

Council Meeting of October 26, 2016

Agenda Item No. 6L

REQUEST FOR COUNCIL ACTION

SUBJECT: 7000 South & 9000 South Bridges – West Jordan City Master Utility Agreement Amendment No. 1

SUMMARY: Approval of Amendment No. 1 to the West Jordan City Master Utility Agreement for City betterments with the Utah Department of Transportation defining scope of work items to be accomplished within the project.

FISCAL AND/OR

ASSET IMPACT: Funding will be from Water and Sewer Capital Funds.

STAFF RECOMMENDATION:

Staff recommends approving Amendment No. 1 to the West Jordan City Master Utility Agreement.

MOTION RECOMMENDED:

"I move to adopt Resolution No. 16-165 authorizing the Mayor to execute Amendment No. 1 to the West Jordan City Master Utility Agreement.

Roll Call vote required

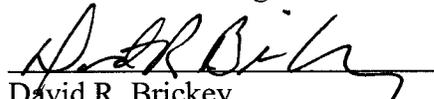
Prepared by:


David Murphy
Engineering Manager for CIP

Recommended by:


Wendell T. Rigby
Public Works Director

Reviewed as to Legal Sufficiency:


David R. Brickey
City Attorney

Recommended by:


Mark R. Palesh
City Manager

BACKGROUND DISCUSSION:

For approximately 15 months, staff has been working with UDOT on upgrades for City systems that are being triggered by work at the Bangerter Highway intersections at 7000 South and 9000 South. These are master planned projects that of necessity need to be built with the bridge projects. Specific project improvements are listed below, and budget has already been approved. This amendment further defines the work to be accomplished, and the responsible party for the cost of each improvement.

7000 South:

1. Replacement of 12 inch existing sewer line with new 24 inch PVC sewer line – City
2. New 24 inch Ductile Iron Pipe for future reuse or secondary water purposes – City

9000 South

1. Replacement of 12 inch existing sewer with new 24 inch PVC sewer line – City
2. Replacement of zone 3 to 2 PRV station – UDOT
3. Replacement of 10 inch Z1 water line with new 16 inch DIP water line – City
4. Replacement of 12 inch Z3B water with new 12 inch DIP water line – City
5. Add new 16 inch water for Z2 transmission water line – City

Further amendments may be required as the design progresses. Some additional work outside the limits of the UDOT project will be required for both the water and sewer systems to complete all modifications required. These projects will be handled under separate contract in the near future.

Attachments:

Resolution
Amendment No. 1

THE CITY OF WEST JORDAN, UTAH
A Municipal Corporation

RESOLUTION NO. 16-165

**A RESOLUTION AUTHORIZING THE MAYOR TO EXECUTE AMENDMENT
NO. 1 TO THE MASTER UTILITY BETWEEN THE UTAH DEPARTMENT OF
TRANSPORTATION AND THE CITY OF WEST JORDAN FOR THE
7000 SOUTH & 9000 SOUTH BRIDGES**

Whereas, the City Council of the City of West Jordan has reviewed Amendment No. 1 to the Master Utility Agreement between the City of West Jordan and Utah Department of Transportation (UDOT) (a copy of which is attached as **Exhibit A**) for the 7000 South & 9000 South Bridges Project; and

Whereas, the City Council of the City of West Jordan desires that the aforementioned Amendment No. 1 to the Master Utility Agreement be executed by the Mayor, and

NOW, THEREFORE, IT IS RESOLVED BY THE CITY COUNCIL OF WEST JORDAN, UTAH:

Section 1. The Mayor is hereby authorized and directed to execute Amendment No. 1 to the Master Utility Agreement between the City of West Jordan and UDOT.

Section 2. This Resolution shall take effect immediately.

Adopted by the City Council of West Jordan, Utah, this 26th day of October 2016.

Kim V. Rolfe
Mayor

ATTEST:

Melanie S. Briggs
City Recorder

Voting by the City Council	"AYE"	"NAY"
Council Member Dirk Burton	_____	_____
Council Member Jeff Haaga	_____	_____
Council Member Zach Jacob	_____	_____
Council Member Chris McConnehey	_____	_____
Council Member Chad Nichols	_____	_____
Council Member Sophie Rice	_____	_____
Mayor Kim V. Rolfe	_____	_____



**CITY OF WEST JORDAN
AMENDMENT No. 1 TO MASTER UTILITY AGREEMENT
FINANCE NUMBER 178263**

THIS MASTER UTILITY AGREEMENT AMENDMENT No. 1, made and entered into this _____ day of _____, 20____, by and between the **Utah Department of Transportation**, (“UDOT”), and the **City of West Jordan**, a Municipal Corporation of the State of Utah, (“City”) each as (“Party”) and jointly as (“Parties”).

RECITALS

WHEREAS, UDOT is preparing to request proposals for and award a design-build contract for the highway project identified as Project No. S-0154(12)11, 4 Interchanges on Bangerter Highway in Salt Lake County, Utah, (“Project”); and

WHEREAS, the Parties hereto entered in to a Master Utility Agreement, finance number 178263, dated the 12 day of September, 2016. All the terms of the Master Utility Agreement remain in full force and effect unless otherwise specified herein.

The parties hereto agree amend the Master Utility Agreement as follows:

1. Replace paragraph 3 of Section 9, Betterment Work with the following:

If the City desires to include Betterment Work in the Project at any specific location UDOT may agree to the Betterment Work providing the difference in costs between the functionally equivalent required Utility Work and the City’s desired Betterment Work that is not required by the Project shall be at the sole cost of the City and the Betterment Work can be accommodated without delaying UDOT’s Project. The Betterment Work will be addressed by separate supplemental agreement between UDOT and the City. UDOT shall adhere to requirements in Sections 6 and 7 and requirements identified in Exhibits D and E.

2. Replace Exhibit “D” with new Exhibit “D” that is incorporate by reference.



Project No. S-0154(12)11, Salt Lake County
4 Interchanges on Bangerter Highway
CITY OF WEST JORDAN
Charge ID No. 71939 PIN 12566

IN WITNESS WHEREOF, the Parties hereto have caused these presents to be executed by their duly authorized officers as of the day and year first written above.

ATTEST:

City of West Jordan

Title: _____

Title: _____

Date: _____

Date: _____

(Impress Seal)

.....

RECOMMENDED FOR APPROVAL:

**UTAH DEPARTMENT OF
TRANSPORTATION**

Title: Utility and Railroad Leader

Title: Project Director

Date: _____

Date: _____

UDOT Comptroller Office
Contract Administrator

.....



EXHIBIT D
CITY OF WEST JORDAN BETTERMENTS
7000 South and 9000 South

7000 Betterment Work

City, through its consultant, has provided concept layouts for proposed Betterment Work as shown and described below.

1. **7000 South 24-in Sewer Betterment:** Upsize existing 12-in diameter sewer to 24-in diameter sewer. Betterment Work shall include, but not limited to, piping, manholes, collars, trenching and/or boring, casing, as shown in concept drawings marked Exhibit "D-1" that is incorporated by reference.
 - a. Design the Betterment Work using the Project Manual marked Exhibit "D-1".
2. **7000 South 24-in DIP Betterment:** Work includes, but not limited to, installation of new 24-in steel casing for secondary waterline. See Exhibit "D-1".
 - a. Location of Betterment Work is between approximate Sta: 1+00 to Sta: 6+05 within 7000 South. UDOT shall work with the City to define final Betterment Work limits.
 - b. Betterment Work requirements:
 - i. Install Ductile-Iron CL-50 250psi rated.
 - ii. Work will be performed as shown on plan C-200 and C-201.

9000 South Betterments

City has requested Betterment Work as follows:

1. **9000 South 24-in Sewer Betterment:** Upsize existing 12-in diameter sewer to 24-in diameter sewer. Work shall include but not limited to piping, manholes, collars, trenching and/or boring, casing, road repair, pumping, service laterals, backfill, bedding, dumping, and material disposal.
 - a. Work will be performed from Sta, 606+90 to Sta. 614+00 within 9000 South roadway.
2. City shall install sewer from Sta. 614+00 to Sta. 620+00 for sewer system functionality prior to the Betterment Work. In the event the City is unable to install improvements, UDOT will not be obligated to perform the Betterment Work and will be entitled to reimbursement of all Betterment Work Project costs. See Exhibit "D-2" that is incorporated by reference.
3. **9000 South Waterline Replacement Betterments:** UDOT shall design and construct 3 waterline replacements
 - a. Work shall include, but not limited to piping, pipe wrap, valves, fittings, service laterals, collars, backfill, bedding, and waterline commissioning.
 - b. City requires all waterline replacement pipe be Ductile-Iron CL-52 350psi rated except as noted.
 - c. UDOT shall work with City to define final Betterment limits.



- d. Waterline replacements Betterment Work scope and location:
- i. **9000 South 10-in Waterline Replacement Betterment (upsized to 16-in)–**
 - 1. Replace existing 10-in waterline with new 16-in waterline.
 - 2. Work will be performed from Withrope Circle to existing hospital connection (Sta 607+33 to 614+00). City concept drawings are shown in Exhibit "D-3" that is incorporated by reference.
 - ii. **9000 South 12-in Waterline Replacement Betterment –**
 - 1. Replace existing 12-in waterline with new 12-in waterline.
 - 2. Work will be performed from existing City PRV vault to existing hospital connection (Sta. 607+85 to 614+00). See concept drawings shown in Exhibit "D-3."
 - iii. **9000 South 16-in Waterline Extension Betterment –**
 - 1. Extend existing 16-in waterline with new 16-in waterline.
 - 2. Replacement shall follow current 16-in alignment.
 - 3. Work shall be performed from Sta. 609+00 to Sta. 614+00. See concept drawings shown in Exhibit "D-3".

4. 9000 South West Jordan Central PRV Vault Betterment –

UDOT shall design and construct a central PRV Vault. Work shall include, but not limited to, PRV valve, piping, isolation valves, meters, gauges, couplings, pipe supports, fittings, vaults, electrical systems and cabinets, power source, vault, hatches, manholes, ladders, ventilation systems, sumps pumps, lifting equipment, backfill, trenching, bedding, existing system connections and water system commissioning.

- a. CLA-VAL pressure reducing and flow control valves as follows:
 - i. Pressure Zone 3 reduced to Zone 2 existing pipe size 10-inch:
 - 1. Size: 8-in CLA- Val 90-01 (City to identify Pilot System Specifications) with Low-Flow By-Pass
 - 2. Flow: 300 gpm – 1100 gpm
 - 3. Downstream Pressure Setting: 53 psi
 - 4. Upstream Pressure Range: Min 95 psi – Max 122 psi
- b. UDOT shall work the City to determine final location of City's PRV Vault.
- c. UDOT shall have final acceptance authority of City's PRV Betterment Work design that impacts UDOT right-of-way.
- d. City shall provide design, construction and equipment for PRV communication SCADA system.
 - i. City shall apply for a Project permit, defining scope, schedule and the City's installation contractor's contact information and insurances prior to entering the Project limits to install the PRV communication SCADA system.



Project No. S-0154(12)11, Salt Lake County
4 Interchanges on Bangerter Highway
CITY OF WEST JORDAN
Charge ID No. 71939 PIN 12566

- e. UDOT shall assist and provide information to City to receive Utah Division of Drinking Water approval.
 - i. City is responsible to obtain necessary approval from DEQ and Division of Drinking Water.

See concept drawings shown in Exhibit "D-4" that is incorporated by reference.

EXHIBIT D-1

CITY OF WEST JORDAN, UTAH

PROJECT MANUAL FOR

**CITY OF WEST JORDAN
7000 SOUTH AND BANGERTEER HIGHWAY
UTILITY BETTERMENTS**

SEPTEMBER 2016



CITY OF WEST JORDAN
8000 S. Redwood Road
West Jordan, UT 84088

EXHIBIT D-1

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Applicable APWA 2012 Sections

APWA SECTION 33 08 00; Commissioning Of Water Utilities

APWA SECTION 33 11 00; Water Distribution and Transmission

APWA SECTION 33 31 00; Sanitary Sewage Systems

PART II - APPENDICES

APPENDIX A

City of West Jordan 7000 South and Bangerter Highway Utility Betterments Drawings and Details

EXHIBIT D-1

SECTION 01 42 19 REFERENCE STANDARDS

1.01 GENERAL

- A. Titles of Sections and Paragraphs: Captions accompanying specification sections and paragraphs are for convenience of reference only, and do not form a part of the Specifications.
- B. Applicable Publications: Whenever in these specifications references are made to published specifications, codes, standards, or other requirements, it shall be understood that wherever no date is specified, only the latest specifications, standards, or requirements of the respective issuing agencies which have been published as of the date that the Work is advertised for bids, shall apply; except to the extent that said standards or requirements may be in conflict with applicable laws, ordinances, or governing codes. No requirements set forth herein or shown on the drawings shall be waived because of any provision of, or omission from, said standards or requirements.
- C. Specialists, Assignments: In certain instances, specifications test requires (or implies) that specific work is to be assigned to specialists or expert entities, who must be engaged for the performance of that work. Such assignments shall be recognized as special requirements over which the Contractor has no choice or option. These requirements shall not be interpreted so as to conflict with the enforcement of building codes and similar regulations governing the Work; also they are not intended to interfere with local union jurisdiction settlements and similar conventions. Such assignments are intended to establish which party or entity involved in a specific unit of work is recognized as "expert" for the indicated construction processes or operations. Nevertheless, the final responsibility for fulfillment of the entire set of contract requirements remains with the Contractor.

1.02 REFERENCE SPECIFICATIONS, CODES, AND STANDARDS

- A. Without limiting the general provisions of other portions of the specifications, all work specified herein shall conform to or exceed the requirements of all applicable codes and the applicable requirements of the following documents to the extent that the provisions of such documents are not in conflict with the requirements of these Specifications nor the applicable codes.
- B. References herein to codes shall mean the following listed codes, as adopted by City of West Jordan, including all addenda, modifications, amendments, or other lawful changes thereto:
 - 1. 2012 Manual of Standard Specifications, American Public Works Associations (APWA) Utah Chapter
 - 2. UDOT 2012 Standard and Supplemental Specifications For Road and Bridge Construction and Drawings
 - 3. UDOT Minimum Sampling and Testing Requirements
 - 4. 2012 International Building Code
 - 5. 2015 International Residential Code
 - 6. 2009 International Mechanical Code
 - 7. 2009 International Plumbing Code
 - 8. 2015 International Fire Code
 - 9. National Electric Code, 2014 Edition, as Published by the National Fire Protection Association

EXHIBIT D-1

(NFPA)

- C. In case of conflict between codes, reference standards, drawings and the other Contract Documents, the most stringent requirements shall govern. All conflicts shall be brought to the attention of the Engineer or Architect for clarification and directions prior to ordering or providing any materials or labor. The Contractor shall bid the most stringent requirements.
- D. Applicable Standard Specifications: The contractor shall construct the Work specified herein in accordance with the requirements of the Contract Documents and the referenced portions of those referenced codes, standards, and specifications listed herein; except, that whenever references to "Standard Specifications" are made, the provisions therein for measurement and payment shall not apply.
- E. References in the Contract Documents to "Standard Specifications" shall mean the 2012 Manual of Standard Specifications, American Public Works Associations (APWA) Utah Chapter including all current supplements, addenda, and revisions thereof; and UDOT 2012 Standard and Supplemental Specifications For Road and Bridge Construction including all current supplements, addenda, and revisions thereof.
- F. Applicable Standard Drawings: References herein to "Standard Drawings" shall mean the Standard Drawings of the City of West Jordan which drawings are hereby incorporated in and made a part of these Contract Documents; and UDOT 2012 Standard and Supplemental Drawings For Road and Bridge Construction.
- G. References herein to "OSHA Standards" shall mean Title 29, Part 1910, Occupational Safety and Health Standards, Code of Federal Regulations (OSHA), including all changes and amendments thereto.

*** END OF SECTION ***

EXHIBIT D-1

SECTION 26 42 10

CORROSION MONITORING

PART 1 GENERAL

1.01 WORK INCLUDED

- A. This section covers the work necessary to furnish and install pipe joint bonds to form an electrically continuous pipeline, insulating joints, electrical isolation, and test stations, complete.

1.02 DEFINITIONS

- A. Ferrous Metal Pipe: Any pipe made of steel or iron, or pipe containing steel or iron as a principal structural material, except reinforced concrete pipe.
- B. Foreign Owned: Any buried pipe or cable not specifically owned or operated by the Owner.
- C. Lead, Lead Wire, Joint Bonds, Pipe Connecting Wires, Cable: Insulated copper conductor; the same as wire.
- D. Electrically Continuous Pipeline: A pipeline which has a linear electrical resistance equal to or less than the sum of the resistance of the pipe plus the maximum allowable bond resistance for each joint as specified in this section.
- E. Electrical Isolation: The condition of being electrically isolated from other metallic structures (including, but not limited to, piping, reinforcement, casings, etc.) and the environment as defined in NACE Standard RP0169.

1.03 SUBMITTALS

- A. Shop Drawings: Catalog cuts and other information for products proposed for use.
- B. Quality Assurance Submittals:
 - 1. Manufacturers' Certificates of Compliance.
 - 2. Field Test Reports.

PART 2 PRODUCTS

2.01 GENERAL

- A. Like items of materials provided hereunder shall be the product of one manufacturer in order to achieve standardization for appearance, maintenance, and replacement.
- B. Materials and workmanship as specified in this section shall be installed concurrently with pipe installation. Coordinate all work specified herein with related sections.

EXHIBIT D-1

- C. The use of a manufacturer's name and model or catalog number is for establishing only the standard of quality and general configuration desired. Products of other manufacturers will be considered.

2.02 JOINT BONDS

A. Ductile or Cast Iron Pipe:

1. No. 2 AWG, stranded copper wire, HMWPE insulation, maximum 18-inches long, with formed copper sleeves on each end.
2. Welding of bond to pipe shall be with the thermite weld mold recommended by the bond manufacturer for the specified pipe diameter and wire size.

B. Flexible Coupling, Flanged Coupling Adapter, and Other Non-standard Joints:

1. Ductile Iron Pipe: No. 2 AWG wires, 24 inches long, HMWPE insulation, with two 12-inch long THHN insulated No. 12 AWG wire pigtails, as manufactured by Erico Products Inc. (Cadweld), Cleveland, OH.
2. Steel Pipe:
 - a. Solid copper strap, 1-1/4-inch wide by 1/16-inch thick, equivalent to 1/0 AWG wire, with five punched holes for thermite welding to the coupling and pipe. Strap bond shall be fabricated for the length of the coupling with sufficient additional length for 1 inch of joint movement.
 - b. Weld bonds to pipe with the thermite weld mold recommended by the bond manufacturer.
 - c. Strap bond shall be as manufactured by Erico Products, Continental Industries, or approved equal.

