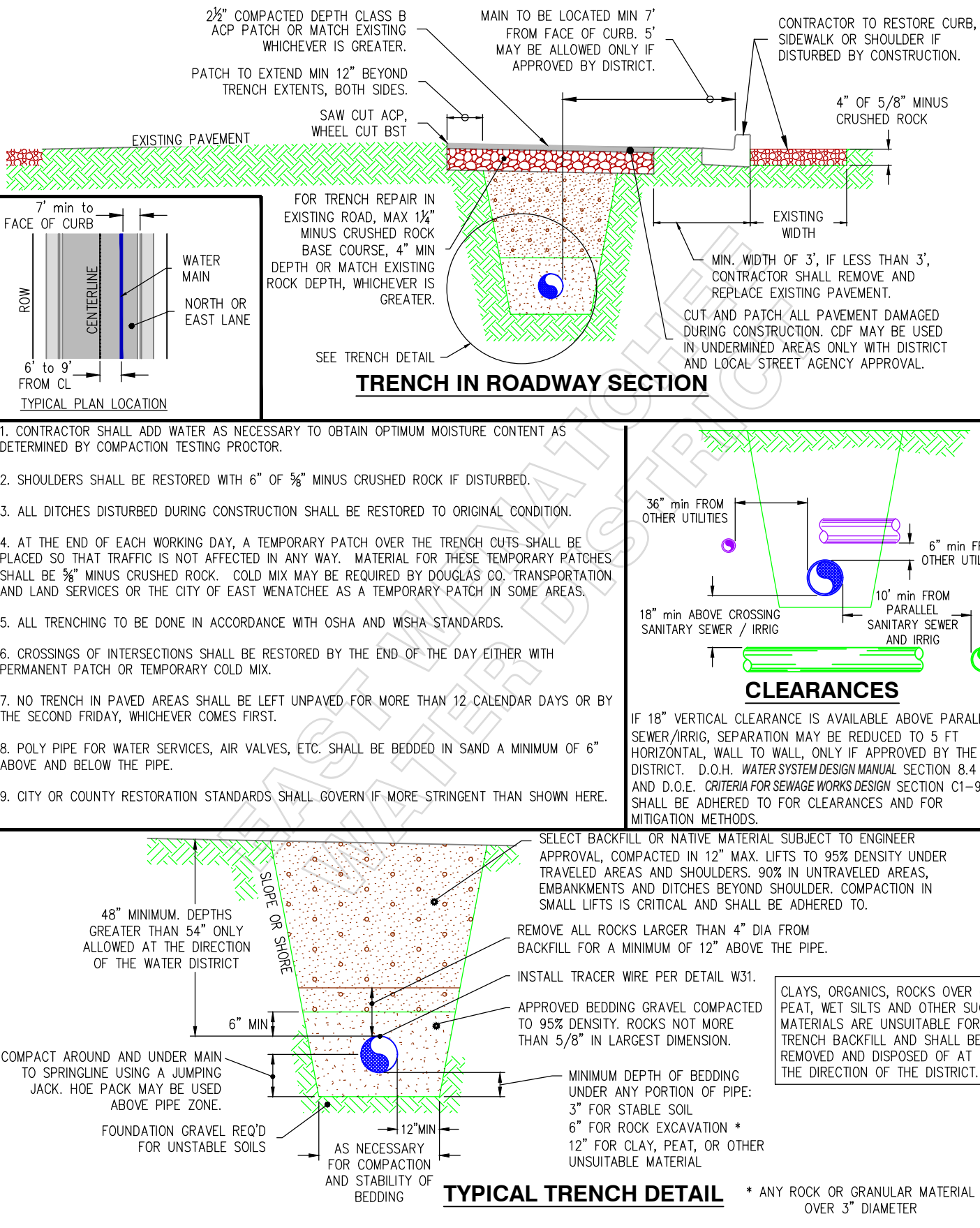


- CONSTRUCTION OF IMPROVEMENTS SHALL BE IN ACCORDANCE WITH THE MOST CURRENT VERSIONS OF THE FOLLOWING:
  - EAST WENATCHEE WATER DISTRICT DEVELOPER EXTENSION AGREEMENT (when applicable).
  - EAST WENATCHEE WATER DISTRICT STANDARD DETAILS (INCLUDING REVISIONS AFTER PLAN APPROVAL).
  - EAST WENATCHEE WATER DISTRICT SERVICE POLICIES AND CONSTRUCTION STANDARDS.
  - WA. STATE DEPT. OF TRANSPORTATION STANDARD SPECIFICATIONS FOR ROAD, BRIDGE AND MUNICIPAL CONSTRUCTION.
- ALL METAL PRODUCTS (VALVE BOXES AND CASING PIPES EXCLUDED) AND FITTING COMPONENTS (E.G. BOLTS, GLANDS, ETC) ARE TO BE OF DOMESTIC FABRICATION & CONSTRUCTION.
- ONLY FORD, McDONALD AND MUELLER PRODUCTS ARE APPROVED FOR USE AS SERVICE BRASS, EXCEPT WHERE OTHERWISE NOTED IN THESE STANDARD DETAILS.
- A PRECONSTRUCTION CONFERENCE IS REQUIRED PRIOR TO CONSTRUCTION AND 48 HOURS ADVANCE NOTIFICATION OF THE LOCAL MUNICIPALITY, THE EAST WENATCHEE WATER DISTRICT AND ALL AFFECTED UTILITY COMPANIES PRIOR TO THE ACTUAL START OF WORK.
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR COMPLYING WITH THE PROVISIONS OF THE RIGHT-OF-WAY/STREET CONSTRUCTION PERMIT AS ISSUED BY THE DOUGLAS COUNTY DEPT. OF TRANSPORTATION AND LAND SERVICES, CITY OF EAST WENATCHEE, AND/OR WA. STATE DOT FRANCHISE FOR THIS PROJECT.
- LOCATIONS OF EXISTING UTILITIES SHOWN ON THE PLANS ARE ESTIMATED UNLESS STATED OTHERWISE. IT IS THE CONTRACTOR'S RESPONSIBILITY TO VERIFY, LOCATE AND PROTECT ALL UTILITIES WITHIN THE PROJECT AREA. THE CONTRACTOR SHALL BE RESPONSIBLE FOR REPLACING OR REPAIRING ANY UTILITIES DAMAGED DURING CONSTRUCTION. SHOW ENCOUNTERED UTILITIES ON THE AS-BUILTS.
- LOCATION AND EXTENT OF IRRIGATION PIPELINES WITHIN THE PROJECT LIMITS ARE UNKNOWN. CONTRACTOR SHALL CONTACT PROPERTY OWNERS ADJACENT TO THE PROJECT FOR LOCATING PRIVATE IRRIGATION SYSTEMS. CONTRACTOR IS RESPONSIBLE FOR LOCATING IRRIGATION MAINS AND REPLACING OR REPAIRING PIPELINES DAMAGED DURING CONSTRUCTION. SHOW THESE PIPELINES ON THE AS-BUILTS.
