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DRAFT ENVIRONMENTAL ASSESSMENT (11-097)

*FRESNO COUNTY WATER WORKS DISTRICT NO. 18 AND LOWER TULE RIVER  
IRRIGATION DISTRICT REQUEST FOR APPROVALS PURSUANT TO THE FRIANT  
RANCH SPECIFIC PLAN*

**Appendix D**

**90% Preliminary Construction Designs Pages 5 and 6**

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May 2013

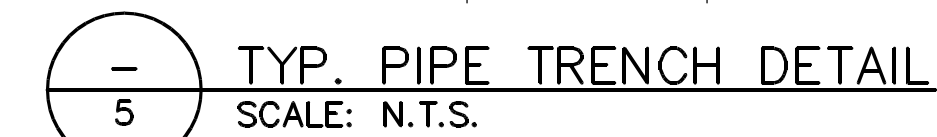




DEMOLITION OF EXISTING VENTURI METER VAULT  
& PRV VAULT

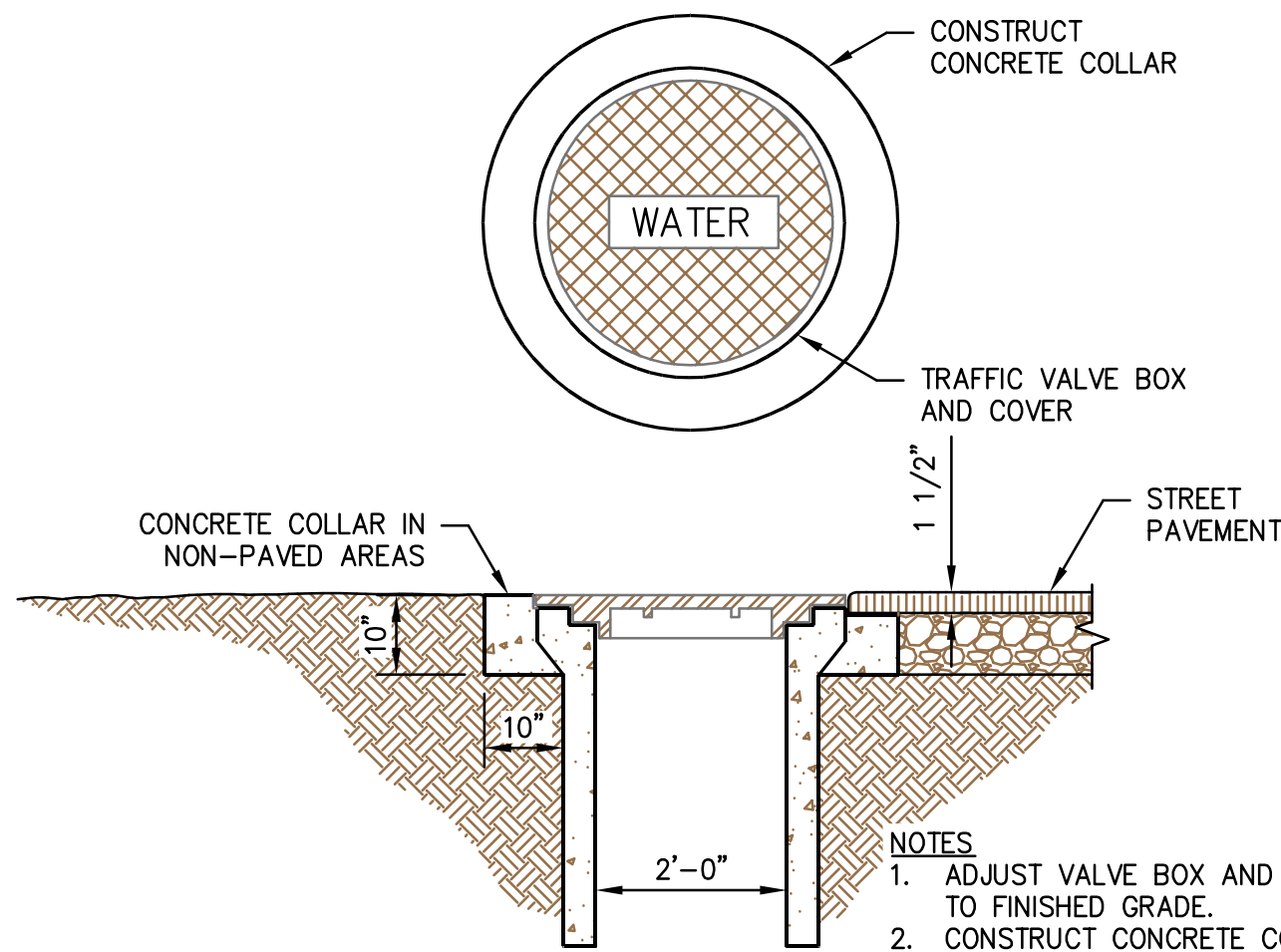
### DEMOLITION – PLAN VIEW

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- 1.5'
- VARIES PER PLAN
- CHRISTY B24"x36" CONCRETE UTILITY BOX WITH STEEL H2O TRAFFIC RATED LID OR APPROVED EQUAL
- INSTALL GATE VALVE IN BOX PER DETAIL ON SHEET 6
- EXISTING GROUND OR PAVED SURFACE
- 1" MIN. 6" MAX.
- 6" PVC RISER
- SHAFT EXTENSION AS REQUIRED
- FULL SIZED TEE SIZED PER PLAN AND PROFILE SHEET
- 3" MIN.
- DI PIPE WITH FLANGED JOINTS (SEE SIZING TABLE)
- PROVIDE COMPANION FLANGE WITH 4" MALE QUICK-COUPING HOSE ADAPTOR AND WATER TIGHT (NOT SHOWN)
- ECENTRIC REDUCER
- FLANGED GATE VALVE (SEE SIZING TABLE)
- D.I. 90° BEND (SEE SIZING TABLE)
- #12 SOLID COPPER TRACER WIRE (INSULATED)
- DI PIPE (LENGTH VARIES-SEE SIZING TABLE)
- NOT TO SCALE
- SIZING TABLE
- | WATER MAIN SIZING | BLOW-OFF PIPING AND VALVE SIZE |
|-------------------|--------------------------------|
| 18"               | 4"                             |
- PERMANENT BLOWOFF ASSEMBLY

