352-18001

OKIE location Marked? ☒ Yes ☐ No ☐ Other \_\_\_\_\_

Was Utility Located? ☒ Yes ☐ No (if Yes, Show Schematic Below)

Location Schematic:



Signature

11-02-20  
Date

- ⊗ - Indicates Found Utility Location
- - Indicates Pot Hole Location
- ⊕ - Indication Probed Location up to 9' Deep

### NOTE:

1. All Utility Sizes Indicated are Approximate.
2. The pipe type listed is general based on visual from the surface.



## SIDEWINDER UTILITY LOCATORS

General Location Description:

Reno Ave & Frontier Dr

## Utility Location Information

SUL Marking Date: 10-30-20

Client: Tetra Tech

City: OKC

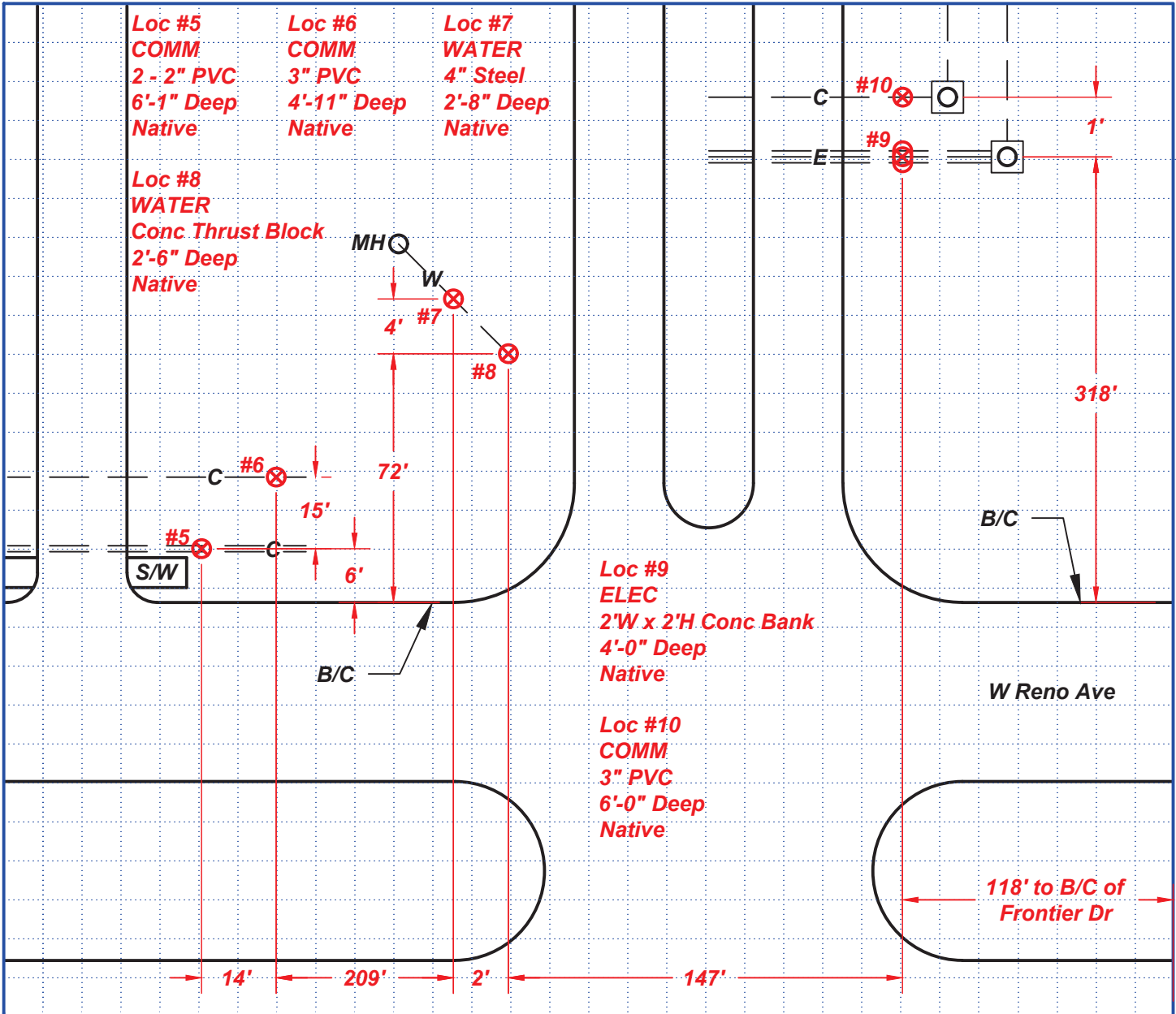
Location No. 5-10 of 12

Project No. 200-11352-18001

OKIE location Marked? ☒ Yes ☐ No ☐ Other \_\_\_\_\_

Was Utility Located? ☒ Yes ☐ No (if Yes, Show Schematic Below)

Location Schematic:



Signature

11-02-20  
Date

- ⊗ - Indicates Found Utility Location
- ⊙ - Indicates Pot Hole Location
- ⊕ - Indication Probed Location up to 9' Deep

### NOTE:

- All Utility Sizes Indicated are Approximate.
- The pipe type listed is general based on visual from the surface.