- WATER MAIN TRENCH SECTION AND ALL EXCAVATED AREAS SHALL BE BACKFILLED AND COMPACTED IN ACCORDANCE WITH THE STANDARD DETAILS AND WITH SECTIONS 7-9.3(10) AND 7-9.3(11) OF THE STANDARD SPECIFICATIONS. COMPACTION TESTING IS REQUIRED DURING BACKFILLING OPERATIONS AT THE DISCRETION OF THE WATER DISTRICT. IF TRENCH BACKFILL DOES NOT MEET COMPACTION REQUIREMENTS, CONTRACTOR SHALL EXCAVATE, RECOMPACT AND RETEST MATERIAL AT CONTRACTOR'S EXPENSE.
- RESTORATION OF DAMAGED ROAD SURFACING SHALL BE IN ACCORDANCE WITH THE LOCAL MUNICIPALITY'S REQUIREMENTS. ALL OTHER AREAS SHALL BE RESTORED TO ORIGINAL CONDITION OR AS DIRECTED BY THE DISTRICT. THIS INCLUDES SHOULDERS, LANDSCAPING, WALLS, FENCES AND OTHER IMPROVEMENTS.
- ALL SERVICES, FIRE HYDRANTS AND THRUST BLOCKING SHALL BE INSPECTED BY THE DISTRICT BEFORE BURY.
- DISTRICT APPROVED THRUST RESTRAINTS ARE REQUIRED FOR ALL UNRESTRAINED FITTINGS. RESTRAINED JOINTS ARE ALLOWED FOR VERTICAL BENDS, WHERE BLOCKING IS NOT PRACTICAL OR INEFFECTIVE, AND ARE REQUIRED FOR MAINS THAT WILL BE EXTENDED.
- A SANITARY GAP MUST BE PROVIDED BETWEEN THE EXISTING AND NEW WATER SYSTEMS. CONNECTION TO THE EXISTING WATER SYSTEM SHALL BE PERFORMED BY THE CONTRACTOR ONLY AFTER COMPLETING AN ACCEPTABLE HYDROSTATIC PRESSURE TEST AND THE PIPELINE IS DISINFECTED, FLUSHED AND RECEIPT OF APPROVAL OF WATER QUALITY TEST RESULTS FROM THE HEALTH DISTRICT OR LAB.
- PERFORM PRESSURE TEST AT 250psi. THE DISTRICT INSPECTOR HAS DISCRETION TO MODIFY THE TESTING REQUIREMENTS.
  - PRESSURE TEST INCLUDES MAINLINE, HYDRANTS, SERVICE LINES, SETTERS, AND CUSTOMER SERVICE SIDE TAILPIPE.
  - TEST MAINLINE IN SECTIONS OF NO MORE THAN 1,500 FEET. PRESSURE DROP SHALL NOT EXCEED 5psi IN 60 MINUTES.
  - ASSEMBLE AND TEST VALVE CLUSTERS OUTSIDE OF THE TRENCH PRIOR TO INSTALLATION.
- AN INFLATABLE PIPE PLUG SHALL BE USED ON EACH JOINT DURING INSTALLATION TO PROTECT AGAINST SOIL INTRUSION AND FLOODING OF THE PIPE. OPEN ENDS OF VALVES SHALL BE PLUGGED OR BAGGED UNTIL EXTENDED WITH PIPE.
- NO OTHER PARALLEL UTILITIES SHALL BE INSTALLED WITHIN 36" HORIZONTALLY OF ANY ACTIVE WATER LINE UNLESS OTHERWISE PRE-APPROVED BY THE DISTRICT.
- CONTRACTOR SHALL POTHOLE A SUFFICIENT DISTANCE AHEAD OF PIPELAYING TO VERIFY DEPTH OF EXISTING WATER MAINS AND CROSSING UTILITIES AND TO ANTICIPATE ANY NECESSARY CHANGES IN FITTINGS OR ALIGNMENT.
- ALL PE PIPE SHALL BE MIN 200psi RATED CTS (Copper Tube Size).