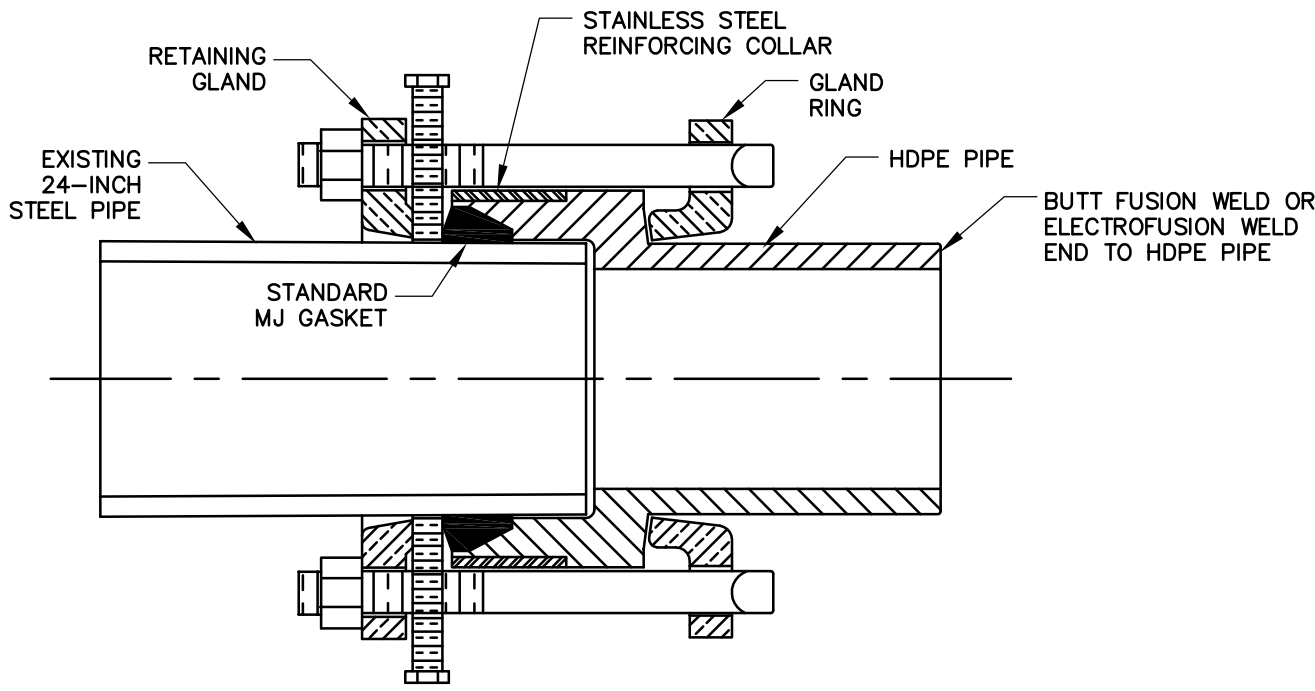


5 OF 6





WATER VALVE BOX



- NOTE:**
- CONTRACTOR TO INSTALL PER MANUFACTURER'S TECHNICAL INSTALLATION INSTRUCTIONS (PERFORMANCE PIPE TECHNICAL NOTE 812 - MJ ADAPTER CONNECTIONS OR EQUAL).
  - MJ ADAPTER CONNECTIONS SHALL MEET AWWA C111/ANSI A21.11 STANDARDS.
  - MJ ADAPTER CONNECTION ASSEMBLY TO BE PRESSURE RATED FOR THE SPECIFIED HDPE DR. TIGHTEN THE GLAND BOLTS EVENLY TO 76-90 FT-LB. TIGHTEN IN TORQUE INCREMENTS OF ABOUT 15-20 FT-LB. EACH AND FOLLOW A TIGHTENING PATTERN - TIGHTEN THE BOTTOM BOLT; THEN THE TOP BOLT; THEN THE BOLTS TO EITHER SIDE, AND FINALLY THE REMAINING BOLTS IN A CROSSING PATTERN FROM ONE SIDE TO THE OTHER. AT ONE TORQUE INCREMENT, TIGHTEN ALL BOLTS COMPLETELY THROUGH THE PATTERN BEFORE GOING UP TO THE NEXT HIGHER TORQUE INCREMENT AND TIGHTENING THROUGH THE PATTERN. TIGHTENING WITH TORQUE-MEASURING WRENCHES IS STRONGLY RECOMMENDED. DURING TIGHTENING, MAINTAIN APPROXIMATELY THE SAME GAP BETWEEN THE GLAND AND THE FACE OF THE SOCKET HUB FLANGE AT ALL POINTS AROUND THE JOINT.
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MJ ADAPTER - HDPE TO STEEL PIPE  
SCALE: N.T.S.

**BOLT TORQUE TABLE TO SEAT HDPE FLANGES**

NOMINAL PIPE SIZE	LAP-JOINT FLANGE BOLT DIAMETER	NUMBER OF BOLTS	INITIAL MINIMUM LUBED TORQUE (FT-LBS)	MAXIMUM LUBED TORQUE (FT-LBS)	FLANGE OD/ID (INCHES)
18"	1.125	16	200	300	21.12/ 14.73
24"	1.125	20	290	435	28.00/ 19.64

**BOLT TORQUE TABLE TO SEAT HDPE FLANGE FACE TO A BEV. STEEL PIPE FLANGE, OR DIP FLANGE**

NOMINAL PIPE SIZE	LAP-JOINT FLANGE BOLT DIAMETER	NUMBER OF BOLTS	INITIAL MINIMUM LUBED TORQUE (FT-LBS)	MAXIMUM LUBED TORQUE (FT-LBS)	FLANGE OD/ID (INCHES)
18"	1.125	16	140	210	21.12/ 16.88
24"	1.125	20	180	270	28.00/ 23.25