C. Insulated Flexible Coupling Joints:

1. Ductile Iron Pipe: No. 8 AWG HMWPE wire, 18-inch long, with one 12-inch long THHN insulated No. 12 AWG wire pigtail.
2. Steel Pipe:
 - a. Solid copper strap, 1-1/4-inch wide by 1/16-inch thick, equivalent to 1/0 AWG wire, with four punched holes for thermite welding to the coupling and pipe. Strap bond shall be fabricated for the length of the coupling with sufficient additional length for 1 inch of joint movement.
 - b. Weld bonds to pipe with the thermite weld mold recommended by the bond manufacturer.
 - c. Strap bond shall be as manufactured by Erico Products, Continental Industries, or approved equal.

2.03 TEST STATION WIRES

- A. General: Conform to applicable requirements of NEMA WC 3-80, WC 5-73, and WC 7-88.
- B. Wire: Single-conductor, No. 12 AWG or No. 8 AWG stranded copper with 600-volt TW, THWN, or THHN insulation.

EXHIBIT D-1

C. Insulation Color:

- | | |
|--------------------------------|---------------------------------------|
| 1. Pipeline Test Wires: | White |
| 2. Insulated Joints: | Green and White as shown on Drawings. |
| 3. Foreign Metallic Pipelines: | Blue (Water) and Red (Gas) |
| 4. Permanent Reference Cell: | Yellow |

2.04 TEST STATION

A. Flush Mounted:

1. Test Box: Concrete body cast with a cast iron ring, with a minimum weight of 55 pounds and minimum dimensions of 8-inch inside diameter and 12 inches long. Furnish extensions as required to penetrate concrete surfaces by 4 inches minimum. Furnish with a 12-pound cast iron lid with the letters "TS" or words "Test Station" cast into the lid.
2. Manufacturer and Products: Brooks; Models 1RT or equal.

B. Flush Mount Test Station Terminal Board:

1. Test boards for terminating pipeline test leads and other test leads inside test boxes: 5-inch by 8-inch by 1/4 inch thick micarta or glass-fiberglass.
2. Furnish terminal block with five stainless steel studs, washers, and lock washers.
3. Shop fabricated as shown on the Drawings with engrave labels on terminal board.

C. Post Mounted (Wood Post):

1. Test Box: Cast aluminum suitable for threaded mounting to a 2-inch or larger rigid galvanized conduit.
2. Terminal Block: Plastic or glass-reinforced laminate, 1/4-inch thick with seven (7) terminals. Terminal heads shall have special heads to keep them from turning or shall be easily accessible from both sides of the terminal block without requiring its removal. Terminal studs, washers, and nuts shall be stainless steel.
3. Mounting Post: 4-inch by 4-inch by 6-foot long AWPB LP-22 preservative-treated wood post.
4. Mounting Hardware: Conduit, straps, and hardware for mounting test station to the post as specified under CONDUIT, LOCKNUTS, AND STRAPS.
5. Manufacturer and Product: Testox 800 series test stations for Type T, C, F and I test stations as manufactured by Gerome Manufacturing.

2.05 PERMANENT REFERENCE ELECTRODES

A. Prepackaged Copper-Copper Sulfate Reference Electrodes:

1. Material: High impact ABS, ceramic with Moisture Retention Membrane.
2. Dimensions: 1.5" by 10.5" or 1" by 8".
3. Wire: Minimum 14 AWG stranded copper wire with yellow, 600-volt TW, THWN, or THHN insulation. The wire shall be attached to the electrode and insulated with the manufacturer's standard connection. Connection shall be stronger than the wire.

EXHIBIT D-1

4. Packaging: Furnish electrode packaged in a plastic or heavy paper bag of sufficient thickness to protect the electrode, backfill, and cloth bag during normal shipping and handling.
5. Manufacturers:
 - a. Borin Manufacturing, Stelth Series
 - b. MC Miller, IonX Permanent Reference Electrode

2.06 CONDUIT, LOCKNUTS, AND STRAPS

- A. Conduit shall be rigid galvanized steel. Locknuts, two-hole straps, and other miscellaneous hardware shall be galvanized steel.

2.07 THERMITE WELD MATERIALS

A. General:

1. Thermite weld materials consist of wire sleeves, welders, and weld cartridges according to the weld manufacturer's recommendations for each wire size and pipe or fitting size and material.
2. Welding materials and equipment shall be the product of a single manufacturer. Interchanging materials of different manufacturers is not acceptable.

B. Molds: Graphite. Ceramic "One-Shot" molds not acceptable.

C. Adapter Sleeves:

1. For No. 12 AWG and No. 2 AWG wires.
2. Prefabricated factory sleeve joint bonds or bond wires with formed sleeves made in the field are acceptable. Attach field-formed joint bonds sleeves with the appropriate size and type of hammer die furnished by the thermite weld manufacturer.
3. Extend wire conductor 1/8 inch beyond the end of the adapter sleeve.

D. Cartridges:

1. Steel: 32 grams, maximum.
2. Cast and Ductile Iron: 45 grams, maximum, XF-19 Alloy

E. Welders and Cartridges: For attaching copper wire to pipe material:

EXHIBIT D-1

Pipe Material	Weld Type	Cartridge Size, Max.
No. 4 AWG Wire & Smaller		
Steel	HA, VS, HC	25 gm
Ductile or Cast Iron	HB, VH, HE	32 gm
Wire Joint Bonds		
Steel	FS	32 gm
Ductile or Cast Iron	FC	45 gm

F. Welding Materials Manufacturers:

1. Erico Products Inc. (Cadweld), Cleveland, OH.
2. Continental Industries, Inc. (Thermo-Weld), Tulsa, OK.

2.08 COATING REPAIR MATERIAL FOR PIPE AND FITTINGS

A. General:

1. Complete coating repairs in accordance with recommendations of the pipe or fitting manufacturer.
2. Coat thermite weld connections to ductile iron pipe with fast cure epoxy or thermite weld cap.

B. Thermite Weld Caps: Prefabricated weld cap with coating and primer, if required, such as Handy Cap IP as manufactured by Royston Laboratories, Inc.

C. Epoxy Coating:

1. 100 percent solids, fast curing epoxy suitable for submerged or buried conditions.
2. Acceptable products and manufacturers or equal:
 - a. Aquata-poxy, American Chemical Corp., East Lake, OH.
 - b. Protal 7125 (low temperature) or Protal 7300, Denso North American, Houston, TX.
 - c. TC 7010, Tapecoat, Evanston, IL.

2.09 ANCILLARY MATERIALS

A. Wire Connectors: One-piece, tin-plated crimp-on ring tongue connector as manufactured by Burndy Co. or Thomas and Betts.

B. Compression Connectors:

1. For in-line, tap, and multi-splice, furnish "C" taps made of conductive wrought copper, sized to fit the wires being spliced.

EXHIBIT D-1

2. Provide crimp tool and dies as recommended by the manufacturer for the wire and connector size.
 3. Manufacturer and Product: Burndy; Type YC, or equal.
- C. Electrical Tape:
1. Linerless rubber high-voltage splicing tape and vinyl electrical tape suitable for moist and wet environments.
 2. Use Scotch 130 C and Scotch 88 as manufactured by 3M Products.
- D. Silver Brazing Alloy: Fifteen percent silver content, 1185 degrees F to 1300 degrees F melting range, ASTM B 260.

2.10 INSULATING JOINTS

- A. General: Insulating joints shall be dielectric unions, flanges, or couplings. The complete assembly shall have an ANSI rating equal to or higher than that of the joint and pipeline. All materials shall be resistant for the intended exposure, operating temperatures, and products in the pipeline.
- B. Insulating Flange Joints:
1. Complete assembly shall have an ANSI rating of 150 pounds, minimum, or equal to or higher than that of the joint and pipeline.
 2. Gasket materials shall be resistant to intended chemical exposure, operating temperatures, and pressures in the pipeline.
 3. Gaskets: Full-face Type E with O-ring seal.
 4. Insulating Sleeves: Full-length fiberglass reinforced epoxy (NEMA G-10 grade).
 5. Insulating Washers: Fiberglass reinforced epoxy (NEMA G-10 grade).]
 6. Steel Washers: Plated, hot-rolled steel, 1/8-inch thick.
 7. Manufacturers:
 - a. Pacific Seal, Inc., Burbank, CA.
 - b. Central Plastics Co., Shawnee, OK.

PART 3 EXECUTION

3.01 GENERAL

- A. All materials and equipment associated with joint bonding, test stations, insulating joints, and corrosion monitoring sensors as shown on the Drawings and specified herein shall be furnished and installed by the Contractor. Any changes in design or method of installation of an item as specified shall be reviewed by the Engineer.
- B. The Contractor shall coordinate the installation of the specified items with the General Contractor or other subcontractors on the project such that installation of the items herein specified can be completed concurrently with pipeline installation. Items not installed before backfilling of the pipe shall be installed at the Contractor's sole expense.
- C. Whenever the requirements of the Specifications or Drawings exceed those of the codes or manufacturer's instructions, the requirements of the Specifications or Drawings shall

EXHIBIT D-1

prevail. Where a larger size or better grade of material or a higher standard of workmanship is required, the most stringent requirement shall apply.

3.02 PIPE JOINT BONDING

- A. To form an electrically continuous pipeline and associated appurtenances, the joints of all buried steel and iron pipe, including vault and manhole piping and all fittings, and including all restrained joints and follower rings, shall be electrically bonded, except joints specified to be threaded, welded, or insulated.
- B. Mechanical pipe connections are not considered to provide electrical continuity. All metallic components associated with appurtenances and fittings, including follower rings and retainer glands shall be electrically bonded to the piping system.
- C. Install two (2) joint bond wires at ductile iron pipe joint that requires bonding.
- D. Electrical connection of all wires to pipe and fittings shall be by the thermite weld process.
- E. Each bonded joint shall be tested as specified under ELECTRICAL CONTINUITY TESTING, this section.

3.03 TEST STATION INSTALLATION

- A. Location
 - 1. Location of test stations shall be as shown on the Drawings. CONTRACTOR shall determine the location of the test stations based on actual site conditions and as approved by the ENGINEER.
 - 2. Test stations types shall be generally located as follows, unless otherwise specified or shown on the Drawings:
 - a. Install Type T test stations or other type test stations as required or at 1,200-foot intervals, but shall not exceed 1,500 feet.
 - b. Install a Type F test station where any metallic pipe crosses a foreign-owned metallic pipeline under cathodic protection.
 - c. Install a Type C test station at each end of cased crossings, including irrigation canals, rivers, railroad, or interstate highway, unless otherwise indicated on the Drawings.
 - d. Install a Type I test station at all insulated joints.
 - 3. Locate post-mounted test stations directly over the pipe and, where possible, at protected locations such as fences, manholes, power poles, or edges of cultivated land.
 - 4. Locate flush mounted test stations directly over the pipeline, except in areas of heavy traffic conditions. When heavy traffic conditions exist, offset the test stations to the side of the street.
- B. Style:
 - 1. Test station style shall be either flush or post mounted as shown on the Drawings and as follows:
 - 2. Post mount style test stations shall be wood, plastic, steel, or conduit style as shown on the Drawings.

EXHIBIT D-1

- a. Wood, plastic, or steel post style test stations shall be used for Type C, F, or I test stations or any other test station type which has four or more wires and for type T test stations where self support is required.
 - b. Condulet post style test station shall be used for Type T test stations where support is available in the form of fence posts, pipe marker posts, or aboveground manholes.
 3. Flush mount style test stations shall be used for all type test stations in traffic, landscaped, or areas where aesthetic requirements restrict use of aboveground facilities.
- C. Installation:
1. Post mounted test station:
 - a. Height shall be 30 to 36-inches above finish grade.
 - b. In areas with livestock, test station height shall be between 12 and 18-inches.
 2. Flush Mounted Test Stations
 - a. Place in concrete pad or sidewalk with cast iron cover as shown on Drawings.
 - b. Place concrete box on top of 3-inch base of compacted sand.
 - c. In unimproved areas provide blue "Carsonite" utility marker with yellow reflector on each side 1 foot from test box or as directed by the ENGINEER.
- D. Test Wires:
1. Wires shall be attached to the pipe as specified under WIRE CONNECTIONS, this section.
 2. Wires to foreign-owned pipelines shall be connected to the pipe by the CONTRACTOR unless the foreign pipeline owner has indicated otherwise in writing. The CONTRACTOR shall coordinate this work with the owner of the foreign pipeline.
 3. Wires shall be buried a minimum of 30 inches below finished grade. Wires shall be direct buried except when station is required to be offset to the side of a road. Offset wires shall be installed in PVC coated rigid steel conduit from the centerline of the pipeline to the back of curb or test station, whichever is least.
 4. Provide 12-inch diameter loop in wires at the pipeline connection, at each end of rigid conduit when required, and below post mounted test stations to prevent wires from being stressed or broken.
 5. Maintain sufficient slack in flush mount test wires to permit extension of terminal block 18-inches from station.
 6. Make wire connections to test station terminals with crimp-on ring tongue terminals, except where solid wire is specified.

3.04 REFERENCE ELECTRODE INSTALLATION

- A. Remove plastic or paper wrapper and place reference electrode within the pipeline trench excavation 6 inches below the centerline of the pipe in a vertical position or as required by manufacturer.
- B. Install reference cell as required by manufacturer at the locations indicated on the Drawings.
 1. Do not use lead wire in lowering reference cell.
 2. Backfill hole with select native material in 6-inch layers and hand tamp each layer around anode.

EXHIBIT D-1

3. Use only native soil for backfill; do not use sand.
4. Exercise care not to strike reference cell or lead wire with tamper.

C. Terminate reference electrode wire in test station.

3.05 WIRE CONNECTIONS

A. Thermite Weld:

1. Use thermite weld method for electrical connection of copper wire to steel, ductile, and cast iron surfaces. Observe proper safety precautions, welding procedures, thermite weld material selection, and surface preparation recommended by the welder manufacturer. Assure that the pipe or fitting wall thickness is of sufficient thickness that the thermite weld process will not damage the integrity of the pipe or fitting wall or protective lining.
2. After the weld connection has cooled, remove slag, visually inspect, and physically test wire connection by tapping with a hammer; remove and replace any defective connections.
3. On pipe and fittings with dielectric linings, make the weld connection on the shop tab provided or on a thick metal section to minimize damage to the lining and coating. After the weld is made, coat the weld with coating repair material.
4. Coat all welds and exposed wire or copper on each connection as specified, this section. If the lining is damaged by the welding, repair in accordance with the lining applicator's recommendations.

3.06 WIRE INSULATION REPAIR

- A. Splicing of wire will not be permitted except where specifically shown on the drawings and approved by the Engineer.
- B. Splices or damage to the wire insulation shall be required by spirally wrapping with two coats of high-voltage rubber splicing tape and two layers of vinyl electrical tape.
- C. Make wire splices with suitable sized compression connectors or mechanically secure and solder with rosin cored 50/50 solder.

3.07 INSULATED JOINTS

- A. Install insulated joints to electrically isolate the pipeline as shown on the Drawings.
- B. Align and install insulating joints according to the manufacturer's recommendations to avoid damaging insulating materials.
- C. After assembly of insulated flanges, prepare cement-mortar surface in accordance with paint manufacturer's instructions and apply a 20-mil minimum thickness of EPA potable water approved, 100 percent solids water or air curing epoxy coating to the interior of the pipeline. Apply coating for a minimum of two pipe diameter lengths from the insulating flange in both directions. Apply and cure coating in accordance with the manufacturer's recommendations. Do not apply coating where it will interfere with operation of pipeline valves or other pipeline assemblies.

EXHIBIT D-1

- D. Install a Type I test station at each insulated joint.
- E. The CONTRACTOR shall test each insulated joint for electrical insulation as specified this section. Defective insulating joints shall be repaired by the CONTRACTOR at his sole expense. All damaged or defective insulation parts shall be replaced.

3.08 TESTS AND INSPECTIONS

A. Electrical Continuity Testing:

1. General

- a. Furnish all necessary equipment and materials and make all electrical connections to the pipe as required to test continuity of bonded joints.
- b. Conduct a continuity test on all buried joints that are required to be bonded. Test the electrical continuity of joint bonds after the bonds are installed but before backfilling of the pipe.
- c. The Contractor shall test completed joint bonds for electrical continuity using digital low resistance ohmmeter or by the Calculated Resistance Test Method at the Contractor's option. The equipment and test procedures for the two methods are described herein.

2. Digital Low Resistance Ohmmeter Method:

- a. Required Equipment and Materials:
 - (1) One Biddle Model 247001 digital low resistance ohmmeter.
 - (2) One set of duplex helical current and potential handspikes, Biddle Model No. 241001, cable length as required.
- b. Test Procedure: Measure the resistance of joint bonds with the low resistance ohmmeter in accordance with the manufacturer's written instructions. Use the helical handspikes to contact the pipe on each side of the joint, without touching the thermite weld or the bond. The contact area shall be cleaned to bright metal by filing or grinding and without any surface rusting or oxidation. Record the measured joint bond resistance on the test form described herein. Repair any damaged pipe coating in accordance with WIRE CONNECTIONS, this section.

3. Calculated Resistance Method:

- a. Required Equipment and Materials:
 - (1) One dc ammeter (meter or clamp-on) with full-scale reading of 100 amperes and a minimum resolution of 1 ampere or a 100-ampere shunt with a voltmeter as specified herein.
 - (2) One high-resistance electronic voltmeter with a dc low range of 200 millivolts full scale to a dc high range of 20 volts full scale and capable of a minimum resolution of 1 millivolt (two voltmeters are required if a shunt is used).
 - (3) One knife switch, safety switch, or time controlled relay suitable for test current.
 - (4) Two electrical probes for the voltmeter.
 - (a) Insulated wire suitable for carrying the test current, length as required.

EXHIBIT D-1

- (b) One dc power supply with a steady capacity of 50 amperes minimum; storage batteries are not an acceptable power supply.
- b. Test Procedure:
- (1) Current wire connections shall be either tightly clamped or thermite welded to the pipe at the Contractor's option. Wire size shall be determined by the Contractor and shall be sized for the test current, and shall not exceed 1,000 feet in length.
 - (2) Apply a minimum direct current of 50 amperes.
 - (3) Measure the voltage drop across each joint with a voltmeter by contacting the pipe on each side of the joint. Voltmeter connections to the bond wire or thermite welds will not be acceptable.
 - (4) Measure the current applied to the test span and the voltage drop across the joint simultaneously.
 - (5) Record the measured voltage drop and current for each joint of the test form described herein and calculate the bond resistance in accordance with the following formula:

$$R = \frac{E}{I}$$

Where:

- R = Resistance of the joint bond.
 E = Measured voltage drop across the joint, in volts.
 I = Test current applied to the pipe test span, in amperes.