## SIDEWINDER UTILITY LOCATORS

General Location Description:

Reno Ave & Frontier Dr

## Utility Location Information

SUL Marking Date: 10-30-20

Client: Tetra Tech

City: OKC

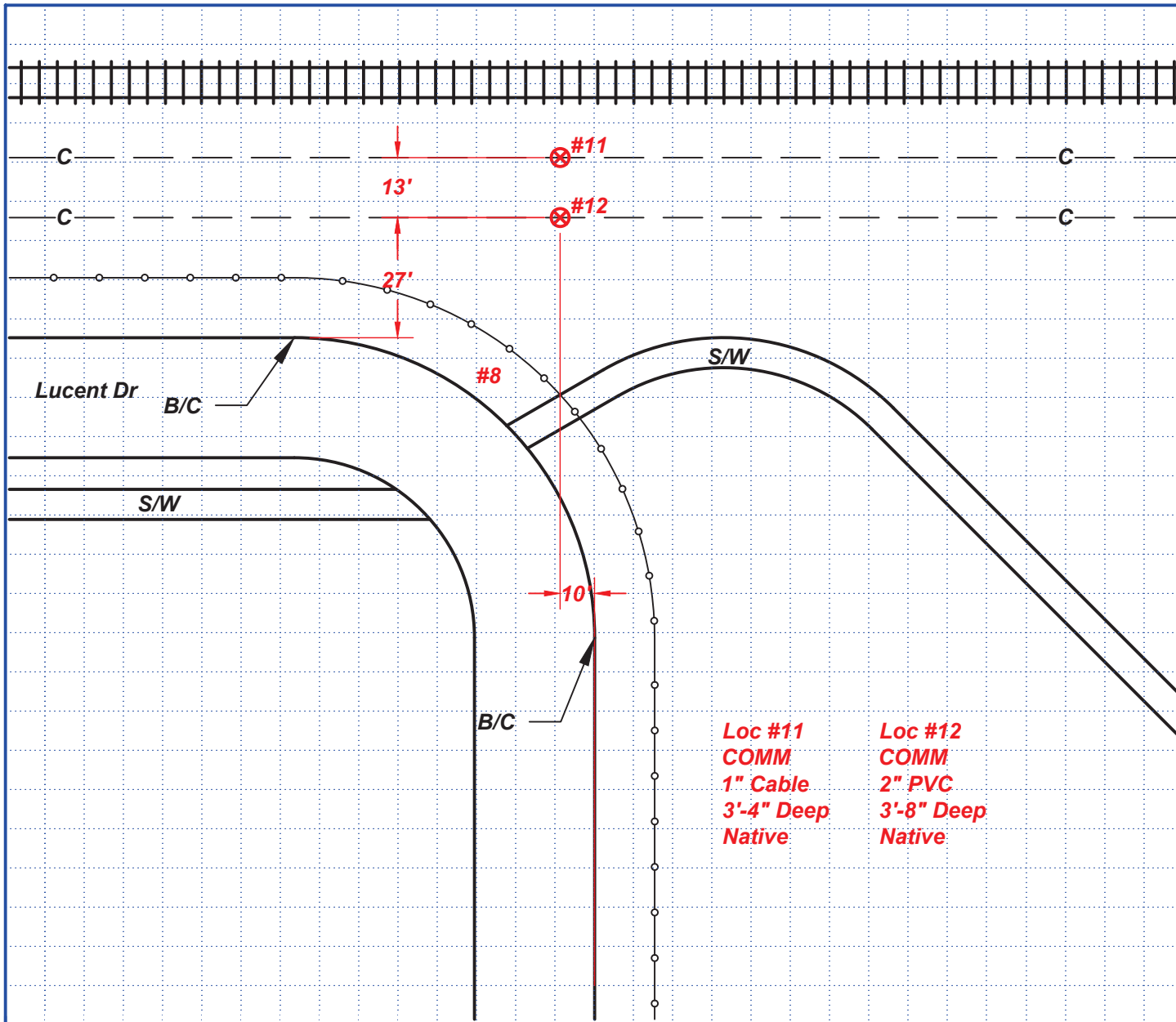
Location No. 11-12 of 12

Project No. 200-11352-18001

OKIE location Marked? ☒ Yes ☐ No ☐ Other \_\_\_\_\_

Was Utility Located? ☒ Yes ☐ No (if Yes, Show Schematic Below)

Location Schematic:



Signature

11-02-20  
Date

- ⊗ - Indicates Found Utility Location
- - Indicates Pot Hole Location
- ⊕ - Indication Probed Location up to 9' Deep

### NOTE:

- All Utility Sizes Indicated are Approximate.
- The pipe type listed is general based on visual from the surface.