- NOTE (BOLT TORQUE TABLES):**
- ESTIMATED VALUES ARE BASED ON NON-PLATED BOLTS AND STUDS, USING A NUT FACTOR OF K=0.16 FOR LIGHTLY GREASED BOLTS AND NUTS.
  - THESE CALCULATIONS USE AN HDPE MATERIAL MINIMUM AND MAXIMUM COMPRESSIVE SEATING STRESS OF 1200-PSI TO 1800-PSI.
  - GASKETS ARE NOT NECESSARILY REQUIRED FOR HDPE FLANGES WHEN THE LAP-JOINT FLANGE IS PROPERLY ALIGNED, TORQUED, AND THE FLANGE-ADAPTER FACE IS UN-DAMAGED. THE HARDNESS OF HDPE IS ABOUT 65 SHORE D, SLIGHTLY HARDER THAN SOME RUBBER, OR TEFLON GASKETS. THE THICK FACE OF THE HDPE FLANGE ADAPTER ENABLES THE USER TO COMPRESS THE FLANGE FACE, THROUGH BOLT TORQUE, SUCH THAT THE FLANGE FACE IS ELASTICALLY COMPRESSED. THIS STRAIN IS THE APPROXIMATE THICKNESS OF A TRADITIONAL ELASTIC, RESILIENT, REINFORCED RUBBER GASKET.

**BOLT TIGHTENING SEQUENCE TABLE**

NUMBER OF BOLTS	CRISS-CROSS PATTERN TIGHTENING SEQUENCE
16	1-9-5-13 >> 3-11-7-15 >> 2-10-6-14 >> 4-12-8-16
20	1-11-6-16 >> 3-13-8-18 >> 5-10-15-20 >> 2-12-7-17 >> 4-14-9-19

- NOTE (BOLT TIGHTENING TABLE):**
- NUMBER THE BOLTS IN ROTATION AROUND THE LAP-JOINT FLANGE CIRCUMFERENCE IN A CLOCKWISE ORDER, BEGINNING WITH THE FIRST BOLT AT THE TOP IN THE NOMINAL 12:00 POSITION, THE SECOND BOLT BEING NEXT BOLT TO THE RIGHT, THE THIRD BEING THE NEXT TO THE RIGHT, ECT, UNTIL ALL BOLTS ARE NUMBERED SEQUENTIALLY.
  - FOLLOWING THE TABLE ABOVE, TIGHTEN THE GIVEN BOLT NUMBER TO THE DESIRED TORQUE VALUE FOR THE GIVEN ROUND OF TIGHTENING AS SPECIFIED IN THE INSTALLATION.