4. Joint Bond Acceptance:
- a. Joint bond resistance shall be less than or equal to the maximum allowable bond resistance values shown in Table 1.

Table 1			
Joint Type	Max. Allowable Resistance (Ohms)		
	One bond/Joint	Two Bonds/Joint	Three Bonds/Joint
No. 2 AWG wire Bonds	0.000325	0.000162	0.000081
Flexible Coupling	0.000425	0.000212	0.000115

- b. The Contractor shall replace any joint bond that exceeds the allowable resistance. Replacement joint bonds shall be retested for compliance with the specified bond resistance.
 - c. Any defective joint bond discovered during energizing and testing shall be located, excavated, repaired, and backfilled by the Contractor.
5. Test Records: Records shall be made of each bonded pipeline during the test and submitted to the Engineer. These records shall include:
- a. Description and location of the pipeline tested.

EXHIBIT D-1

- b. Starting location and direction of test.
- c. Date of test.
- d. Joint type.
- e. Test current and voltage drop across each joint and calculated bond resistance (Calculated Resistance Method only).
- f. Measured joint bond resistance (Digital Low Resistance Ohmmeter method only).

B. Final Electrical Continuity Test:

1. After the pipeline construction is completed and test stations have been installed, the Engineer shall test the completed pipeline for electrical continuity using the four-wire lineal pipe resistance test method.
2. Test will be conducted with a minimum test current of 10 amperes using a portable rectifier or dc welder.
3. An electrically continuous pipeline will be defined as a pipe or section of pipe that has a linear electrical resistance equal to or less than the sum of the lineal resistance of the pipe plus the maximum allowable joint bond resistance for each joint within the test section as specified this section.
4. Each discontinuous section of pipe shall be retested after all continuity repairs are completed to demonstrate that the pipeline is electrically continuous.

C. Electrical Discontinuity Location:

1. If electrically discontinuous sections of pipe are detected during final continuity testing, the Contractor to locate and repair electrically discontinuous joint bonds.
2. Location of discontinuous joints bonds may be performed using a test method determined by the Contractor. Regardless of test method used to locate discontinuous joints, final acceptance of discontinuous sections shall be determined by the lineal pipe resistance method.
3. After all discontinuous joints are repaired, the repaired section shall have a resistance less than or equal to the calculated allowable lineal pipe resistance as determined by the initial final continuity testing.
4. Existing joint bonds damaged during excavation of the pipe for repairs or temporary wire connection shall be repaired by the Contractor.
5. Existing test stations shall be protected from damage. When damage occurs CONTRACTOR shall complete repairs while the excavation is open. Undisclosed test station damage that requires repairs to be made after backfilling the excavation will be repaired at the Contractor sole expense.

D. Insulated Joint Testing:

1. Test each insulating joint after assembly with a GAS Electronics Model 601 insulator tester or equivalent instrument in accordance with the manufacturer's written instructions. Conduct test before burial and coating of buried insulating flanges.
2. Contractor to replace damaged or defective insulation parts identified during testing.
3. Electrical Isolation is defined as a condition of being electrically isolated from other metallic structures (including, but not limited to, other piping, concrete reinforcement, casings, and other structures not intended to be cathodically protected) and the environment as defined in NACE Recommended Practice RP0169-83.

EXHIBIT D-1

4. Engineer shall conduct additional insulating joint tests as required to ensure that insulating flanges are not electrically shorted by other equipment or incidental contact with concrete reinforcement or other equipment during energizing and testing.

END OF SECTION

EXHIBIT D-1

SECTION 33 05 05

DUCTILE IRON PIPE

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Ductile iron pipe, couplings, fittings, and joint materials.

1.02 REFERENCES

- A. American Water Works Association (AWWA)
 1. C104 Cement-Mortar Lining for Ductile-Iron Pipe and Fittings for Water.
 2. C105 Polyethylene Encasement for Ductile-Iron Pipe
 3. C110 Ductile-Iron and Gray Iron Fittings, 3 In. Through 48 In., for Water and Other Liquids.
 4. C111 Rubber-Gasket Joints for Ductile-Iron and Gray-Iron Pressure Pipe and Fittings.
 5. C115 Flanged Ductile-Iron and Gray Iron Pipe with Threaded Flanges.
 6. C150 Standard for the Thickness Design of Ductile-Iron Pipe.
 7. C151 Ductile-Iron Pipe, Centrifugally Cast in Metal Molds or Sand-Lined Molds, for Water or Other Liquids.
 8. C600 Installation of Ductile-Iron Water Mains and Their Appurtenances.

1.03 SUBMITTALS

- A. Product Data: Manufacturer's catalog data for pipe, and pipe joints.
- B. Quality Control
 1. Certificates from manufacturer evidencing compliance with AWWA standards listed herein for pipe, pipe joints, valves, valve boxes, and hydrants.
 2. Certification by nationally recognized, independent organization that components, materials, and treatment chemicals in contact with potable water conform to ANSI/NSF Standard 60 or 61, as applicable.

PART 2 PRODUCTS

2.01 CEMENT-LINED DUCTILE IRON PIPE

- A. Pipe:
 1. Design: AWWA C150.
 2. Manufacture: AWWA C151.
 3. Minimum thickness:
 - a. Buried: 24-inch Pressure Class 250.
 - b. Exposed, flanged: Class 53.
- B. Fittings:
 1. Buried: Mechanical, push-on joints, or TR Flex Restrained Joint.
 - a. AWWA C153.
 - b. AWWA C110; rated working pressure, 250 psi.
 2. Exposed: Flanged joints.
 - a. AWWA C110; rated working pressure, 250 psi.
- C. Joints:

EXHIBIT D-1

1. Buried: Mechanical, push-on, or TR Flex Restrained Joint Pipe, AWWA C111.
 2. Exposed: Flanged, AWWA C111.
 3. Gasket: Styrene butadiene rubber.
 4. Fitting joints: Type similar to that used for pipe; AWWA C110, C111, C115, or C153.
 5. Restrained joints:
 - a. Use pipe manufacturer's standard restrained joints or Series 1700 restraint harness, EBAA Iron Sales, Inc., or approved equal rated at specified test pressure for buried piping lengths shown on Drawings.
 - b. Fittings: Series 1100 bell restraints, EBAA Iron Sales, Inc., or approved equal rated at specified test pressure for buried piping lengths shown on Drawings.
 - c. Restrained joint pipe and fittings (McWane TR Flex or approved equal) may be used in lieu of mechanical restraint harness.
- D. Standard cement lining for pipe and fittings; AWWA C104.
1. Thickness: Standard thickness.
 2. Seal coat: Asphaltic material.
- E. Include gaskets, glands, bolts, and nuts required for complete installation.
- F. Mark each length of pipe with manufacturer's name and class.
- G. Exterior coating for pipe and fittings: Asphaltic coating; AWWA C151.
- H. Polyethylene encasement:
1. Linear, low-density with 8-mil thickness or high-density, cross-laminated with 4-mil thickness, tube-type, polyethylene film; AWWA C105.
 2. Color: Purple.
 3. All fittings shall be completely coated with Chevron FM Grease and shall be completely encased with 8 mil, Class C polyethylene in those areas designated by the ENGINEER, conforming to AWWA C105. All seams in the polyethylene encasement shall be taped with Polycan #900 Adhesive Tape to completely seal the seam.
- I. Buried Mechanical Joints:
1. Grease and 8-mil vinyl wrap plastic cover.
 2. Color: Purple.

2.02 UNDERGROUND WARNING TAPES

- A. Type: Purple; 6" wide, polyethylene by 5 mil thickness with no less than a 50 gauge solid aluminum foil core, for ease of locating buried pipe. Printed wording shall read "Caution - Water Line Buried Below."
- B. Bury approximately 12" directly above water main.
- C. Location: Entire length of water main except for canal crossings. Warning tape shall be as manufactured by Magnatec or approved equal.

2.03 DUCTILE IRON PIPE JOINTS

EXHIBIT D-1

- A. Ductile iron pipe shall be furnished with mechanical joints, push on, flanged joints, or TR Flex Restrained Joint as required and shall conform to the "American National Standard for Rubber-Gasket Joints for Cast Iron and Ductile Iron Pressure Pipe and Fittings" (ANSI A21.11 AWWA C111) and the "American National Standard for Flanged Cast Iron and Ductile Iron Pipe with Threaded Flanges" (ANSI A21.15 AWWA C115).

2.04 MECHANICAL-TYPE COUPLINGS

- A. Mechanical-type couplings shall be designed for a water working pressure not less than the design pressure of the pipe on which they are to be installed. Restraints shall be provided as required.

2.05 SLEEVE-TYPE COUPLINGS

- A. Sleeve-type couplings shall be provided where shown. Couplings shall be of ductile iron, without pipe stop, and shall be of sizes to fit the pipe and fittings shown. Couplings shall be the CLOW F-1014 or approved equal. Where sleeves are utilized proper anchoring shall be provided.

2.06 GASKETS AND BOLTS

- A. Except as otherwise provided, gaskets for flanged joints shall be 1/8-inch thick rubber fabric. Wherever blind flanges are shown, the gaskets shall consist of 1/8-inch thick cloth-inserted rubber sheet which shall cover the entire inside surface of the blind flange and shall be cemented to the surface of the blind flange. All buried fittings using steel bolts shall be coated with no-oxide wax and wrapped with polyethylene or as otherwise approved by the ENGINEER.

2.07 CEMENT MORTAR LINING

- A. Ductile iron pipe and fittings shall be lined with cement mortar in accordance with the requirements of the "American National Standard for Cement Mortar Lining for Cast Iron and Ductile Iron Pipe and Fittings for Water" (ANSI A21.4 AWWA C104) except that the lining thickness shall be not less than 1/8 of an inch.

2.08 THRUST RESTRAINTS

- A. All fittings shall have proper thrust restraints as noted for the type of installation required. Restraints shall be tie-rods, Megalug or approved equal, or Engineer approved anchoring devices.

EXHIBIT D-1

PART 3 EXECUTION

3.01 INSTALLATION

- A. Store, handle, join, lay, and otherwise install in accordance with pipe manufacturer's recommendations.
- B. Trench excavation and backfill: Conform to requirements of UDOT 2012 Standard and Supplemental Specifications For Road and Bridge Construction.
- C. Minimum earth cover: 4'.
- D. Clean pipe interior of foreign material before lowering into trench; keep clean at all times by securely closing open ends of pipe and fittings.
- E. Lay pipe in dry soil conditions.
- F. Handle pipe and accessories in manner to ensure delivery to trench in sound, undamaged condition; take particular care not to injure pipe coating or cement lining.
- G. Cut pipe in neat and workmanlike manner without damage to pipe.
- H. Carefully protect joint material from injury while handling and storing pipe; keep weight off joint material on spigot; use no pipe with joints deformed, gouged, or otherwise impaired.
- I. Pipe which is damaged or unsound will be rejected; before installation of ductile iron pipe, tap with light hammer to detect cracks.
- J. Use suitable fittings where grade or alignment requires offsets greater than manufacturer's recommended joint deflections. Do not exceed 50% of manufacturer's recommended joint deflection.
- K. Plug or cap and block pipe ends or fittings left for future connections. The pipe shall be plugged at the end of each work day or period of suspension.
- L. Uncover existing mains, to which connections are to be made, a sufficient time ahead of pipe laying operations to determine fittings required.
- M. Make connections between existing and new water mains with specials and fittings to suit actual conditions.
- N. Install polyethylene encasement of ductile iron pipe in accordance with AWWA C105.

EXHIBIT D-1

3.02 PRELIMINARY CLEANING AND FLUSHING

- A. CONTRACTOR shall flush the pipeline as the work progresses by a means in accordance with good practice to insure that sand, rocks, or other foreign material are not left in any of the pipeline. If possible the flushing shall be made with an open pipe end.

3.03 TESTS FOR WATER MAINS

- A. Test piping after installation in accordance with AWWA Specification C600.
- B. Test piping with relatively clean water, free from organic debris and sand or silt.
- C. Pressure test for water main:
 - 1. Pressure test: 200 psi at lowest point in test section.
 - 2. Duration of pressure test: 2 hours.
 - 3. Flush out main before test to remove air; insert taps if necessary to blow off trapped air.
 - 4. Maximum allowable pressure variation during test period: 5 psi.

- D. Leakage test for water main:
 - 1. Conduct concurrently with pressure test.
 - 2. Measure water supplied to maintain test pressure within 5 psi of test pressure by pumping from calibrated container.
 - 3. Maximum allowable leakage (L) in gallons per hour:
$$L = \frac{SD \sqrt{P}}{133,200}$$

S = length of pipe tested in feet
D = nominal pipe diameter in inches
P = average test pressure, psig
 - 4. When testing against closed metal seated gate valves, an additional leakage of 0.0078 gallons per hour per inch of nominal valve size shall be allowed.

- E. Provide test pumps, test plugs, pipe, calibrated container, and gages, and make required piping connections.
- F. Carefully examine visible joints during the time pressure is on pipe.
- G. Refit piping as needed to minimize or eliminate leakage.
- H. Locate and repair or replace defective pipe or fittings until leakage is within specified allowance.
- I. A satisfactory shutdown is one which allows the work to be accomplished (i.e. pipe installation) using drainage pumps to dewater if needed.

EXHIBIT D-1

- J. Furnish labor, material and equipment associated with construction dewatering at no additional cost to Owner.
- K. In the case of pipelines that fail to pass the leakage test, CONTRACTOR shall determine the cause of the excessive leakage, shall take corrective measures necessary to repair the leaks, and shall again test the pipelines, all at no additional cost to OWNER.
- L. The ENGINEER shall be notified at least 48 hours before the pipeline is to be tested so that he may be present during the test.

END OF SECTION

EXHIBIT D-1

SECTION 33 08 00 COMMISSIONING OF WATER UTILITIES

This specification changes a portion of APWA Standard Specification Section 33 08 00. All other provisions of the Section remain in full force and effect.

Delete articles 3.3.B, 3.8.G in Part 3.

END OF SECTION

EXHIBIT D-1

SECTION 33 11 00 WATER DISTRIBUTION AND TRANSMISSION

This specification changes a portion of APWA Standard Specification Section 33 11 00. All other provisions of the Section remain in full force and effect.

change the following articles in part 1.

1.5 SITE CONDITIONS

- D. The Contractor is to coordinate water shutdowns with City Water Department. Water valves shall only be operated by City personnel.

change the following articles in part 2.

2.3 CONCRETE

- A. Refer to UDOT Standard Specification Section 03055 Portland Cement Concrete and UDOT Supplemental Specification 03055M Portland Cement Concrete.

2.6 TAPPING SADDLES

- A. As specified in West Jordan Standard Drawing CW-105.

2.7 SERVICE CONNECTION

- A. As specified in West Jordan Standard Drawing CW-105.

2.8 ACCESSORIES

- A. Service Pipe: Provide pipe as specified in the most current edition of the City of West Jordan Water Policies, Design and Criteria Manual. See Standard Drawings CW-105 and CW-120 for more information.
- B. Service Valves and Fittings: As specified in Standard Drawing CW-105 and CW-120.
- C. Meter Settings: As specified in Standard Drawing CW-120.
- D. Corporation Stops and Angle Valves: As specified in Standard Drawing CW-105.
- E. Bypasses: Not allowed on any service installation without approval of the Engineer.

change the following articles in part 3.

3.8 INSTALLATION – SERVICE LINES

- A. Replace Existing Service Line:
 - 1. Follow AWWA C800, Utah public drinking water regulations and Utah plumbing code requirements.
 - 2. When replacing water service lines, replace lines copper lines with Type K copper pipe, and non-copper pipe with polyethylene IPS 200 PSI SIDR-7 “Blue NSF approved unless otherwise stated on the plans.

EXHIBIT D-1

3.12 BACKFILLING

B. Trenches:

1. Pipe zone backfill: Refer to detail drawings.
2. Trench backfill: Refer to detail drawings.

Delete article 3.13 in Part 3.

END OF SECTION

EXHIBIT D-1

SECTION 33 31 00 SANITARY SEWERAGE SYSTEMS

This specification changes a portion of APWA Standard Specification Section 33 31 00. All other provisions of the Section remain in full force and effect.

Replace the following articles to Part 2.

2.2 MORTAR, GROUT AND CONCRETE

- A. Portland cement mortar, stiff mortar composed of one part portland cement to two parts sand.
- B. Non-shrink grout, use non-shrink grout according to ASTM C 1107.
- C. Concrete:
 - 1. Cast-in-place: 4,000 psi, UDOT Standard Specification Section 03055 Portland Cement Concrete and UDOT Supplemental Specification Section 03055M Portland Cement Concrete.
 - 2. Precast concrete: 5,000 psi, UDOT Standard Specification Section 03055 Portland Cement Concrete and UDOT Supplemental Specification Section 03055M Portland Cement Concrete.

2.3 MANHOLES

- D. Frame and Cover: Scoriated, asphalt coated, heavy duty, ductile iron UDOT Standard Specification Section 02635, with flat top and appropriate utility lettering. Shape, size and lifting device as necessary.
- E. Pipe Connectors:
 - 2. Cast in Place or Connections to Existing Fixture with Plastic Pipe: Use rubber adapter gasket for precast sections. Grout, use non-shrink grout according to ASTM C 1107 for cast in place sections.

Replace the following articles to Part 3.

3.1 PREPARATION

- B. Hand trim excavations to required elevations. Backfill over excavations and compact, UDOT Standard Specification Section 02056 Embankment, Borrow, and Backfill; and UDOT Supplemental Specification Section 02056M Embankment, Borrow, and Backfill.