- AN AS-BUILT RECORD MUST BE SUBMITTED TO THE DISTRICT BEFORE WATER SERVICE WILL BE PROVIDED.
- DEFLECTION AT PIPE AND FITTING JOINTS WILL BE ALLOWED UP TO 3.0" (11" OVER 18") OR AS RECOMMENDED BY MANUFACTURER, WHICHEVER IS LESS.
- CONTRACTOR SHALL ONLY DISPOSE OF WASTE MATERIAL AT SITES APPROVED BY DOUGLAS COUNTY TRANSPORTATION AND LAND SERVICES. STOCKPILE MATERIALS ONLY ON DISTRICT APPROVED SITES.
- ALL PIPE 3" AND LARGER SHALL BE DUCTILE IRON. PIPE SHALL BE MINIMUM CLASS 50 EXCEPT WHERE TRENCH BACKFILL AND LOADING DICTATE A STRONGER CLASS PIPE. CLASS 52 SHALL BE USED FOR HYDRANT RUNS AND IN AREAS WHERE PRESSURE EXCEEDS 150 PSI.
- CONTRACTORS WORKING WITHIN THE RIGHT OF WAY OR ON EXISTING DISTRICT INFRASTRUCTURE SHALL BE LICENSED, BONDED AND HAVE EXPERIENCE INSTALLING PUBLIC DOMESTIC WATER SYSTEMS AND BE PREPARED TO PRESENT EXAMPLES OF 5 SUCH PROJECTS UPON REQUEST BY THE DISTRICT.
- Vault Lid Note:** FOR ALL TAPER-TOP STYLE VAULTS FOR WATER SERVICES, AIR VALVES, PERMANENT BLOW-OFFS AND OTHER PURPOSES, CONTRACTOR TO PURCHASE LID AND FRAME EQUAL TO EAST JORDAN IRONWORKS' EAST WENATCHEE WATER DISTRICT SPECIFICATION, FRAME 36192, LID 36190 (TRAFFIC) 36200 (NONTRAFFIC).
- ANCHOR FRAME TO VAULT USING NON-SHRINK GROUT. FRAME AND LID TO BE RATED FOR TRAFFIC LOADING IN TRAFFIC AREAS.
- WATER SERVICE VAULT LIDS TO INCLUDE ONE INTEGRAL 2-3/16" DIAMETER HOLE WITH 4-1/4" DIAMETER x 9/16" DEEP RECESS FOR RADIO.
- FOR AIR VALVES AND BLOW-OFFS, DO NOT DRILL HOLE IN LIDS, NOR PROVIDE "METER" TEXT ON FRAME.
- LID SURFACE TO HAVE A STATIC COEFFICIENT OF FRICTION NO LESS THAN 0.60 AS DETERMINED BY ASTM C-1028.
- REPAIR OF EXISTING IRRIGATION SYSTEMS DAMAGED DURING CONSTRUCTION MUST USE PRODUCTS OF NO LESSER QUALITY THAN SCH 40 PVC.
- CONTRACTOR TO PROVIDE NO LESS THAN 48 HOURS NOR MORE THAN 72 HOURS NOTICE TO THE DISTRICT PRIOR TO ANY REQUESTED SHUTDOWN OR CUSTOMER SERVICE OUTAGE. DISTRICT WILL PROVIDE NOTICE TO CUSTOMERS 24 HOURS IN ADVANCE OF OUTAGE.
- NO RESTRAINTS, GASKETS, OR RESTRAINED PIPES (PORTIONS AFFECTED BY RESTRAINTS) MAY BE REUSED ONCE ASSEMBLED.
- FLANGE GASKETS MUST BE RING TYPE (NOT FULL FACE) AND MINIMUM 1/8" THICK. FLANGE BOLTS MUST BE ASTM A307 GRADE A OR B. STEEL BOLTS, NUTS AND WASHERS TO BE ZINC PLATED.
- BURIED VALVES SMALLER THAN 4" DIAMETER TO BE CURB STOP OR CORP STOP PER DETAILS, OR STYLE AT THE DISCRETION OF THE DISTRICT. BURIED VALVES SMALLER THAN 4" SHALL NOT BE GATE VALVES.