**INSTALLATION:**

- FLANGE FACE INSPECTION AND INTEGRITY:** THE HDPE AND METAL FLANGE FACES SHOULD BE INSPECTED TO INSURE THEY ARE FREE FROM RADIAL GOUGES ACROSS NO MORE THAN 1/3RD OF THE FACE WIDTH. SOME SURFACE MARRING OR DENTING IS ACCEPTABLE. THE METAL FLANGE SEALING FACES SHOULD BE FREE FROM RUST, WELD SPATTER, DIRT, DEBRIS, ETC. HDPE FLANGE-ADAPTER FACES EXHIBITING SURFACE MARRING OR DENTS SHOULD LIMIT SUCH DEFECTS TO LESS THAN 1/16" DEEP. (SOMETIMES, MINOR HDPE SURFACE MARRING ON FLAT-FACE FLANGE ADAPTERS (NOT SERRATED FACES) CAN BE "FLATTENED" BY LIGHTLY STRIKING THE DAMAGED AREA WITH A FLAT FACED 5-LB SLEDGE HAMMER TO "WORK" THE DEFECT "FLAT".)
- ALIGNMENT OF THE FLANGE FACES:** ALIGN FLANGE FACES PRIOR TO BOLTING SO THAT ANY GAP IS MINIMAL. THE MATING FLANGE FACES SHOULD BE ALIGNED SQUARE AND TRUE. AS A GENERAL RULE THE AXIAL CENTERLINE OFF-SET MISALIGNMENT SHOULD NOT EXCEED 1/8". THE ANGULAR MISALIGNMENT OF THE FLANGE-ADAPTER FACE IS USUALLY LIMITED TO LESS THAN 0.005" PER INCH OF DIAMETER. THE TOLERABLE AXIAL GAP SHOULD BE LESS THAN 1/32".
- MEASUREMENT OF GAPS:** DURING THE LEVELS OF TORQUE PROGRESSION, TAKE MEASUREMENTS BETWEEN THE LAP-JOINT FLANGES (LJF) AROUND THE CIRCUMFERENCE IN AT LEAST 3 TO 4 PLACES TO VALIDATE THAT THE FLANGES ARE BEING BROUGHT TOGETHER EVENLY. THE CLOSURE DISTANCE FOR EACH ROUND SHOULD BE ABOUT THE SAME FOR EACH POSITION MEASURED. THE GAP SHOULD BE MEASURED AT EVERY OTHER OR EVERY THIRD BOLT. RECORD THE GAP POSITION AND GAP CLOSURE DISTANCE AFTER EACH ROTATIONAL ROUND.
- CONCENTRIC ALIGNMENT: FLANGE ADAPTERS:** ALIGN THE LJF'S TO BE REASONABLY CONCENTRIC WITH THE OD OF THE HDPE FLANGE ADAPTERS. THE WEIGHT OF THE LJF'S WILL TEND TO CAUSE THEM TO "HANG" ECCENTRIC WITH AN UN-EVEN CRESCENT CONTACT AREA ON THE BACK FACE OF THE FLANGE ADAPTER. BY SNUGGING A FEW BOLTS FIRST, THE LJF CAN THEN BE RAISED UPWARDS AND HELD CONCENTRICALLY IN PLACE BY LIGHT BOLT FRICTION, SO AS TO MAXIMIZE, AND MAKE UNIFORM, THE CONTACT AREA BETWEEN THE LJF AND THE FLANGE ADAPTER.
- PROPER BOLT PROCEDURE AND BOLT SEQUENCE:** THE BOLT SEQUENCE TABLE GIVE THE PROPER SEQUENCES TO USE WHEN TORQUING THE BOLTS. EACH BOLT SHOULD BE NUMBERED TO INSURE IT IS USED IN THE PROPER SEQUENCE. KEEPING TRACK OF THE BOLTING SEQUENCE ON LARGE DIAMETER FLANGES CAN BE CONFUSING.
- TORQUE PROGRESSION:** WHEN TIGHTENING PIPE FLANGE BOLTS, THE BEST EVEN LOADING OF THE BOLTS, AND THE BEST EVEN COMPRESSION OF THE HDPE FLANGE FACE, IS ACHIEVED BY PROGRESSING THROUGH SEVERAL LEVELS TO THE FINAL TORQUE VALUE. FOR 18" AND LARGER NOMINAL DIAMETER FLANGES, THE 25-25 RULE APPLIES IN WHICH BOLTS ARE SEQUENTIALLY TIGHTENED IN FOUR (25%) STAGES, WITH A FINAL CLOCKWISE TORQUE CHECK.