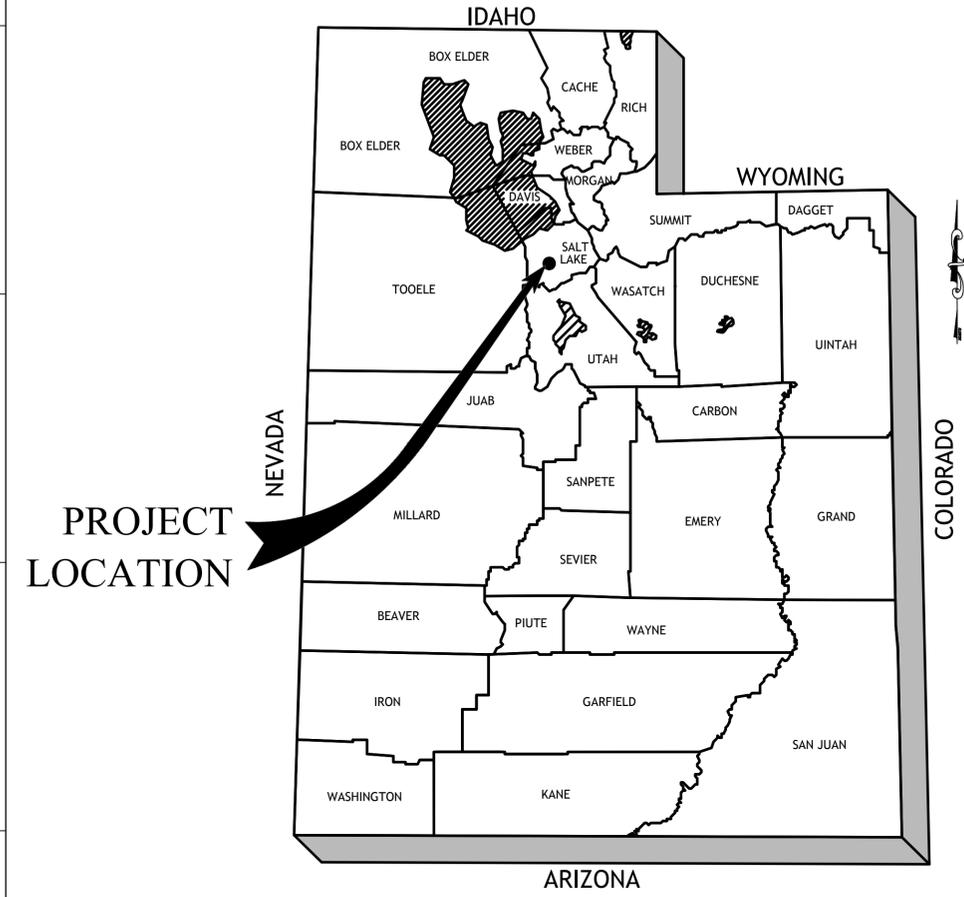
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7000 SOUTH AND BANGERTER HIGHWAY UTILITY BETTERMENTS

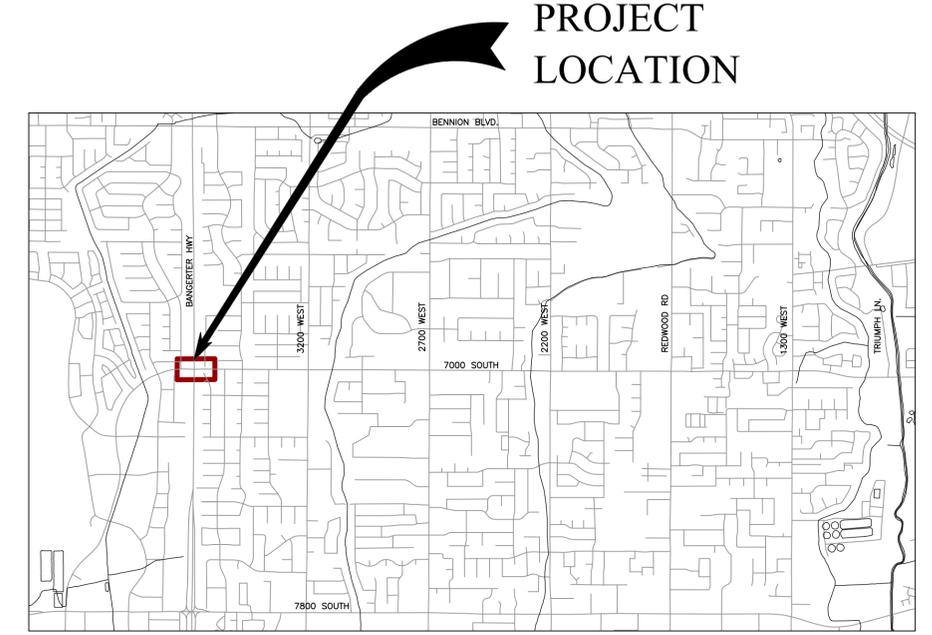
ISSUED FOR REVIEW



DRAFT



LOCATION MAP
N.T.S



VICINITY MAP
N.T.S

INDEX OF DRAWINGS

SHEET NO.	DWG. NO.	DESCRIPTION
1	G-001	PROJECT LOCATION AND SHEET INDEX
2	G-002	LEGEND
3	G-003	GENERAL NOTES
4	C-100	PLAN AND PROFILE - SANITARY SEWER SHEET 1
5	C-200	PLAN AND PROFILE - SECONDARY WATER SHEET 1
6	C-201	PLAN AND PROFILE - SECONDARY WATER SHEET 2
7	C-610	SANITARY SEWER DETAIL SHEET 1
8	C-611	SANITARY SEWER DETAIL SHEET 2
9	C-620	SECONDARY WATER DETAIL SHEET 1
10	C-621	SECONDARY WATER DETAIL SHEET 2

B	ISSUED FOR RFP	AKF	GST	DWJ	09/08/16
A	ISSUED FOR REVIEW	AKF	GST	DWJ	07/07/16
NO.	REVISIONS	DSGN	CHKD	APVD	DATE

**PRELIMINARY
NOT FOR
CONSTRUCTION**

383 West Vine Street, Suite 400, Murray, Utah 84123
www.stanleyconsultants.com

CITY OF WEST JORDAN
7000 SOUTH UTILITY BETTERMENTS
PROJECT LOCATION AND SHEET INDEX

DESIGNED	AKF/JDU	SCALE:	AS SHOWN
DRAWN	IL	NO.	
CHECKED	GST	REV.	
APPROVED	GST		
APPROVED	DWJ	G-001	B
DATE	7/5/16		

EXHIBIT D-1

SYMBOL LEGEND		
DESCRIPTION	EXIST.	PROP.
SANITARY SEWER		
SANITARY SEWER MANHOLE		
STORM SEWER MANHOLE		
STORM DRAIN		
CATCH BASIN		
DROP INLET		
STORM DRAIN		
COMMUNICATION		
TELE. PEDESTAL		
TV PEDESTAL		
CABLE TV		
DOMESTIC WATER		
FIRE HYDRANT		
WATER MANHOLE		
WATER METER		
WATER VALVE		
ELECTRIC		
ELEC. MANHOLE		
JUNCTION BOX		
ELEC. TRANS.		
GUY WIRE		
LIGHT POLE		
POWER POLE		
SIGNALS		
SIGNAL CONTROLLER		
SIGNAL POLE		
MANHOLES		
MANHOLE		
NATURAL GAS		
GAS VALVE		
GAS MANHOLE		
SITE		
SIGN		

DESCRIPTION	EXIST.	PROP.
SURVEY		
CAP		
CTRL PT		

LINE LEGEND		
DESCRIPTION	EXIST.	PROP.
STORM DRAIN		
MIDVALE STORM DRAIN		
UDOT STORM DRAIN		
SANITARY SEWER		
MIDVALE SANITARY SEWER		
WATER		
IRRIGATION		
NATURAL GAS		
HIGH PRESSURE NATURAL GAS		
OVERHEAD POWER		
UNDERGROUND POWER		
POWER		
TELEPHONE		
FIBER OPTIC		
CABLE TELEVISION		
FENCE		
MAJOR CONTOUR		
MINOR CONTOUR		
PROPERTY LINE		
RIGHT OF WAY		
SECTION LINES		
QUARTER SECTION LINES		
CURB AND GUTTER		
ROAD CENTERLINE		

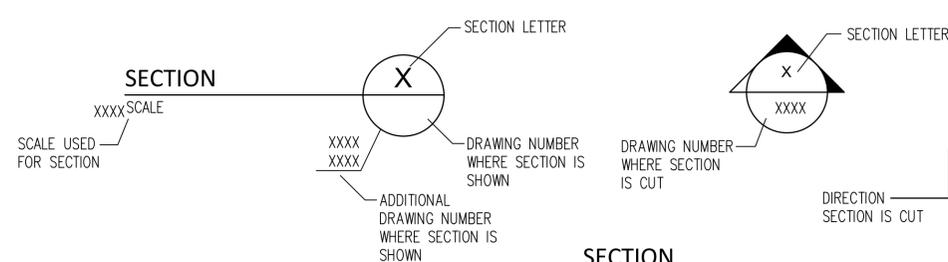
ABBREVIATIONS	
ABBREV.	TERM
A	GRADE CHANGE
ALUM	ALUMINUM
ASSY	ASSEMBLY
Z	ANGLE
@	AT (MEASUREMENTS)
BC	BEGINNING OF CURVE
BFS	BEGIN FULL SUPER
BLDG	BUILDING
B.M.	BENCH MARK
BNC	BEGIN NORMAL CROWN
BNS	BEGIN NORMAL SHOULDER
BOA	BEGINNING OF ALIGNMENT
BP	ALIGNMENT BEGINNING
BREAK	GRADE BREAK
BSC	BITUMINOUS SURFACE COURSE
BSW	BACK OF SIDEWALK
BVC	BEGIN VERTICAL CURVE
BVCE	BVC ELEVATION
BVCS	BVC STATION
BVP	PROFILE START
B.W.	BOTH WAYS
C	CHANNEL (STRUCTURAL)
CJ	CONTROL JOINT
CL	CENTER LINE
CLR	CLEARANCE
CMP	CORRUGATED METAL PIPE
CO	CLEANOUT
CONC	CONCRETE
CONT	CONTINUOUS
CPLG	COUPLING
CS	CURVE-SPIRAL INTERSECT
CS_LRB	COMPOUND SPIRAL LARGE RADIUS AT BEGINNING
CS_LRE	COMPOUND SPIRAL LARGE RADIUS AT END
CS_SRB	COMPOUND SPIRAL SMALL RADIUS AT BEGINNING
CS_SRE	COMPOUND SPIRAL SMALL RADIUS AT END
CTR	CENTER
CU FT	CUBIC FEET
CU YD	CUBIC YARD
DEG OR °	DEGREE
DET	DETAIL
DIA OR Ø	DIAMETER
D.I.P.	DUCTILE IRON PIPE

ABBREVIATIONS	
ABBREV.	TERM
DIST	DISTRIBUTION
DWG	DRAWING
EA	EACH
EC	END OF CURVE
EFS	END FULL SUPER
ELB	ELBOW
ELEV OR EL.	ELEVATION
ENC	END NORMAL CROWN
ENS	END NORMAL SHOULDER
EOA	END OF ALIGNMENT
EP	ALIGNMENT END
EVP	PROFILE END
E.W.	EACH WAY
EXIST	EXISTING
EVC	END VERTICAL CURVE
EVCE	EVC ELEVATION
EVCS	EVC STATION
FF	FINISH FLOOR
FG	FINISH GRADE
FH	FIRE HYDRANT
FL	FLOW LINE
FLG	FLANGE
FT OR '	FEET
FTG	FOOTING
GALV	GALVANIZED
GB	GRADE BREAK
GV	GATE VALVE
HORIZ	HORIZONTAL
HP	HIGH POINT
ID	INSIDE DIAMETER
IE	INVERT ELEVATION
IN. OR "	INCH
INV.	INVERT
K	CURVE COEFFICIENT
L	LEFT
LB	LINE BEGINNING
LB OR #	POUND
LC	LEVEL CROWN
LE	LINE END
LF	LINEAL FEET
LN	LINEAL
LP	LOW POINT
LSM	LOW SHOULDER MATCH
MAN	MANUAL
MAX	MAXIMUM
MIN	MINIMUM
NO. OR #	NUMBER

ABBREVIATIONS	
ABBREV.	TERM
OVERALL HP	OVERALL HIGH POINT
OVERALL LP	OVERALL LOW POINT
PC	POINT OF CURVATURE
PCC	POINT OF COMPOUND CURVATURE
PE	POLYETHYLENE
PI	TANGENT-TANGENT INTERSECT
PL OR R	PLATE OR PROPERTY LINE
PRC	POINT OF REVERSE CURVATURE
PT	END OF CURVE
PVC	POLYVINYL-CHLORIDE
PVI	POINT OF VERTICAL INTERSECTION
R	RADIUS OR RIGHT
R&R	REMOVE & REPLACE
RC	REVERSE CROWN
REM	REMOVE
REQ'D	REQUIRED
REV	REVISION
R/W	RIGHT-OF-WAY
S	SLOPE
SBO	SHOULDER BREAKOVER
SC	SPIRAL-CURVE INTERSECT
SPI	REVERSE SPIRAL INTERSECT
SPEC	SPECIFICATION
SS_LRB	SIMPLE SPIRAL LARGE RADIUS AT BEGINNING
SS_LRE	SIMPLE SPIRAL LARGE RADIUS AT END
SS_SRB	SIMPLE SPIRAL SMALL RADIUS AT BEGINNING
SS_SRE	SIMPLE SPIRAL SMALL RADIUS AT END
ST	SPIRAL-TANGENT INTERSECT
STA	STATION
STD	STANDARD
STL	STEEL
ST STL	STAINLESS STEEL
SS	SPIRAL-SPIRAL INTERSECT
TBC	TOP BACK OF CURB

ABBREVIATIONS	
ABBREV.	TERM
TFC	TOP FACE OF CONCRETE
TOB	TOP OF BEAM
TOC	TOP OF CONCRETE
TOF	TOP OF FOOTING
TOP	TOP OF PIPE
TOW	TOP OF WALL
TS	TANGENT-SPIRAL INTERSECT
TYP	TYPICAL
UDOT	UTAH DEPARTMENT OF TRANSPORTATION
VCC	VERTICAL COMPOUND CURVE
VCCE	VCC ELEVATION
VCCS	VCC STATION
VRC	VERTICAL REVERSE CURVE
VRCE	VRC ELEVATION
VRCS	VRC STATION
W/	WITH
W/O	WITHOUT
W/REQ'D	WHERE REQUIRED