CONSTRAINTS

- SOIL CONDITIONS AND BEARING CHARACTERISTICS ARE TO BE DETERMINED BY THE DISTRICT.
- THIS STANDARD DETAIL IS FOR HORIZONTAL THRUST RESTRAINT ONLY.
- CONCRETE BLOCKING SHALL BE PER DOT/APWA SPECIFICATION 7-09.3(21), CURRENT EDITION.
- MAINTAIN 18" MINIMUM GROUND COVER OVER THE TOP OF ALL CONCRETE BLOCKINGS.
- ALL THRUST BLOCKS TO BE FORMED AND FITTINGS COVERED IN PLASTIC.
- ANY TEMPORARY BLOCKING USED TO SUPPORT FITTINGS DURING CONSTRUCTION SHALL BE REMOVED PRIOR TO BACKFILLING.

PROCEDURE

- DETERMINE BEARING FACTOR IN TABLE 1 CORRESPONDING TO APPROPRIATE PIPE SIZE AND TYPE OF FITTING.
- MULTIPLY THE BEARING FACTOR DETERMINED IN TABLE 1 BY THE MULTIPLICATION FACTOR IN TABLE 2 FOR THE APPROPRIATE SOIL CLASSIFICATION.
- THE RESULT IS THE REQUIRED AREA OF CONCRETE (IN SQ. FT.) WHICH MUST BEAR AGAINST UNDISTURBED SOIL.
- USING TABLE 3 LOCATE THE MINIMUM DEPTH OF CONCRETE (D<sub>min</sub>) CORRESPONDING TO THE REQUIRED BEARING AREA.

THE RESULT IS THE REQUIRED AREA OF CONCRETE (IN SQ. FT.) WHICH MUST BEAR AGAINST UNDISTURBED SOIL.

USING TABLE 3 LOCATE THE MINIMUM DEPTH OF CONCRETE (D<sub>min</sub>) CORRESPONDING TO THE REQUIRED BEARING AREA.