- RESIDUAL BOLT TORQUE (RBT) & MANDATORY RE-TORQUING:** WITH TIME THE INITIAL BOLT TORQUE WILL SLOWLY DECLINE TO A RESIDUAL LEVEL OF ABOUT 35% OF THE INITIAL BOLT TORQUE. THIS LONG TERM LEVEL OF ENGINEERED TORQUE IS SUFFICIENT TO SEAL THE LJF ASSEMBLY. THE RBT IS THE MINIMUM TORQUE NECESSARY TO PROVIDE THE ELASTIC HDPE FACE COMPRESSION NECESSARY TO SEAL THE PIPE JOINT, WITH RESERVED INLCUDED FOR SURGE PRESSURE, BOLT TENSION SCATTER, AND OTHER VARIABLES. (A) ABOUT FOUR HOURS OR SO AFTER THE FIRST TIGHTENING TO THE TARGET TORQUE VALUE, RETIGHTEN EACH BOLT'S NUT TO THE FINAL TARGET TORQUE VALUE. AS BEFORE, RETIGHTEN IN THE CRISS-CROSS PATTERN SEQUENCE AND IN SMALL INCREMENTS, FOLLOWED BY A FINAL ROTATIONAL ROUND, TO RAISE THE TORQUE BACK TO ITS TARGET VALUE. (B) FOR DIAMETERS LARGER THAN 14", A SECOND RE-TORQUE IS ENCOURAGED AFTER AN ADDITIONAL 4 TO 24 HOURS. (C) IN ALL CASES, BEFORE PIPELINE AND FLANGE ASSEMBLY BURIAL, THE CRITERIA FOR RESIDUAL BOLT TORQUE SHOULD BE RBT NOT LESS THAN 35% OF THE INITIAL TARGET TORQUE. CHECKING RBT CAN BE DONE BY USING A TORQUE WRENCH, SETTING IT AT A LOW TORQUE, AND THEN TRYING TO ROTATE A NUT ON THE STATIONARY BOLT. RE-SET TO A HIGHER TORQUE AND TRY AGAIN, AND THEN AGAIN. WHEN THE NUT SLIGHTLY ROTATES WHILE THE BOLT IS STATIONARY, THE RESIDUAL TORQUE IS THEN MEASURED BY THE TORQUE WRENCH.
- HYDRO-TESTING & LEAK CLOSURE GUIDELINE:** NORMALLY AFTER INITIAL TORQUE AND THE RE-TORQUE, A HYDROTEST IS APPLIED. IF A DRIP OR SPRAY LEAKS ARE DISCOVERED DURING HYDROTEST, THE PRINCIPLE CORRECTIVE ACTION IS TO MEASURE THE EXISTING BOLT TORQUE WITH A TORQUE WRENCH, INCREASE IT 10% TO 15%, AND APPLY THAT LARGER TORQUE TO THE BOLT(S) IN THE CENTER OF THE LEAK, AND TO EACH SIDE OF THE LEAK. TIGHTEN, SLIGHTLY-MORE, EACH BOLT ADJACENT TO THOSE BOLT(S). REPEAT, SLIGHTLY INCREASING THE TORQUE ON THE BOLTS NEIGHBORING THE LEAK, UNTIL THE LEAKAGE STOPS AND THE PIPELINE REMAINS SEALED. DO NOT LOOSEN THE BOLTS ON A PRESSURIZED SYSTEM. HOWEVER, IF 150% OF THE SPECIFIED TORQUE VALUE IS REACHED AND THE FLANGE ASSEMBLY STILL LEAKS, STOP THE HYDROTEST, DE-PRESSURIZE, AND SAFELY DISASSEMBLE THE FLANGE JOINT.

BOLT TORQUE TABLES FOR FLANGED JOINTS  
SCALE: N.T.S.

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PRELIMINARY  
NOT FOR CONSTRUCTION  
90% DRAFT SUBMITTAL

NEW RAW WATER CONNECTION  
AT FRIANT DAM  
FRESNO COUNTY WATER WORKS DISTRICT NO. 18  
FRESNO COUNTY, CA

DETAILS

EST. 1983  
**PROVOST & PRITCHARD**  
CONSULTING GROUP  
An Employee-Owned Company  
768 WEST BROWNE AVENUE  
FRESNO, CALIFORNIA 93711-6162  
559/449-2700 FAX 559/449-2715  
www.ppg.com

DESIGN ENGINEER:

LICENSE NO:

DRAFTED BY: JSD

CHECKED BY:

SCALE: AS SHOWN

DATE: 2011-11-02

JOB NO: 13281106

DWG. NO:

SHEET

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OF 6