VIEW MARKERS



B	ISSUED FOR RFP	AKF	GST	DWJ	09/08/16
A	ISSUED FOR REVIEW	AKF	GST	DWJ	07/07/16
NO.	REVISIONS	DSGN	CHKD	APVD	DATE

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CITY OF WEST JORDAN
7000 SOUTH UTILITY BETTERMENTS

LEGEND SHEET

DESIGNED	AKF/JDU	SCALE:	AS SHOWN
DRAWN	IL	NO.	G-002
CHECKED	GST	REV.	B
APPROVED	GST		
APPROVED	DWJ		
DATE	7/5/16		

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CADD DS-R4

EXHIBIT D-1

GENERAL NOTES

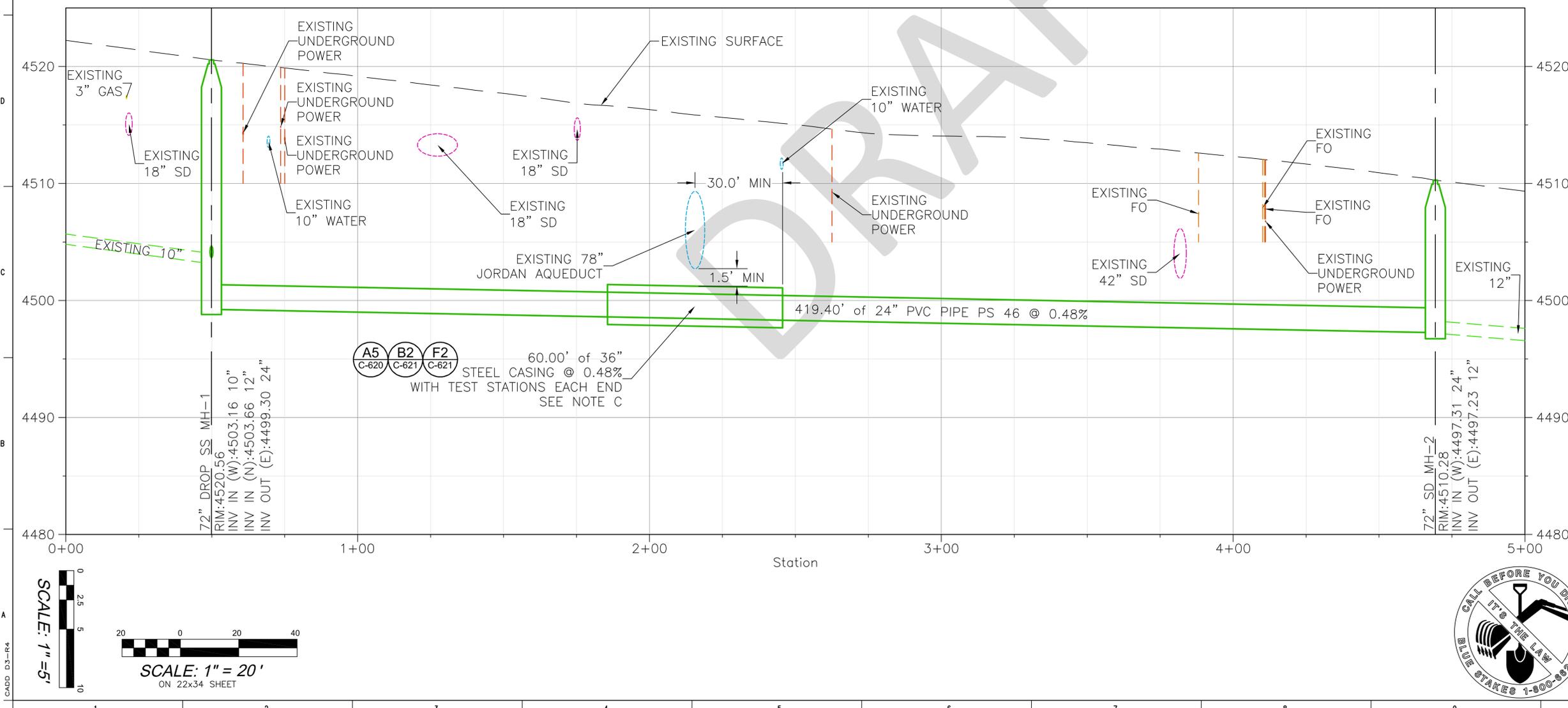
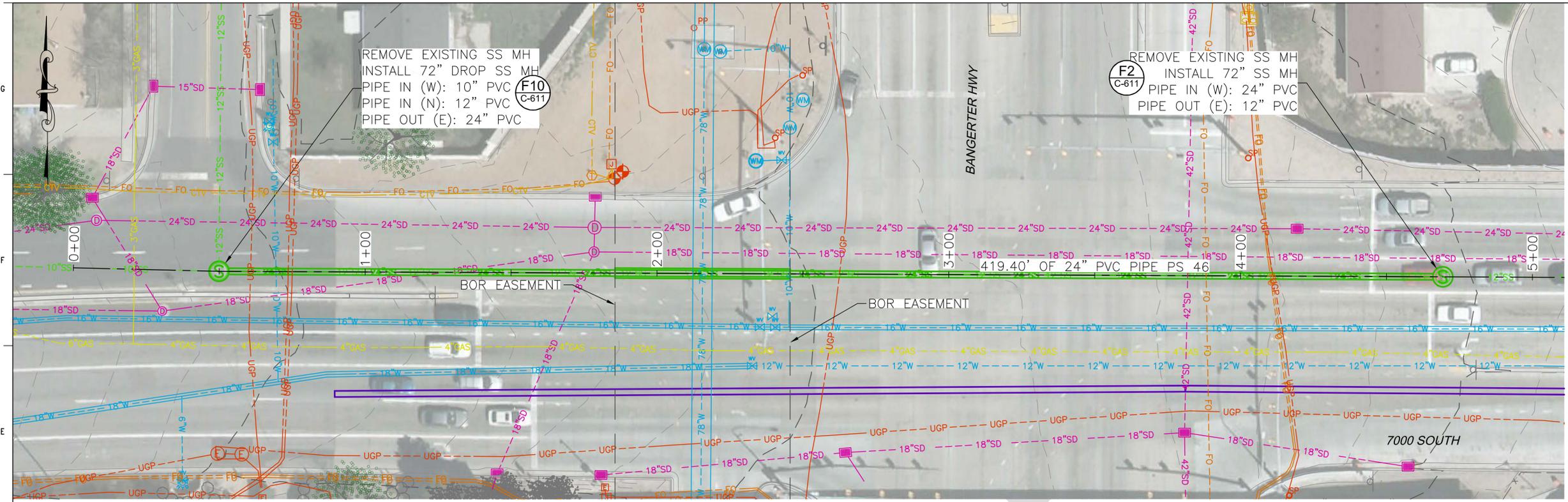
1. SYMBOLS FOR STRUCTURES, PIPE, ETC. USED FOR IDENTIFICATION ARE SHOWN IN LEGENDS AND SHALL BE FOLLOWED THROUGHOUT THE PLANS WHERE APPLICABLE. NOT ALL COMPONENTS FOUND IN SAID LEGENDS ARE NECESSARILY USED IN THE PROJECT.
2. THE SIZE OF THE ORIGINAL PLOTTED DRAWINGS ARE 22"x34". THEREFORE CARE SHOULD BE TAKEN TO REVIEW AND VERIFY THE SCALE BAR TO ADEQUATELY DETERMINE THE SCALE OF THE REDUCED REPRODUCTIONS.
3. KNOWN SEWER MAINS, WATER MAINS, GAS MAINS, STORM DRAINS, IRRIGATION LINES, TELEPHONE CONDUITS, ELECTRIC CABLES AND OTHER UNDERGROUND STRUCTURES ARE SHOWN ON THE DRAWING ONLY TO THE EXTENT SUCH INFORMATION HAS BEEN MADE AVAILABLE TO OR DISCOVERED BY THE ENGINEER. IT IS EXPECTED THAT THERE MAY BE DISCREPANCIES AND OMISSIONS IN THE LOCATION AND QUANTITIES OF THE UTILITIES AND STRUCTURES SHOWN. THIS INFORMATION IS SHOWN FOR THE CONVENIENCE OF THE CONTRACTOR BUT IS NOT GUARANTEED TO BE EITHER CORRECT OR COMPLETE, AND ALL RESPONSIBILITY FOR THE ACCURACY AND COMPLETENESS THEREOF IS EXPRESSLY DISCLAIMED. THE CONTRACTOR SHALL MAKE SUCH INVESTIGATION, AS HE THINKS NECESSARY TO VERIFY ITS CORRECTNESS AND COMPLETENESS. THE CONTRACTOR SHALL, AHEAD OF THE EXCAVATOR, LOCATE UNDERGROUND UTILITIES AND STRUCTURES SO THAT THEY WILL NOT BE ACCIDENTALLY CUT OR DAMAGED BY HIS CONSTRUCTION OPERATION, AND SO THAT THE GRADE OF THE PIPE CAN BE ADJUSTED.
4. NOTIFY "BLUESTAKES" AT 1(800) 662-4111 PRIOR TO ANY EXCAVATION. THE LOCATIONS OF EXISTING UNDERGROUND UTILITIES SHOWN IN THE DRAWINGS ARE APPROXIMATE. DETERMINE THE EXACT LOCATION OF ALL EXISTING UTILITIES BY POTHOLING IN ADVANCE OF TRENCHING OPERATIONS. NOTIFY THE OWNER'S AUTHORIZED REPRESENTATIVE OF ANY POTHOLED UTILITIES IN CONFLICT WITH PROPOSED CONSTRUCTION IN ADVANCE OF CONSTRUCTION OPERATIONS.
5. CONTRACTOR WILL BE RESPONSIBLE FOR CORRECTING ANY SETTLEMENT OF OR DAMAGE TO EXISTING UTILITIES.
6. CONTRACTOR WILL BE RESPONSIBLE FOR ANY DAMAGE TO AND REPAIR OF ADJACENT SURFACE IMPROVEMENTS OR FACILITIES DURING CONSTRUCTION.
7. CONTRACTOR IS RESPONSIBLE TO FURNISH ALL MATERIALS NECESSARY TO COMPLETE THE PROJECT.
8. DEFLECTION OF PIPE SHALL BE KEPT UNDER 50% OF THE PIPE MANUFACTURE'S ALLOWABLE DEFLECTION.
9. EXCAVATION LIMITS SHOWN ARE FOR GRAPHICAL REPRESENTATION ONLY AND DO NOT REPRESENT ACTUAL EXCAVATION LIMITS OR SAFE TRENCH CONDITIONS REQUIRED TO COMPLETE THE WORK. CONTRACTOR IS SOLELY RESPONSIBLE FOR CONFORMANCE WITH LOCAL AND FEDERAL CODES GOVERNING SHORING AND BRACING OF EXCAVATIONS AND TRENCHES. CONTRACTOR IS RESPONSIBLE FOR THE SAFETY AND PROTECTION OF PERSONNEL AND WORKERS.
10. ONLY CITY OF WEST JORDAN INFRASTRUCTURE MAINTENANCE AND OPERATIONS DEPARTMENT PERSONNEL ARE TO OPERATE CULINARY WATER SYSTEM VALVES.
11. LAY PIPE TO UNIFORM GRADE BETWEEN INDICATED ELEVATION POINTS ALONG HORIZONTAL ALIGNMENT AS DEFINED IN THESE DRAWINGS. CONTRACTOR SHALL NOT DEVIATE FROM PROPOSED ALIGNMENT WITHOUT A WRITTEN APPROVAL BY THE CONSTRUCTION MANAGER.
12. ALL LENGTHS OF SANITARY SEWER ARE MEASURED INSIDE FACE TO INSIDE FACE.

DRAFT

B	ISSUED FOR RFP	AKF	GST	DWJ	09/08/16		
A	ISSUED FOR REVIEW	AKF	GST	DWJ	07/07/16		
NO.	REVISIONS	DSGN	CHKD	APVD	DATE		
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CITY OF WEST JORDAN 7000 SOUTH UTILITY BETTERMENTS							
GENERAL NOTES							
DESIGNED	AKF/JDU	SCALE:		AS SHOWN			
DRAWN	IL	NO.		REV.			
CHECKED	GST	G-003		B			
APPROVED	GST						
APPROVED	DWJ						
DATE	7/5/16						
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CADD D3-R4

EXHIBIT D-1



- NOTES:**
- A. ESTIMATED MAXIMUM SANITARY SEWER FLOW WITHIN THE EXISTING 12" SEWER PIPE AT BANGERTEER HIGHWAY AND 7000 SOUTH IS 0.55 CFS. CONTRACTOR TO FIELD VERIFY.
 - B. FLOW CONTROL:
 - a. CONTRACTOR SHALL PROVIDE BYPASS OF FLOW OF SEWAGE AROUND SECTIONS OF PIPE TO BE INSTALLED AND OR REMOVED.
 - b. CONTRACTOR SHALL PROVIDE MEANS AND EQUIPMENT FOR FLOW CONTROL OR PUMPING DURING CONSTRUCTION. CONTRACTOR SHALL BE RESPONSIBLE FOR DAMAGES TO PROPERTY DUE TO SEWER BACKUP WHILE CONTROLLING SEWAGE FLOW.
 - c. CONTRACTOR SHALL FURNISH PUMPING EQUIPMENT, CONDUITS, ETC. UNDER NO CIRCUMSTANCES SHALL BYPASSING OF UNTREATED WASTEWATER TO STORM DRAINAGE FACILITY OR SURFACE WATER COURSE BE ALLOWED.
 - d. SEWER FLOW CONTROL OPERATIONS SHALL NOT CAUSE FLOODING OR DAMAGE TO PUBLIC OR PRIVATE PROPERTY. SEWAGE FLOW DIVERTED SHALL BE DISCHARGED BACK INTO SANITARY SEWER SYSTEM.
 - e. CONTRACTOR SHALL PROVIDE BYPASS PUMPING PLAN FOR FLOW DIVERSION TO CITY OF WEST JORDAN FOR REVIEW PRIOR TO CONSTRUCTION OF SANITARY SEWER IMPROVEMENTS. INDICATE SEQUENCE OF DIVERSION OPERATIONS, TEMPORARY PLUGS, SILENCED BYPASS PUMPING SYSTEMS, TEMPORARY VEHICLE AND PEDESTRIAN BYPASS, AND SITE REINSTATEMENT AFTER DIVERSION.
 - f. CONTRACTOR SHALL PROVIDE FOR BYPASSING PIPE FLOWS AND LATERAL FLOWS. STANDBY PUMPING CAPACITY FOR 125 PERCENT FLOW IS REQUIRED AT ALL TIMES.
 - C. PROVIDE TEST STATIONS AT EACH END OF SEWER CASING AS PER DETAIL F2 ON SHEET C-621. DESIGN BUILD CONTRACTOR TO FIELD LOCATE TEST STATION AND VERIFY WITH CITY OF WEST JORDAN.

B	ISSUED FOR RFP	AKF	GST	DWJ	09/08/16
A	ISSUED FOR REVIEW	AKF	GST	DWJ	07/07/16
NO.	REVISIONS	DSGN	CHKD	APVD	DATE

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**CITY OF WEST JORDAN
7000 SOUTH UTILITY BETTERMENTS**

**PLAN AND PROFILE
SANITARY SEWER SHEET 1**

DESIGNED: AKF	SCALE: AS SHOWN
DRAWN: AKF	NO.
CHECKED: GST	REV.
APPROVED: GST	C-100
APPROVED: DWJ	B
DATE: 6/16/16	

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 CADD D3-F4

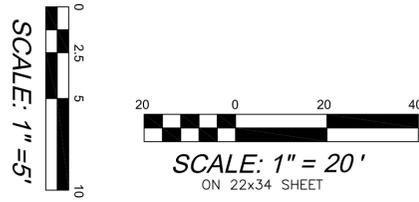
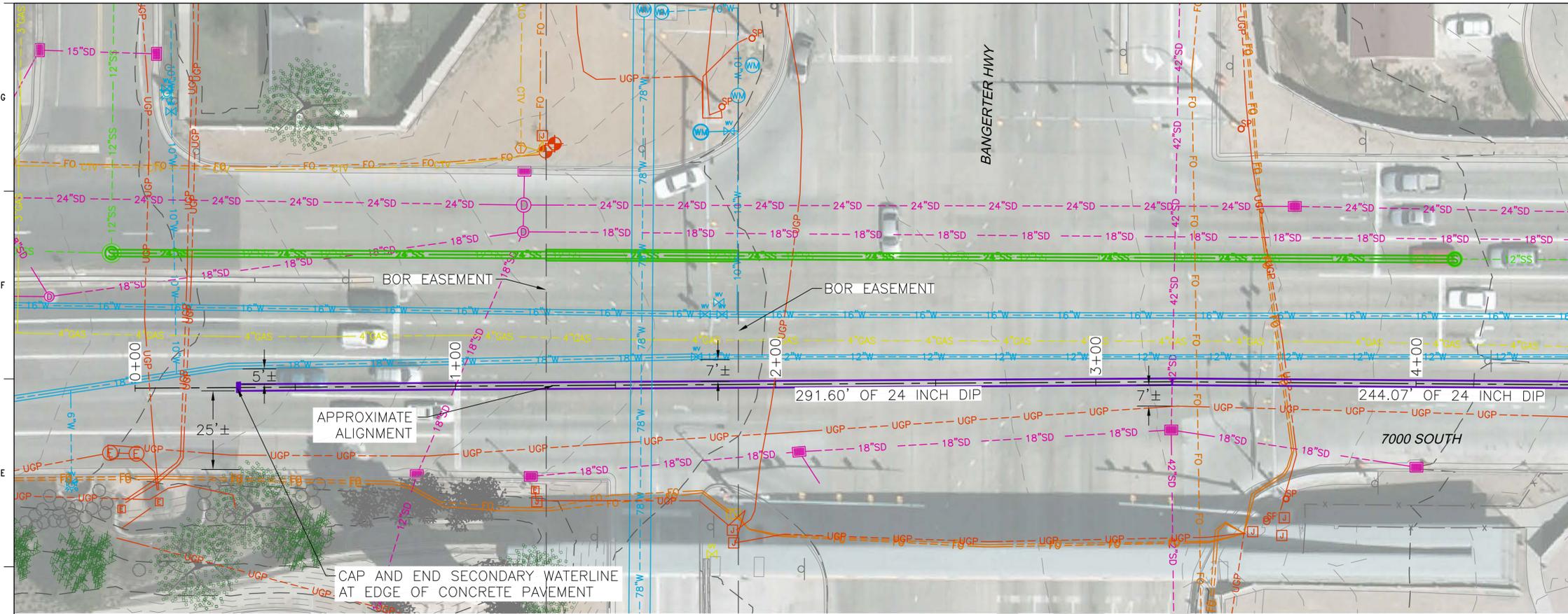
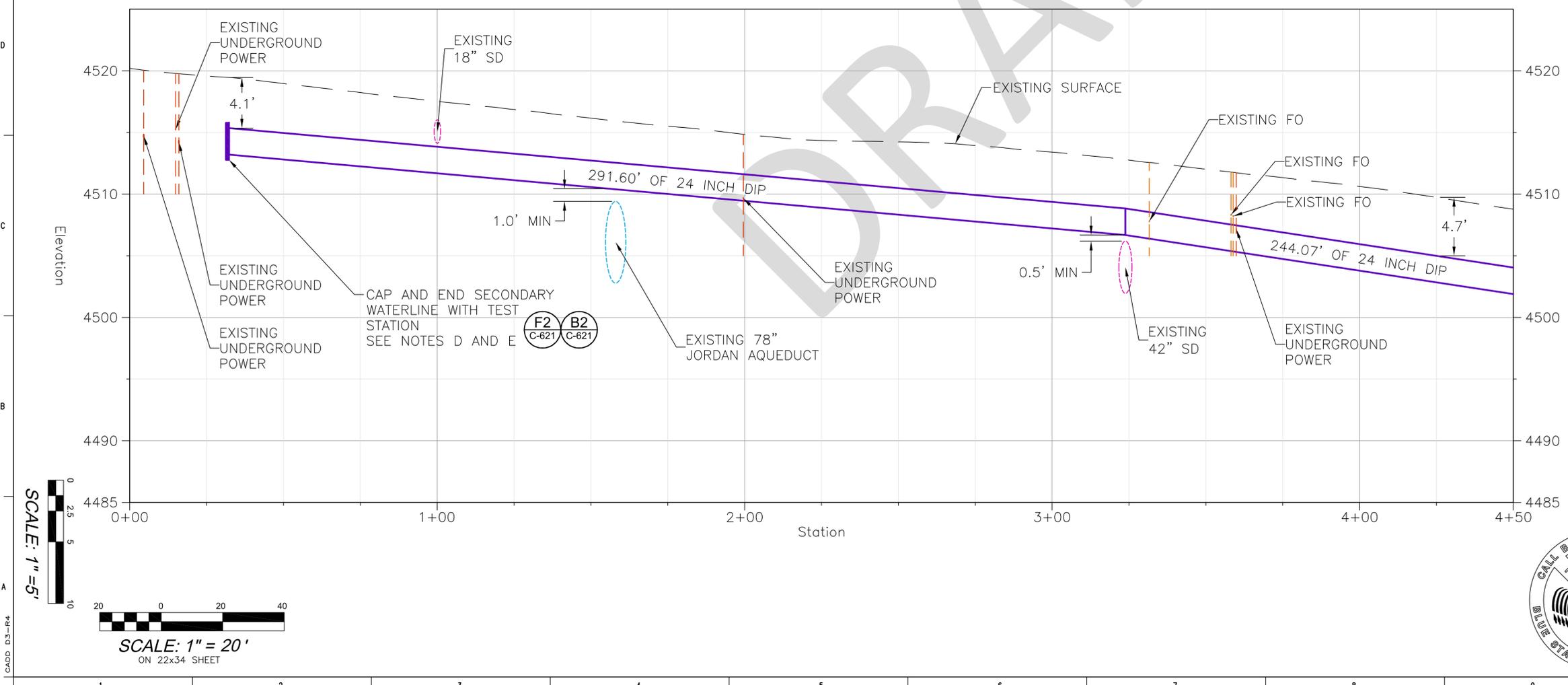


EXHIBIT D-1



MATCH LINE STA 4+50
SEE SHEET C-201

- NOTES:**
- SECONDARY WATER PIPE SHALL BE DUCTILE IRON PIPE PC250. REFER TO SPECIFICATION SECTION 33 05 05.
 - ALL FITTING, VALVES AND APPURTENANCES SHALL BE MECHANICALLY RESTRAINED AS PER DETAIL F8 ON SHEET C-620. RESTRAINED JOINT PIPE (MCWANE TR FLEX OR APPROVED EQUAL) MAY BE USED IN LIEU OF MECHANICAL RESTRAINTS (E.G. MEGA-LUGS).
 - PROVIDE JOINT BONDS AT ALL JOINTS AS PER DETAIL F10 ON SHEET C-621.
 - PROVIDE TEST STATIONS AT EACH END OF SECONDARY WATER LINE AS PER DETAIL F2 ON SHEET C-621. DESIGN BUILD CONTRACTOR TO FIELD LOCATE TEST STATION AND VERIFY WITH CITY OF WEST JORDAN.
 - DESIGN BUILD CONTRACTOR SHALL CONDUCT HYDROSTATIC PRESSURE TESTING OF 24" SECONDARY WATERLINE AFTER CONCRETE PAVEMENT IS INSTALLED. PROVIDE 2" GALVANIZED PIPING AND APPURTENANCES NECESSARY TO FACILITATE HYDROSTATIC PRESSURE TESTING THAT TERMINATE OUTSIDE THE ROADWAY. 2" GALVANIZED PIPING AND APPURTENANCES SHALL BE REMOVED AND TERMINATED WITH CAP 2' BELOW GRADE OUTSIDE ROADWAY AND ABANDONED WITHIN THE ROADWAY.