USING D<sub>min</sub>, THE HEIGHT AND LENGTH OF THE THRUST BLOCKING CAN BE DETERMINED FROM THE DIMENSION RELATIONSHIPS ILLUSTRATED IN FIGURE 1 AND DESCRIBED BELOW:

A. "H" EQUALS "L"  
 B. MAX. "L" EQUALS 2 x "H"  
 C. MIN. "L" EQUALS "H"

SOIL CONDITION	MULTIPLICATION FACTOR
MUCK, PEAT, etc.	1.0
SOFT CLAY	2.0
SILT	2.0
SAND	1.5
SAND AND GRAVEL	1.0
SAND AND GRAVEL CEMENTED W/ CLAY	0.75
HARD SHALE	0.30

PIPE SIZE (INCH)	TEST PRESSURE (PSI)	TEES	DEAD END	90° BEND	45° BEND	22 1/2° BEND	11 1/4° BEND
3	300	2.3	2.3	2.3	2.3	2.3	2.3
4	300	2.3	2.6	2.3	2.3	2.3	2.3
6	300	3.7	5.3	2.9	2.3	2.3	2.3
8	300	6.4	9.1	4.9	2.3	2.3	2.3
10	300	9.7	13.7	7.4	3.8	2.3	2.3
12	300	13.7	19.4	10.5	5.3	2.7	2.7
14	300	18.4	26.0	14.1	7.2	3.6	3.6
16	300	23.8	33.6	18.2	9.3	4.7	4.7
18	300	29.9	42.2	22.9	11.7	5.9	5.9
20	300	36.6	51.8	28.0	14.3	7.2	7.2
24	300	52.3	73.9	40.0	20.4	10.2	10.2

\* 2.3 BASED ON GEOMETRIC FACTORS

SOIL CONDITION	MULTIPLICATION FACTOR	REQ'D BEARING AREA (SQ. FT.)	MINIMUM DEPTH (D <sub>min</sub> )
MUCK, PEAT, etc.	1.0	2.25 Min - 5.0	1.5'
SOFT CLAY	2.0	5.01 - 10.0	2.3'
SILT	2.0	10.01 - 15.0	3.0'
SAND	1.5	15.01 - 30.0	4.0'
SAND AND GRAVEL	1.0	30.01 - 40.0	4.5'
SAND AND GRAVEL CEMENTED W/ CLAY	0.75	40.01 - 50.0	5.0'
HARD SHALE	0.30	50.01 - 70.0	6.0'