B	ISSUED FOR RFP	AKF	GST	DWJ	09/08/16
A	ISSUED FOR REVIEW	AKF	GST	DWJ	07/07/16
NO.	REVISIONS	DSGN	CHKD	APVD	DATE

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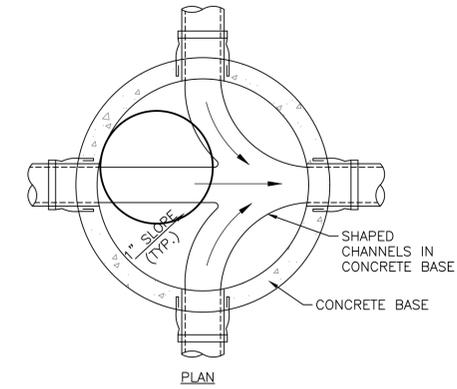
**CITY OF WEST JORDAN
7000 SOUTH UTILITY BETTERMENTS**

**PLAN AND PROFILE
SECONDARY WATER SHEET 1**

DESIGNED	AKF	SCALE:	AS SHOWN
DRAWN	AKF	NO.	C-200
CHECKED	GST	REV.	B
APPROVED	GST		
APPROVED	DWJ		
DATE	7/5/16		

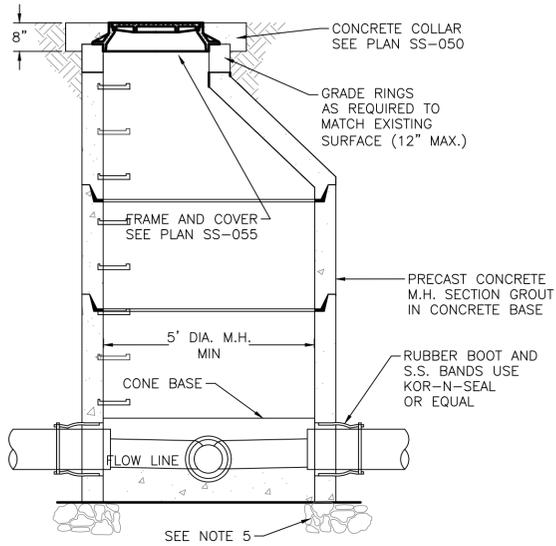


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CADD D3-R4

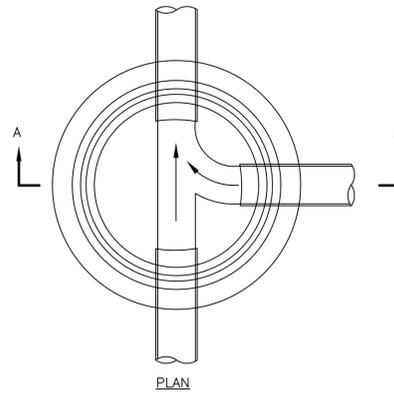


NOTES:

1. SELECT FILL: USE OF UNTREATED BASE COURSE AS PER UDOT STANDARD SPECIFICATION 02721 UNTREATED BASE COURSE (UTBC).
2. BACKFILL: INSTALL AND COMPACT ALL BACKFILL MATERIAL PER UDOT STANDARD SPECIFICATION 02056 EMBANKMENT, BORROW, AND BACKFILL; AND UDOT SUPPLEMENTAL SPECIFICATION SECTION 02056M EMBANKMENT, BORROW, AND BACKFILL.
3. CONCRETE: CLASS 4,000 PER CAST IN PLACE APPLICATIONS AND 5,000 PSI FOR PRECAST APPLICATIONS. APPLY A SEALING/CURING COMPOUND UDOT STANDARD SPECIFICATION 03390 CONCRETE CURING AND UDOT SUPPLEMENTAL SPECIFICATION 03390 CONCRETE CURING.
4. REDUCING RISER: WHEN A DEPTH OF MANHOLE FROM PIPE INVERT TO FINISH GRADE EXCEEDS 6'-7", USE A REDUCING RISER SECTION.
5. FOUNDATION: FOUNDATION TO REST ON 6" OF FREE DRAINING GRANULAR BACKFILL AS PER UDOT STANDARD SPECIFICATION 02056 EMBANKMENT, BORROW, AND BACKFILL; AND UDOT SUPPLEMENTAL SPECIFICATION SECTION 02056M EMBANKMENT, BORROW, AND BACKFILL.
6. JOINTS: PLACE FLEXIBLE GASKET TYPE SEALANT IN MANHOLE JOINTS.
7. BASE OF MANHOLE: POUR IN ONE CONTINUOUS OPERATION. FINISH: PROVIDE SMOOTH AND NEAT FINISHES ON THE INTERIOR OF CONES, SHAFTS, AND RINGS. IMPERFECT MOLDING OR HONEYCOMBS WILL NOT BE ACCEPTED.

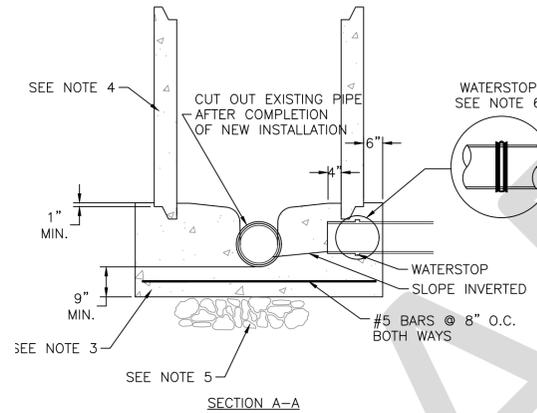


F JUNCTION MANHOLE
2 NTS CITY OF WEST JORDAN STD. PLAN SS-035 REVISED

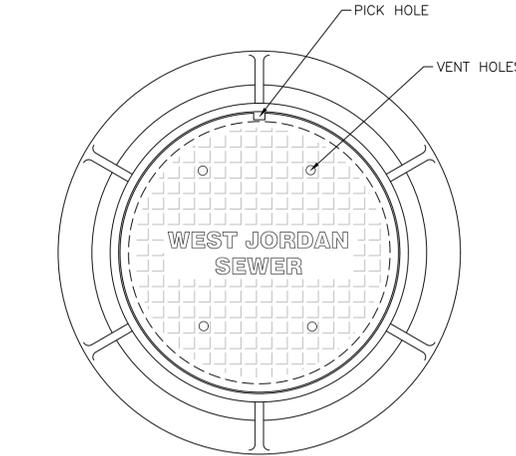


NOTES:

1. SELECT FILL: USE OF UNTREATED BASE COURSE AS PER UDOT STANDARD SPECIFICATION 02721 UNTREATED BASE COURSE (UTBC).
2. BACKFILL: INSTALL AND COMPACT ALL BACKFILL MATERIAL PER UDOT STANDARD SPECIFICATION 02056 EMBANKMENT, BORROW, AND BACKFILL; AND UDOT SUPPLEMENTAL SPECIFICATION SECTION 02056M EMBANKMENT, BORROW, AND BACKFILL.
3. CONCRETE: CLASS 4,000 PER CAST IN PLACE APPLICATIONS AND 5,000 PSI FOR PRECAST APPLICATIONS. APPLY A SEALING/CURING COMPOUND UDOT STANDARD SPECIFICATION 03390 CONCRETE CURING AND UDOT SUPPLEMENTAL SPECIFICATION 03390 CONCRETE CURING.
4. REDUCING RISER: WHEN A DEPTH OF MANHOLE FROM PIPE INVERT TO FINISH GRADE EXCEEDS 6'-7", USE A REDUCING RISER SECTION.
5. FOUNDATION: FOUNDATION TO REST ON 6" OF FREE DRAINING GRANULAR BACKFILL AS PER UDOT STANDARD SPECIFICATION 02056 EMBANKMENT, BORROW, AND BACKFILL; AND UDOT SUPPLEMENTAL SPECIFICATION SECTION 02056M EMBANKMENT, BORROW, AND BACKFILL.
6. WATERSTOP: SHALL BE 1/2" 300 SERIES NONMAGNETIC STAINLESS STEEL CONFORMING TO ASTM A167 AND RUBBER GASKET MEETING ASTM C-443.
7. JOINTS: PLACE FLEXIBLE GASKET TYPE SEALANT IN MANHOLE JOINTS.
8. BASE OF MANHOLE:
 - A. THIS MANHOLE BASE IS TO BE USED FOR A CONNECTION TO AN EXISTING LINE OR AS AN ALTERNATE TO A PRECAST MANHOLE BASE.
 - B. INVERT SHALL BE SMOOTH AND "U" SHAPED AND MATCH THE SPRING LINE OF THE PIPE.
 - C. THE FIRST PRECAST MANHOLE SECTION SHALL BE CAST INTO THE BASE. THE REMAINDER OF THE MANHOLE CONSTRUCTION SHALL CONFORM TO PLAN SS-030.

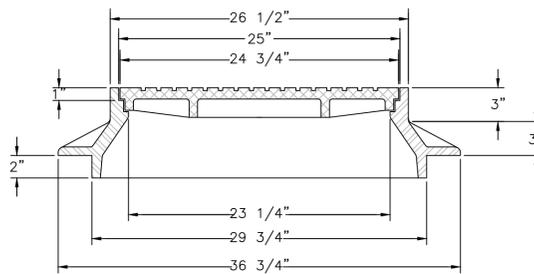


F CAST IN PLACE MANHOLE BASE
6 NTS CITY OF WEST JORDAN STD. PLAN SS-040 (REVISED)

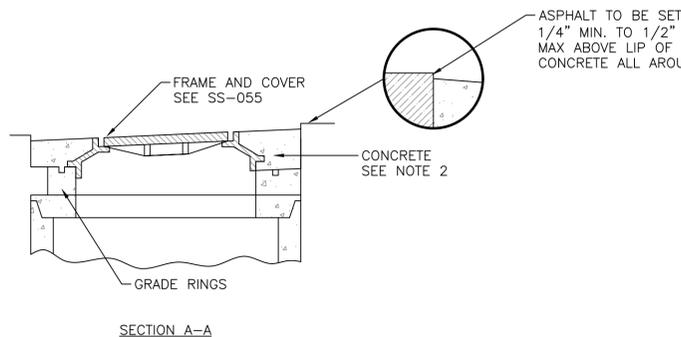
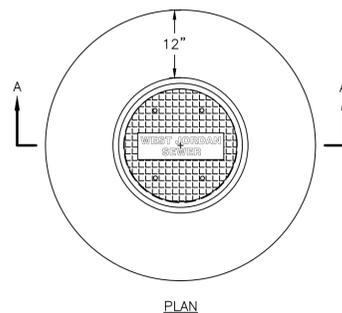


NOTES:

1. CASTINGS: GRAY IRON CLASS 30 MINIMUM PER ASTM A48.
2. COATING: EXCEPT MACHINED SURFACES, COAT ALL METAL PARTS WITH ASPHALTUM PAINT.
3. INSCRIPTIONS: CAST THE WORDS "WEST JORDAN" AND "SEWER" ON THE COVER FLUSH WITH THE SURFACE FINISH.
4. HEAT NUMBER: PLACE FOUNDRY AND HEAT NUMBER ON THE INSIDE OF THE FRAME AND ON THE BOTTOM OF THE COVER.
5. FIT: GIVE THE FRAME AND COVER A MACHINE FINISH SO THE COVER WILL NOT ROCK.
6. LOCKING: PROVIDE COVERS FOR MANHOLES LOCATED IN EASEMENTS, RIGHTS OF WAY, ALLEYS PARKING LOTS, AND ALL OTHER PLACES EXCEPT PAVED STREETS, WITH ALLEN SOCKET SET SCREW LOCKING DEVICES. DRILL AND TAP TWO HOLES TO A DEPTH OF 1 INCH AT 90 DEGREES TO PRY AND INSTALL 3/4" X 3/4" INCH ALLEN SOCKET SET SCREWS.
7. MANHOLE STRUCTURES: SEE PLAN SS-030, SS-035, SS-045, SS-060, SS-065.
8. VENTILATION: STANDARD IS FOR VENTED MANHOLE EXCEPT AS NEEDED FOR PROBLEMS.



F FRAME AND COVER
9 NTS CITY OF WEST JORDAN STD. PLAN SS-055



NOTES:

1. ADJUST TO GRADE: ADJUST INCIDENTAL STRUCTURE TO GRADE PER APWA SECTION 33 05 14
2. BACKFILL: INSTALL AND COMPACT ALL BACKFILL MATERIAL PER UDOT STANDARD SPECIFICATION 02056 EMBANKMENT, BORROW, AND BACKFILL; AND UDOT SUPPLEMENTAL SPECIFICATION SECTION 02056M EMBANKMENT, BORROW, AND BACKFILL.
3. JOINTS: PROVIDE A NEAT STRAIGHT JOINT BETWEEN EXISTING AND NEW ASPHALT CONCRETE SURFACES. PROVIDE CONCENTRIC CIRCLE OR STRAIGHT EDGE CUT. CLEAN EDGES OF ALL DIRT, OIL AND LOOSE DEBRIS.

B CONCRETE COVER COLLAR
4 NTS CITY OF WEST JORDAN STD. PLAN SS-050

B	ISSUED FOR RFP	AKF	GST	DWJ	09/08/16
A	ISSUED FOR REVIEW	AKF	GST	DWJ	07/07/16
NO.	REVISIONS	DSGN	CHKD	APVD	DATE

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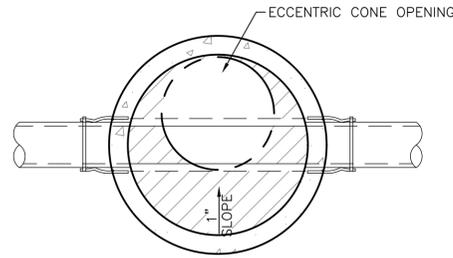
CITY OF WEST JORDAN
7000 SOUTH UTILITY BETTERMENTS

SANITARY SEWER
DETAIL SHEET 1

DESIGNED	AKF	SCALE:	AS SHOWN
DRAWN	IL	NO.	C-610
CHECKED	GST	REV.	B
APPROVED	GST		
APPROVED	DWJ		
DATE	7/5/16		

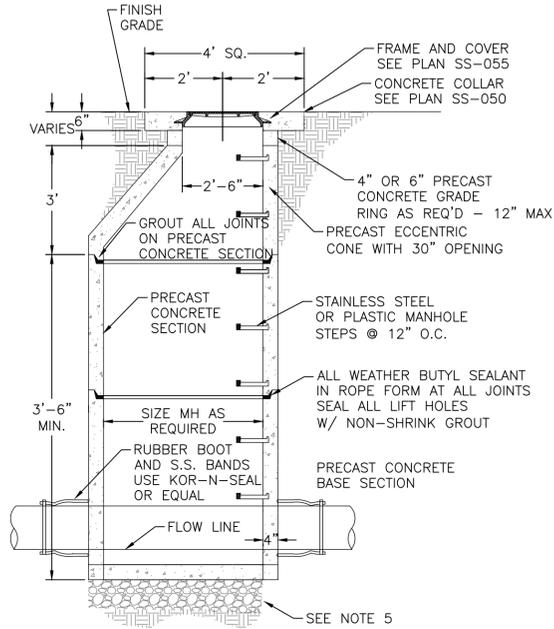
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CADD D3-R4

EXHIBIT D-1



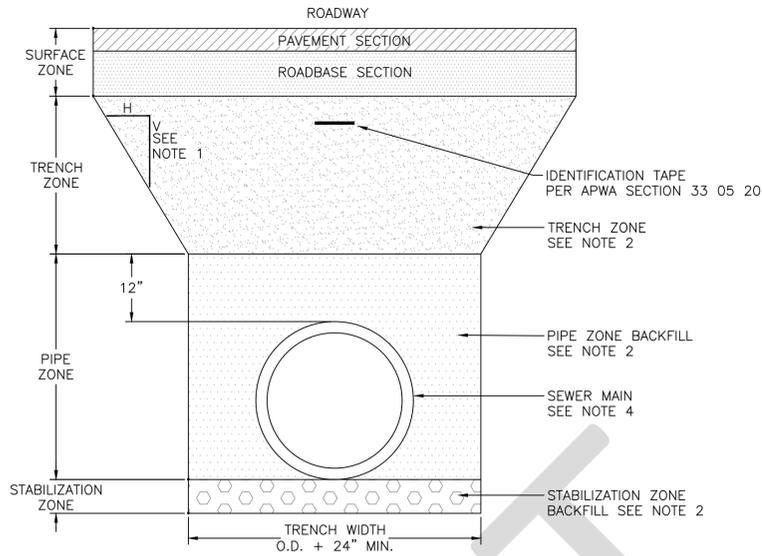
NOTES:

1. SELECT FILL: USE OF UNTREATED BASE COURSE AS PER UDOT STANDARD SPECIFICATION 02721 UNTREATED BASE COURSE (UTBC).
2. BACKFILL: INSTALL AND COMPACT ALL BACKFILL MATERIAL PER UDOT STANDARD SPECIFICATION 02056 EMBANKMENT, BORROW, AND BACKFILL; AND UDOT SUPPLEMENTAL SPECIFICATION SECTION 02056M EMBANKMENT, BORROW, AND BACKFILL.
3. CONCRETE: CLASS 4,000 PER UDOT STANDARD SPECIFICATION 03055 PORTLAND CEMENT CONCRETE AND UDOT SUPPLEMENTAL SPECIFICATION SECTION 03055M PORTLAND CEMENT CONCRETE CAST IN PLACE APPLICATIONS AND 5,000 PSI FOR PRECAST APPLICATIONS. APPLY A SEALING/CURING COMPOUND UDOT STANDARD SPECIFICATION 03390 CONCRETE CURING AND UDOT SUPPLEMENTAL SPECIFICATION SECTION 03390 CONCRETE CURING.
4. REDUCING RISER: WHEN A DEPTH OF MANHOLE FROM PIPE INVERT TO FINISH GRADE EXCEEDS 6'-7", USE A REDUCING RISER SECTION. FOUNDATION: FOUNDATION TO REST ON 6" OF FREE DRAINING GRANULAR BACKFILL AS PER UDOT STANDARD SPECIFICATION 02056 EMBANKMENT, BORROW, AND BACKFILL.
5. JOINTS: PLACE FLEXIBLE GASKET TYPE SEALANT IN MANHOLE JOINTS.
6. BASE OF MANHOLE: POUR IN ONE CONTINUOUS OPERATION.
7. FINISH: PROVIDE SMOOTH AND NEAT FINISHES ON THE INTERIOR OF CONES, SHAFTS, AND RINGS. IMPERFECT MOLDING OR HONEYCOMBS WILL NOT BE ACCEPTED.