FIGURE 1

H = D<sub>min</sub>  
 H < L <= 2H  
 BEARING AREA = H x L

**East Wenatchee Water District**

WATER SYSTEM STANDARD DETAIL  
**CONSTRUCTION NOTES**  
 PAGE 1 of 2

DRAWING NO. W-01 SHEET NO. 1

**East Wenatchee Water District**

WATER SYSTEM STANDARD DETAIL  
**CONSTRUCTION NOTES**  
 PAGE 2 of 2

DRAWING NO. W-30 SHEET NO. 2

**East Wenatchee Water District**

WATER SYSTEM STANDARD DETAIL  
**TRENCH SECTION AND RESTORATION**

DRAWING NO. W-03 SHEET NO. 3

**East Wenatchee Water District**

WATER SYSTEM STANDARD DETAIL  
**HORIZONTAL THRUST BLOCKING**

DRAWING NO. W-04 SHEET NO. 4

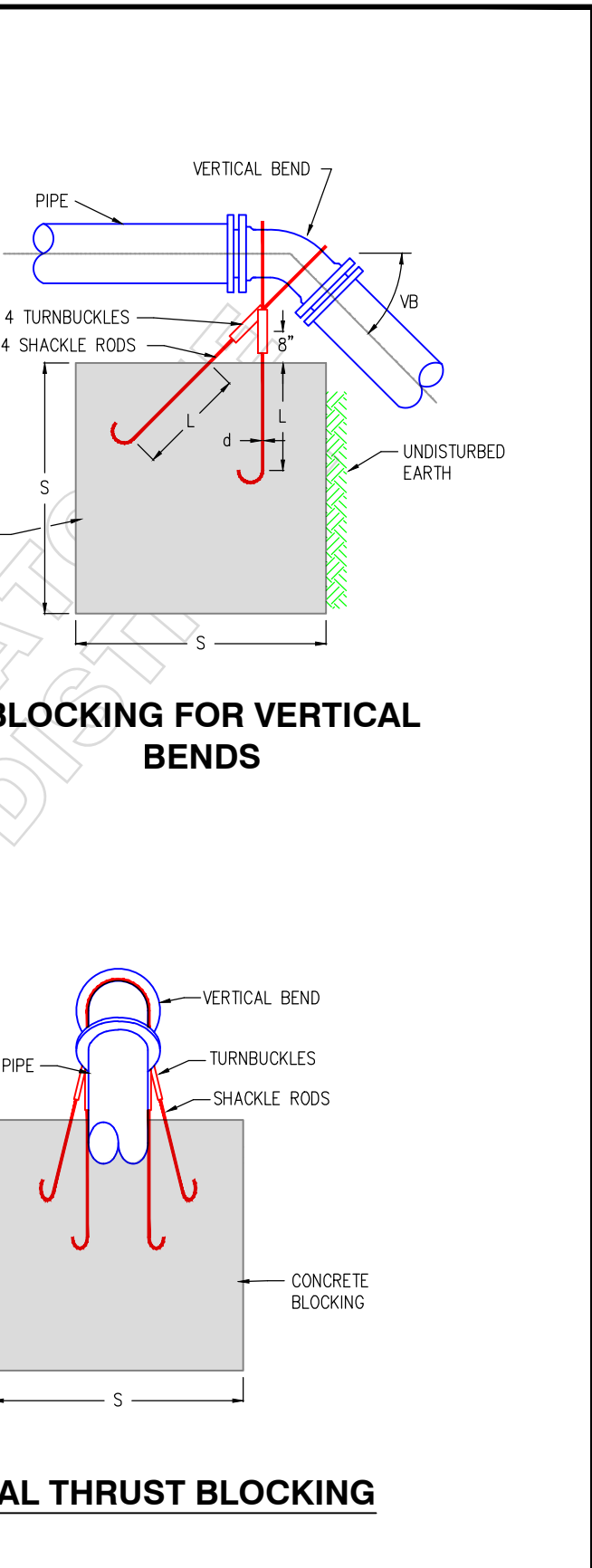
VERTICAL THRUST BLOCKING FOR 11.25", 22.5", AND 45" BENDS

PIPE SIZE NOM. DIAMETER - INCHES	TEST PRESSURE - PSI	VERTICAL BEND DEGREES	AMOUNT CONCRETE BEARING - CU FT.	LENGTH OF SOLE FEET	SHACKLE ROD DIA. INCHES	DEPTH OF ROD IN CONCRETE INCHES	NUMBER OF THE ROD SETS (2 EMBEDDED RODS PER SET)					
							S	L				
3"	300	11 1/4	5.8	1.8	5/8	12"	2	2				
							22 1/2	11.5	2.3	5/8	12"	2
							45	22.6	2.8	5/8	12"	2
4"	300	11 1/4	8.5	2.0	5/8	12"	2	2				
							22 1/2	17.0	2.6	5/8	12"	2
							45	33.2	3.2	5/8	12"	2
6"	300	11 1/4	17.6	2.6	5/8	12"	2	2				
							22 1/2	35.0	3.3	5/8	12"	2
							45	68.7	4.1	5/8	12"	2
8"	300	11 1/4	30.3	3.1	3/4	12"	2	2				
							22 1/2	60.2	3.9	3/4	12"	2
							45	118	4.9	3/4	12"	4
10"	300	11 1/4	45.5	3.6	3/4	12"	2	2				
							22 1/2	90.6	4.5	3/4	12"	2
							45	178	5.6	3/4	24"	4
12"	300	11 1/4	64.4	4.0	3/4	12"	2	2				
							22 1/2	128	5.1	3/4	12"	4
							45	251	6.3	3/4	12"	6
14"	250	11 1/4	86.5	4.4	3/4	12"	2	2				
							22 1/2	172	5.6	3/4	24"	4
							45	338	7.0	1"	24"	6
16"	250	11 1/4	112	4.8	3/4	12"	3	3				
							22 1/2	223	6.1	3/4	12"	6
							45	436	7.6	1"	12"	6
18"	250	11 1/4	141	5.2	3/4	24"	4	4				
							22 1/2	280	6.5	1"	24"	4
							45	549	8.2	1-1/4"	24"	6