F IN-LINE MANHOLE

2 NTS CITY OF WEST JORDAN STD. PLAN SS-030 (REVISED)



NOTES:

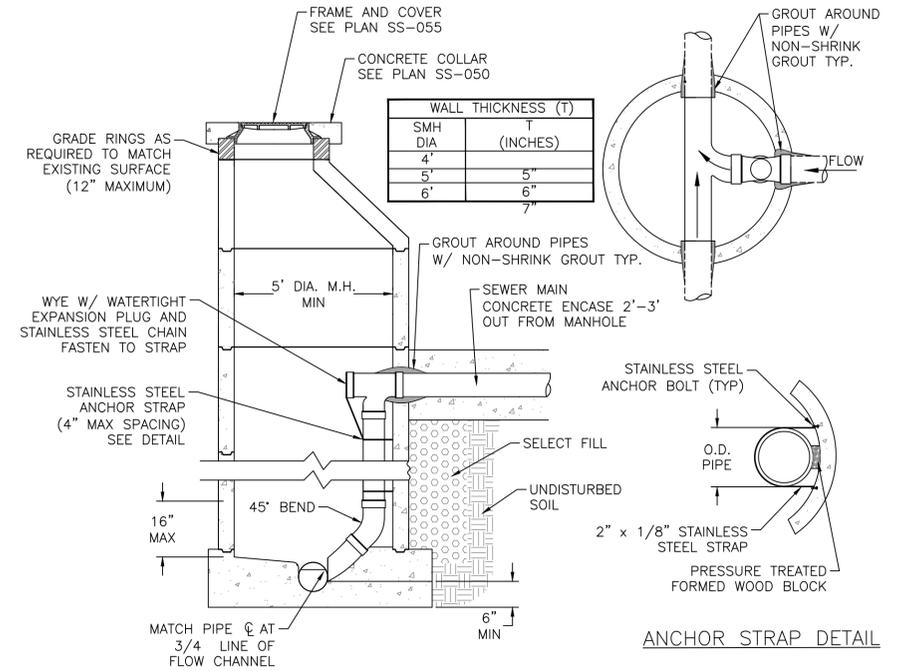
1. EXCAVATION: TRENCH EXCAVATION AND SIDE SLOPES SHALL BE PROVIDED IN ACCORDANCE WITH OSHA AND UOSH SAFETY STANDARDS AND WITH UDOT STANDARD SPECIFICATION SECTION 02317 STRUCTURAL EXCAVATION AND UDOT SUPPLEMENTAL SPECIFICATION 02317M STRUCTURAL EXCAVATION AND ALL STATE AND FEDERAL LAWS FOR TRENCH SAFETY.
2. BACKFILL: BACKFILL OPERATIONS SHALL COMPLY WITH UDOT STANDARD SPECIFICATION SECTION 02056 EMBANKMENT, BORROW, AND BACKFILL; AND UDOT SUPPLEMENTAL SPECIFICATION SECTION 02056M EMBANKMENT, BORROW, AND BACKFILL WITH MATERIAL SELECTION AS FOLLOWS:

	UNIMPROVED AREAS	PAVEMENT AREAS
STABILIZATION ZONE	2" MINUS SEWER ROCK	GRANULAR BACKFILL BORROW
PIPE ZONE	UNTREATED BASE COURSE GRADE 3/4"	UNTREATED BASE COURSE GRADE 3/4"
TRENCH ZONE	GRANULAR BACKFILL BORROW	GRANULAR BACKFILL BORROW
SURFACE ZONE	NATIVE TOP SOIL REPLACE VEGETATION TO PRECONSTRUCTION CONDITION	UDOT ROAD SECTION

3. COMPACTION: COMPACTION OF BACKFILL MATERIALS SHALL COMPLY WITH UDOT STANDARD SPECIFICATION SECTION 02056 EMBANKMENT, BORROW, AND BACKFILL; AND UDOT SUPPLEMENTAL SPECIFICATION SECTION 02056M EMBANKMENT, BORROW. SUBMISSION OF QUALITY ASSURANCE COMPACTION TEST RESULT DATA MAY BE REQUIRED BY ENGINEER AT ANY TIME. CONTRACTOR IS TO PROVIDE RESULTS OF TEST IMMEDIATELY UPON REQUEST.
4. INSTALLATION OF PIPE: INSTALL PIPE PER APWA SECTION 33 31 00 "SANITARY SEWERAGE SYSTEMS". INSTALL PIPE ON STABLE FOUNDATION WITH UNIFORM BEARING.
5. PAVEMENT RESTORATION: DO NOT INSTALL PAVEMENT OR ROADBASE SELECTION UNTIL TRENCH COMPACTION IS ACCEPTED BY ENGINEER.

F SANITARY SEWER TRENCH

6 NTS CITY OF WEST JORDAN STD. PLAN SS-020 (REVISED)



NOTES:

1. SELECT FILL: USE CLASS A UNTREATED BASE COURSE GRADE 1 OR GRADE 3/4 PER UDOT STANDARD SPECIFICATION 02721. USE OF SEWER ROCK OR RECYCLED AGGREGATE REQUIRES ENGINEER'S WRITTEN APPROVAL.
2. BACKFILL: INSTALL AND COMPACT ALL BACKFILL MATERIAL PER UDOT STANDARD SPECIFICATION 02056 EMBANKMENT, BORROW, AND BACKFILL; AND UDOT SUPPLEMENTAL SPECIFICATION SECTION 02056M EMBANKMENT, BORROW, AND BACKFILL.
3. CONCRETE: CLASS 4,000 PER UDOT STANDARD SPECIFICATION 03055 PORTLAND CEMENT CONCRETE AND UDOT SUPPLEMENTAL SPECIFICATION SECTION 03055M PORTLAND CEMENT CONCRETE CAST IN PLACE APPLICATIONS AND 5,000 PSI FOR PRECAST APPLICATIONS. APPLY A SEALING/CURING COMPOUND UDOT STANDARD SPECIFICATION 03390 CONCRETE CURING AND UDOT SUPPLEMENTAL SPECIFICATION SECTION 03390 CONCRETE CURING.
4. FOUNDATION: FOUNDATION TO REST ON 6" OF FREE DRAINING GRANULAR BACKFILL AS PER UDOT STANDARD SPECIFICATION 02056 EMBANKMENT, BORROW, AND BACKFILL; AND UDOT SUPPLEMENTAL SPECIFICATION SECTION 02056M EMBANKMENT, BORROW, AND BACKFILL.
5. JOINTS: PLACE FLEXIBLE GASKET TYPE SEALANT IN MANHOLE JOINTS.
6. FINISH: PROVIDE SMOOTH AND NEAT FINISHES ON THE INTERIOR OF CONES, SHAFTS, AND RINGS. IMPERFECT MOLDING OR HONEYCOMBS WILL NOT BE ACCEPTED.

F DROP MANHOLE

10 NTS CITY OF WEST JORDAN STD. PLAN SS-045 (REVISED)

S:\25931 - 7000 South Utility Design\25931.05 - Secondary Water Transmission Pipeline\11-CADD\C-601 through C-623.dwg

B	ISSUED FOR RFP	AKF	GST	DWJ	09/08/16
A	ISSUED FOR REVIEW	AKF	GST	DWJ	07/07/16
NO.	REVISIONS	DSGN	CHKD	APVD	DATE

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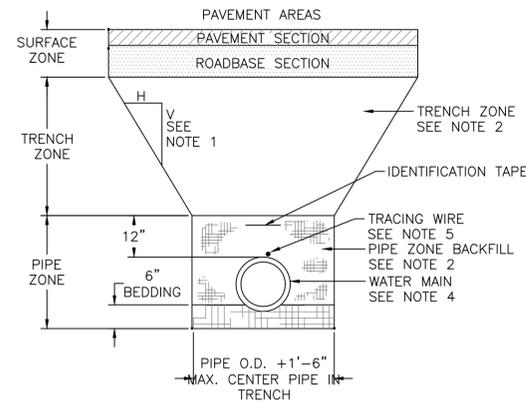
CITY OF WEST JORDAN
 7000 SOUTH UTILITY BETTERMENTS

SANITARY SEWER
 DETAIL SHEET 2

DESIGNED	AKF	SCALE:	AS SHOWN
DRAWN	IL	NO.	
CHECKED	GST	REV.	
APPROVED	GST		
APPROVED	DWJ		
DATE	7/5/16		

C-611 **B**

EXHIBIT D-1



- NOTES:**
- EXCAVATION: TRENCH EXCAVATION AND SIDE SLOPES SHALL BE IN ACCORDANCE WITH OSHA AND UOSH SAFETY STANDARDS AND WITH UDOT STANDARD SPECIFICATION SECTION 02317 STRUCTURAL EXCAVATION AND UDOT SUPPLEMENTAL SPECIFICATION SECTION 02317M STRUCTURAL EXCAVATION AND ALL STATE AND FEDERAL LAWS FOR TRENCH SAFETY.
 - BACKFILL: BACKFILL OPERATIONS SHALL COMPLY WITH UDOT STANDARD SPECIFICATION SECTION 02056 EMBANKMENT, BORROW, AND BACKFILL; AND UDOT SUPPLEMENTAL SPECIFICATION SECTION 02056M EMBANKMENT, BORROW, AND BACKFILL WITH MATERIAL SELECTION AS FOLLOWS:

	UNIMPROVED AREAS	PAVEMENT AREAS
BEDDING	SAND	SAND
PIPE ZONE	SAND	SAND
TRENCH ZONE	GRANULAR BACKFILL BORROW. SAND NATIVE (FREE OF ROCK OVER 2")	GRANULAR BACKFILL BORROW
SURFACE ZONE	NATIVE TOP SOIL	UDOT ROAD SECTION

SEWER ROCK, PEA GRAVEL, RECYCLE AGGREGATE NOT ALLOWED AS BACKFILL

- COMPACTION: COMPACTION OF BACKFILL MATERIALS SHALL COMPLY WITH UDOT STANDARD SPECIFICATION SECTION 02056 EMBANKMENT, BORROW, AND BACKFILL; AND UDOT SUPPLEMENTAL SPECIFICATION SECTION 02056M EMBANKMENT, BORROW, AND BACKFILL AND THE FOLLOWING:

	UNIMPROVED AREAS	PAVEMENT AREAS
PIPE ZONE	PER PIPE MANUFACTURE RECOMMENDATION	PER PIPE MANUFACTURE RECOMMENDATION
TRENCH ZONE	92% OF ASTM D 698	95% OF ASTM D 1557
SURFACE ZONE	80% OF ASTM D 698	UDOT ROAD SECTION

WATER SETTLING OR "JETTING" OF TRENCHES BACKFILL NOT ALLOWED

- INSTALLATION OF PIPE: INSTALL PIPE PER SPECIFICATION SECTION 33 11 00 WATER DISTRIBUTION AND TRANSMISSION (CITY SPECIFICATION) AND APWA SPECIFICATION SECTION 33 11 00 WATER DISTRIBUTION AND TRANSMISSION. INSTALL PIPE ON STABLE FOUNDATION WITH UNIFORM BEARING. SHAPE TRENCH BY HAND TO FIT BOTTOM QUADRANT OF PIPE ALLOWING SPACE FOR PIPE BELLS.
- TRACING WIRE: ALL PIPES SHALL HAVE 12 GA. INSULATED TRACING WIRE INSTALLED W/THE PIPE.
- DEWATERING: CONTRACTOR SHALL BE RESPONSIBLE FOR KEEPING THE TRENCHES FREE FROM SURFACE AND GROUNDWATER.

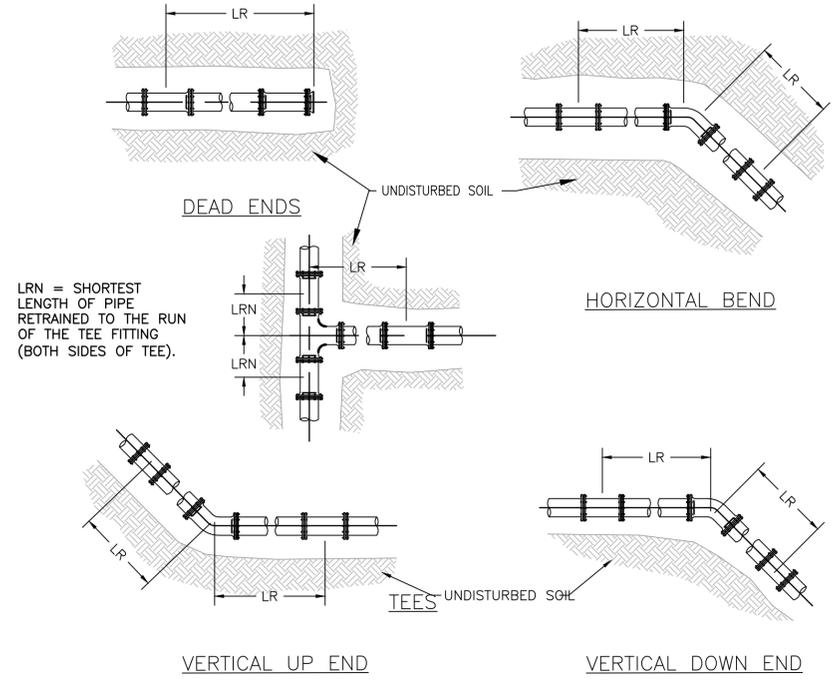
F SECONDARY WATER PIPE TRENCH
2 NTS CITY OF WEST JORDAN STD. PLAN CW-035 (REVISED)

RESTRAINED LENGTHS, LR, FOR DUCTILE IRON PIPE

NOMINAL PIPE SIZE INCHES	HORIZONTAL BENDS			TEES		VERTICAL OFFSETS						DEAD ENDS
	90°	45°	22-1/2°	LRN=0'	LRN=10'	90° BEND FITTINGS		45° BEND FITTINGS		22-1/2° BEND FITTINGS		
						DOWN BEND	UP BEND	DOWN BEND	UP BEND	DOWN BEND	UP BEND	
46	18	7	4	30	8	31	18	13	7	6	3	31
8	25	10	5	43	20	44	25	18	10	9	5	44
10	32	13	6	56	34	58	32	24	13	11	6	58
12	38	16	8	68	45	69	38	29	16	14	8	69
14	45	19	9	80	57	81	45	34	19	16	9	81
16	51	21	10	91	68	92	51	38	21	18	10	92
18	57	24	11	103	79	104	57	43	24	21	11	104
20	62	26	12	113	90	115	62	48	26	23	12	115
24	68	28	14	125	100	126	68	52	28	25	14	126
24	79	33	16	145	121	147	79	61	33	29	16	147

RESTRAINED LENGTHS, LR, FOR DUCTILE IRON PIPE WITH POLYETHYLENE WRAP

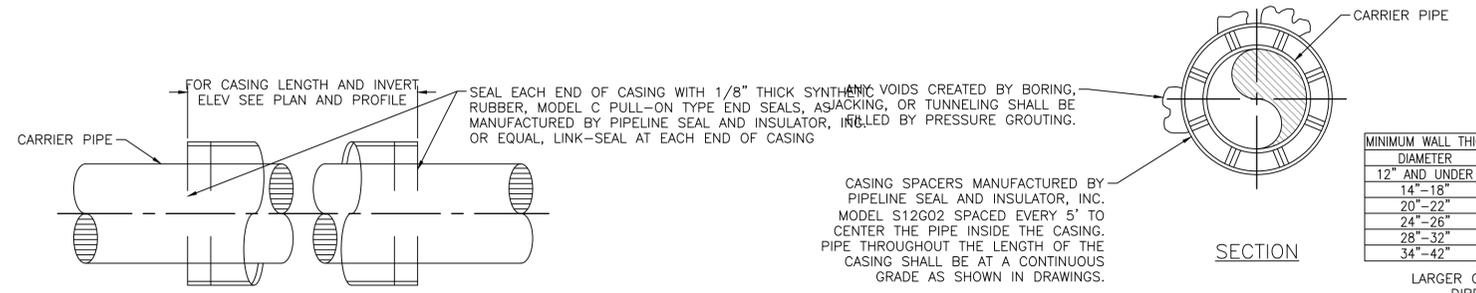
NOMINAL PIPE SIZE INCHES	HORIZONTAL BENDS			TEES		VERTICAL OFFSETS						DEAD ENDS
	90°	45°	22-1/2°	LRN=0'	LRN=10'	90° BEND FITTINGS		45° BEND FITTINGS		22-1/2° BEND FITTINGS		
						DOWN BEND	UP BEND	DOWN BEND	UP BEND	DOWN BEND	UP BEND	
46	26	11	5	69	18	72	26	30	11	14	5	72
8	36	15	7	99	47	102	36	42	15	20	7	102
10	47	19	9	130	78	133	47	55	19	26	9	133
12	56	23	11	157	103	159	56	66	23	32	11	159
14	65	27	13	185	131	187	65	77	27	37	13	187
16	74	31	15	211	156	214	74	89	31	42	15	214
18	82	34	16	238	183	241	82	100	34	48	16	241
20	90	37	18	263	207	266	90	110	38	53	18	266
24	98	41	20	289	233	292	98	121	41	58	20	292
24	113	47	22	337	280	340	113	141	47	68	22	340



- NOTES:**
- ALL JOINTS WITHIN THE SPECIFIED LENGTH LR MUST BE RESTRAINED. ALL LENGTHS ARE GIVEN IN FEET.
 - THE MAXIMUM TEST PRESSURE SHALL NOT EXCEED 200 PSI.
 - THE MINIMUM DEPTH OF BURY SHALL BE 3' TO TOP OF PIPE.
 - RESTRAINED LENGTHS MAY BE REDUCED WHEN SUPPORTED BY ENGINEERING CALCULATIONS.

F JOINT RESTRAINT - DUCTILE IRON
8 NTS CITY OF WEST JORDAN STD. PLAN CW-90&95

- NOTES:**
- CASING PIPES SHALL BE REQUIRED AS INDICATED ON THE DRAWINGS AND/OR WHERE REQUIRED BY THE DISTRICT INSPECTOR OR ENGINEER.
 - SEE PLANS FOR CASING SIZE.
 - CARRIER PIPE SHALL BE TESTED BEFORE SEALING THE ENDS OF THE CASING.
 - SPACERS SHALL BE SECURELY ATTACHED TO CARRIER PIPE PER MANUFACTURER'S REQUIREMENTS.
 - CASING PIPE SHALL BE WELDED STEEL, ASTM A53, GRADE B OR APPROVED EQUIVALENT.
 - ALL CARRIER PIPE JOINTS WITHIN CASING TO BE MECHANICALLY RESTRAINED. THRUST LOCK BOLTLESS RESTRAINED JOINT OR APPROVED EQUAL.



MINIMUM WALL THICKNESS OF CASINGS

DIAMETER	WALL THICKNESS
12" AND UNDER	0.188"
14"-18"	0.312"
20"-22"	0.375"
24"-26"	0.438"
28"-32"	0.500"
34"-42"	0.562"

A STEEL CASING
5 NTS CITY OF WEST JORDAN STD. PLAN SS-100 (REVISED)

B	ISSUED FOR RFP	AKF	GST	DWJ	09/08/16
A	ISSUED FOR REVIEW	AKF	GST	DWJ	07/07/16
NO.	REVISIONS	DSGN	CHKD	APVD	DATE

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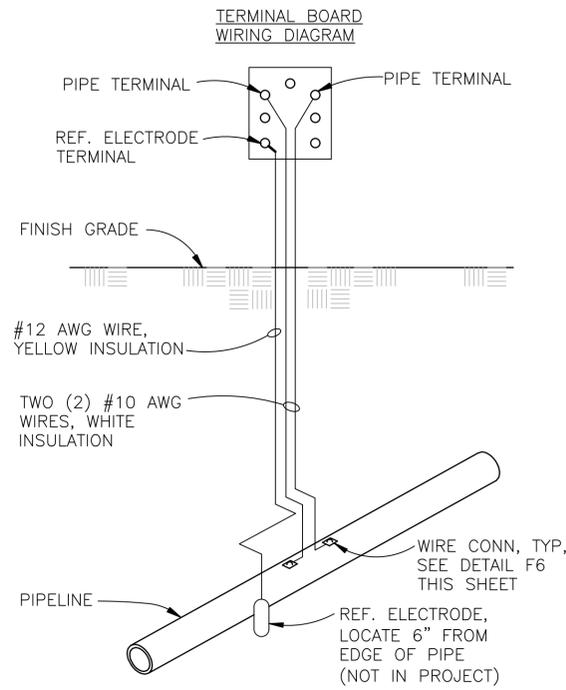
CITY OF WEST JORDAN
7000 SOUTH UTILITY BETTERMENTS

SECONDARY WATER
DETAIL SHEET 1

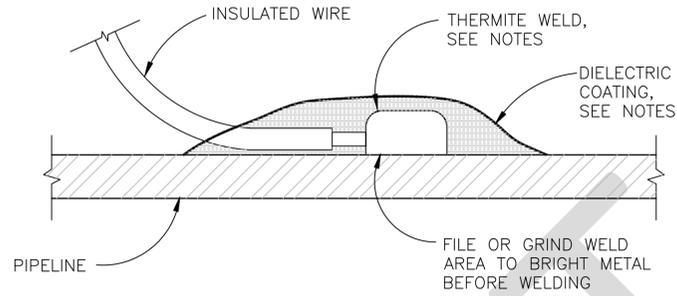
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DRAWN	IL	NO.	C-620
CHECKED	GST	REV.	B
APPROVED	GST		
APPROVED	DWJ		
DATE	7/5/16		

S:\25931 - 7000 South Utility Design\25931.05 - Secondary Water Transmission Pipeline\11-CADD\C-601 through C-623.dwg
CADD D3-R4

EXHIBIT D-1



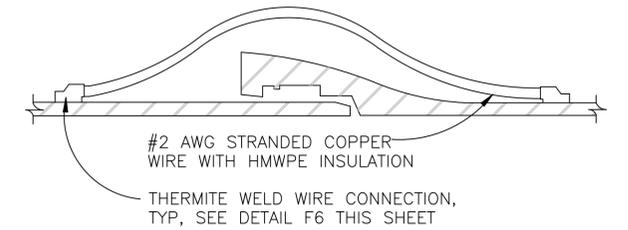
F
2 TYPE T TEST STATION
NTS



NOTES:

1. MAINTAIN SEPARATION BETWEEN MULTIPLE TEST WIRE CONNECTIONS OF ONE PIPE DIA OR 24", WHICHEVER IS LESS.
2. COPPER SLEEVE REQUIRED FOR #2 AWG JOINT BONDS OR FOR #12 AWG OR SMALLER TEST WIRES.
3. THERMITE WELDER AND CARTRIDGE SIZE VARIES ACCORDING TO PIPE SIZE AND PIPE MATERIAL, CONSULT WELDER MANUFACTURER FOR RECOMMENDED WELDER AND CARTRIDGE
4. COAT COMPLETED CONNECTIONS WITH DENSO PROTAL 7200 EPOXY.

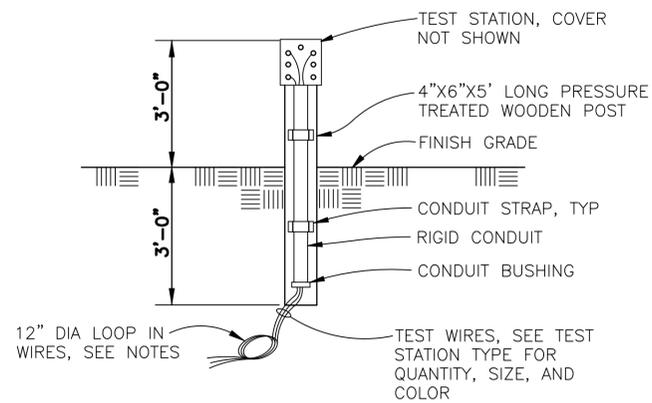
F
6 STEEL AND DUCTILE IRON
PIPE WIRE CONNECTION
NTS



NOTES:

1. PUSH ON DUCTILE IRON BOND SHOWN, SIMILAR FOR DUCTILE MECHANICAL AND RESTRAINED JOINTS, AND STEEL CARNEGIE JOINTS.
2. INSTALL 2 BOND WIRES AT EACH PIPE JOINT, UNLESS SPECIFIED OTHERWISE.
3. COAT THERMITE WELDS WITH DENSO PROTAL 7200 EPOXY.

F
10 DUCTILE IRON JOINT BOND
NTS



NOTES:

1. TEST STATION TO BE ALUMINUM BODY AND LID WITH THREADED CONNECTION FOR CONDUIT.
2. QUANTITY OF TERMINALS AND WIRING CONNECTIONS VARIES, SEE APPLICABLE TEST STATION DETAILS FOR TYPE OF TEST STATION
3. PROVIDE WIRE LOOP AT BASE OF POST MOUNTED TEST STATION TO MINIMIZE SETTLEMENT STRESSES ON WIRE
4. PROVIDE 3"X3" IDENTIFICATION PLATE TO EACH POST ON THE OPPOSITE SIDE OF TEST STATION. SECONDARY WATER IDENTIFICATION PLATE SHALL READ "CITY OF WEST JORDAN 24" DIP SECONDARY WATER LINE". SANITARY SEWER CASING IDENTIFICATION PLATE SHALL READ "CITY OF WEST JORDAN SANITARY SEWER 36" STEEL CASING".

B
2 POST MOUNTED, WOOD POST
NTS

B	ISSUED FOR RFP	AKF	GST	DWJ	09/08/16
A	ISSUED FOR REVIEW	AKF	GST	DWJ	07/07/16
NO.	REVISIONS	DSGN	CHKD	APVD	DATE

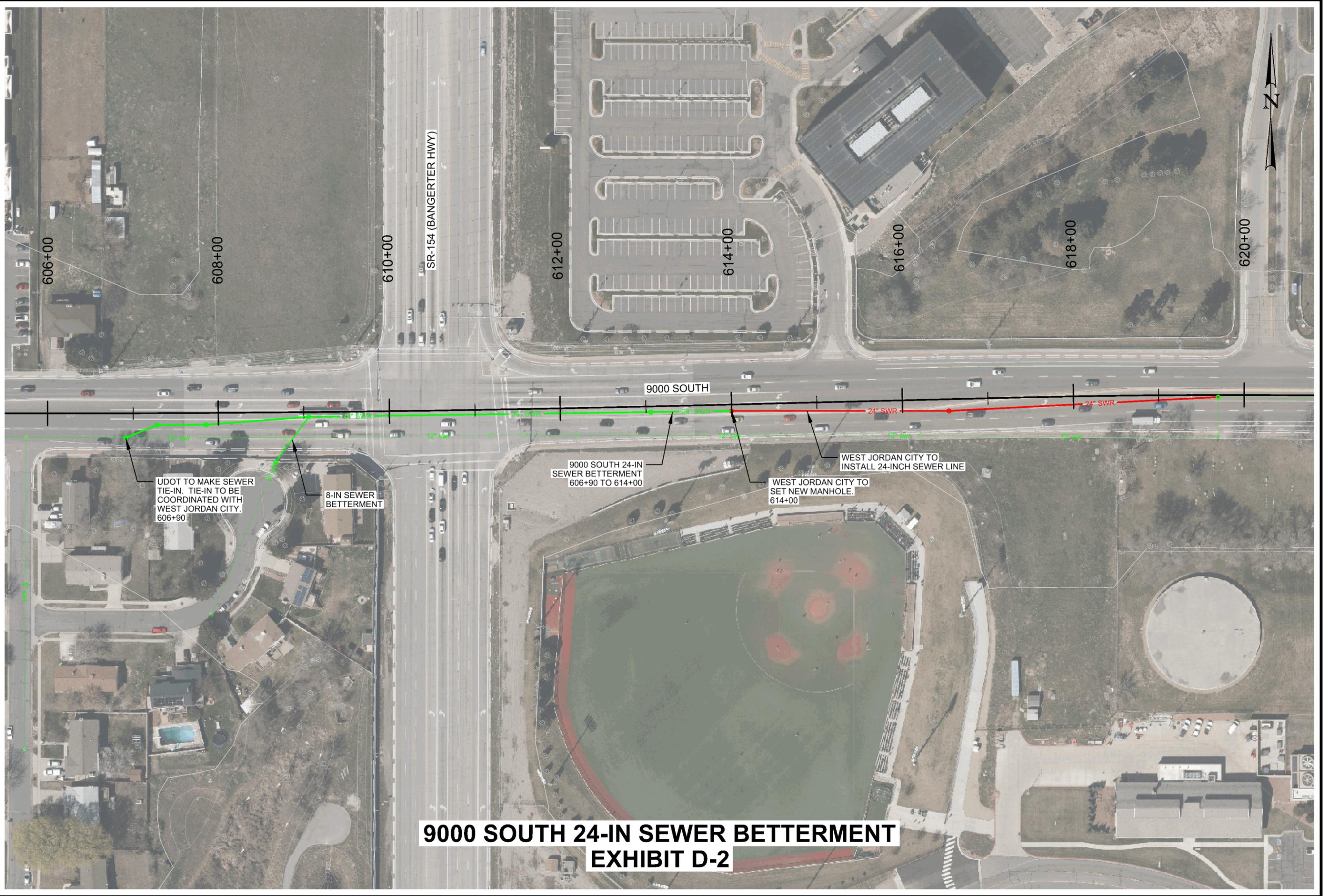


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CITY OF WEST JORDAN
7000 SOUTH UTILITY BETTERMENTS

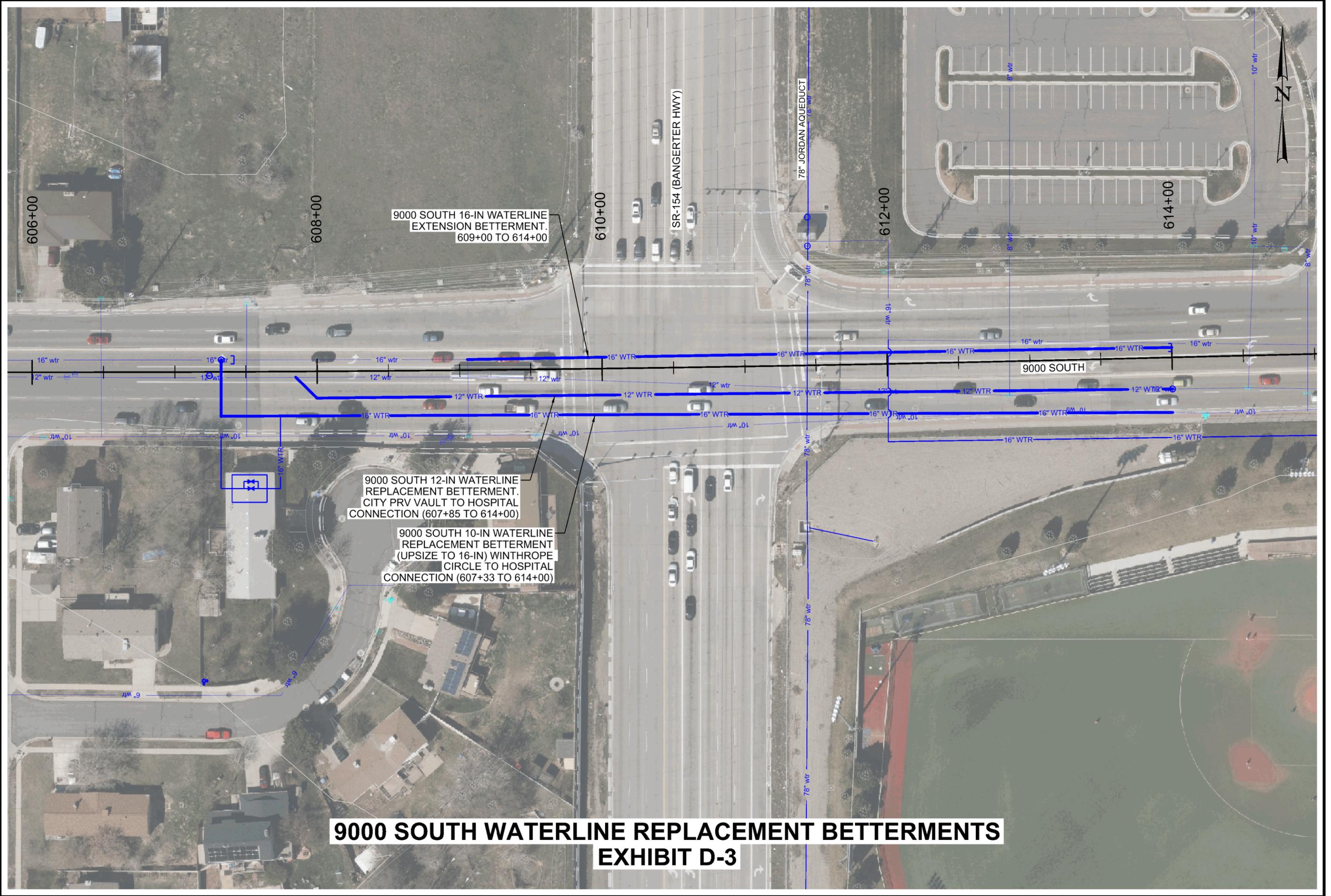
SECONDARY WATER
DETAIL SHEET 2

DESIGNED	AKF	SCALE:	AS SHOWN
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CHECKED	GST	REV.	
APPROVED	GST		
APPROVED	DWJ	C-621	B
DATE	7/5/16		



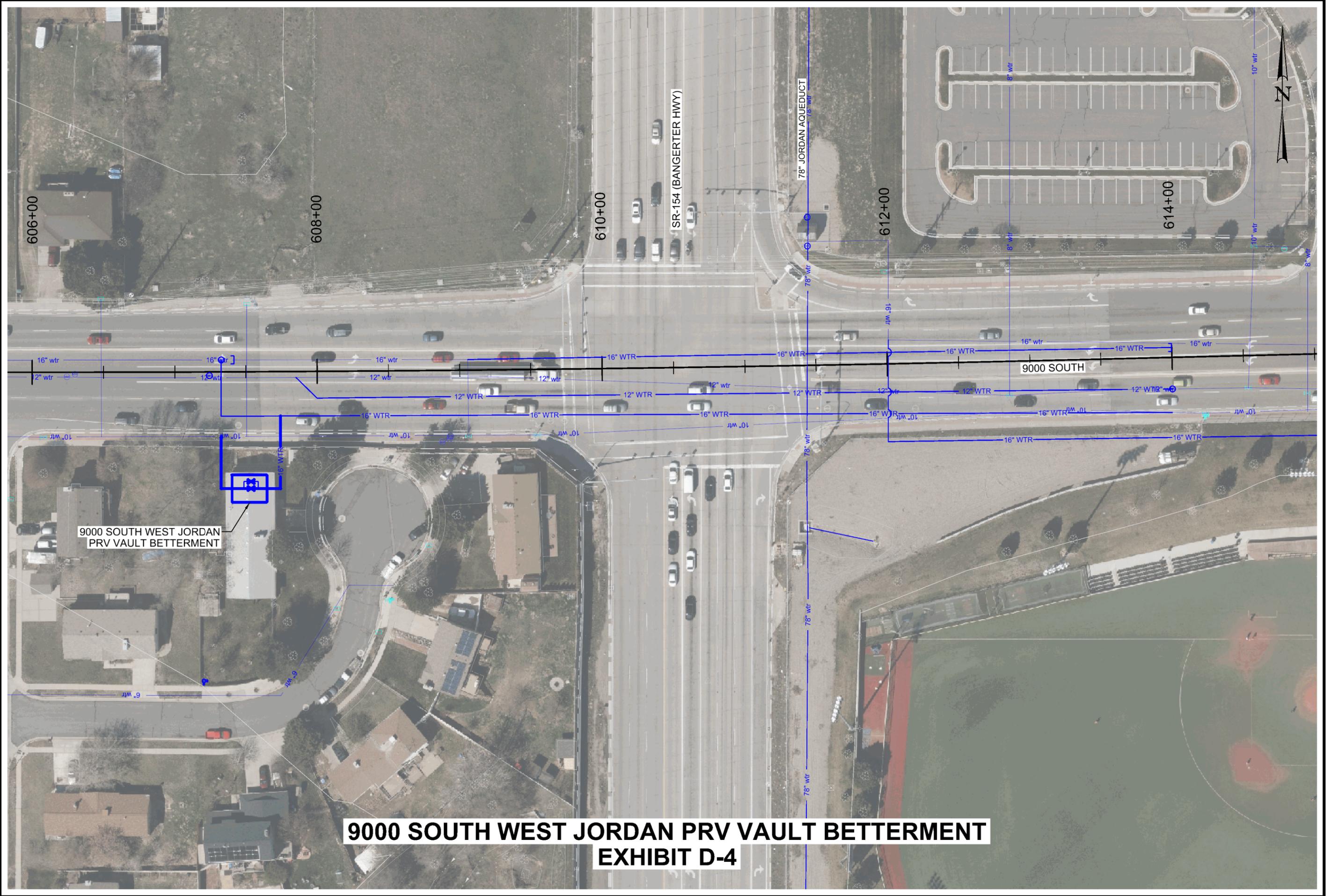
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EXHIBIT D-2**

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9000 SOUTH WATERLINE REPLACEMENT BETTERMENTS EXHIBIT D-3

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**9000 SOUTH WEST JORDAN PRV VAULT BETTERMENT
EXHIBIT D-4**