1. RESTRAINED JOINTS ARE PREFERRED OVER VERTICAL THRUST BLOCKING UNLESS RESTRAINTS ARE NOT PRACTICAL.

2. CONCRETE SHALL HAVE A MINIMUM 28 DAY COMPRESSIVE STRENGTH OF 3000 PSI.

3. SHACKLE RODS SHALL BE PER W-07.



- RESTRAINED JOINT PIPE IS APPROPRIATE TO USE IN MANY SITUATIONS. HOWEVER, THE DISTRICT WILL BE THE SOLE DETERMINER IF THE APPLICATION IS APPROPRIATE ON A GIVEN JOB. TYPICAL APPLICATIONS INCLUDE:
  - DEAD END MAINS THAT MAY BE EXTENDED.
  - SOILS NOT SUPPORTIVE OF THRUST BLOCKING.
  - INSUFFICIENT BEARING SOIL BEHIND FITTINGS.
  - VERTICAL BENDS (not covered here, must be designed by engineer for each job)
- MECHANICAL JOINT RESTRAINTS SHALL BE COATED WITH FUSION BONDED POLYESTER, OR ZINC & EPOXY COATING. EBAA MEGABOND, ROMAC ROMABOND, FORD ARMORGUARD E-COAT, OR APPROVED EQUAL.
- TYLER TUGRIP RESTRAINTS ARE NOT ALLOWED. SET-SCREW STYLE RESTRAINTS ARE NOT ALLOWED.
- THE FOLLOWING TABLES HAVE BEEN DEVELOPED USING THE DUCTILE IRON PIPE RESEARCH ASSOCIATION RESTRAINED JOINT CALCULATOR. THE FOLLOWING CONDITIONS MUST BE MET FOR THESE RESULTS TO BE VALID. IF ANY OF THESE CONDITIONS CANNOT BE MET, PROJECT SPECIFIC CALCULATIONS MUST BE PROVIDED:
  - THESE TABLES ONLY FOR BARE (UNWRAPPED) DUCTILE IRON OR PVC PIPE.
    - PIPE LAYING CONDITION TYPE 4 or 5, DEFINED AS:
      - 1.1. SELECT GRANULAR BEDDING MATERIAL BELOW PIPE.
      - 1.2. PIPE ZONE MATERIAL EXTENDING TO TOP OF PIPE MECHANICALLY COMPACTED.
    - PIPE RESTING DIRECTLY ON NATIVE TRENCH BOTTOM IS NOT ACCEPTABLE.
    - BEDDING MATERIAL IS SANDY SILT. IF USING IMPORT CLEAN SAND OR 5/8" MINUS CRUSHED SURFACING, LENGTHS MAY BE REDUCED BY 25%.
    - DEPTH OF COVER IS 3.5 FEET MINIMUM.
    - 250psi TEST PRESSURE MAXIMUM. FOR HIGHER TEST PRESSURE, TABLE LENGTHS MUST BE MULTIPLIED BY THE PROPORTIONAL DIFFERENCE.
    - EXAMPLE: FOR 300psi, 300/250=1.2 THEREFORE, LENGTHS MUST BE MULTIPLIED BY 1.2

THE LENGTH "L" GIVEN BELOW IS THE DISTANCE THAT PIPE MUST BE RESTRAINED PAST THE FITTING JOINT. ALL JOINTS WITHIN THIS DISTANCE MUST BE RESTRAINED, INCLUDING THE FITTING.

BRANCH DIAMETER	4"	6"	8"	10"	12"	16"	18"
4"	46"	39"	31"	23"	15"	1"	1"
6"	70"	65"	60"	55"	43"	37"	
8"	97"	91"	87"	81"	75"		
10"	122"	115"	110"	104"	98"		
12"	151"	143"	137"	131"	125"		
16"	211"	200"	194"	188"	182"		
18"	241"	229"	223"	217"	211"		

\*\* Assumes reducer down 2 sizes (example 12"x8"). Larger reductions shall be treated as a tee.  
 \*\* For PVC pipe, multiply the lengths by the value shown in the PVC row.

**East Wenatchee Water District**

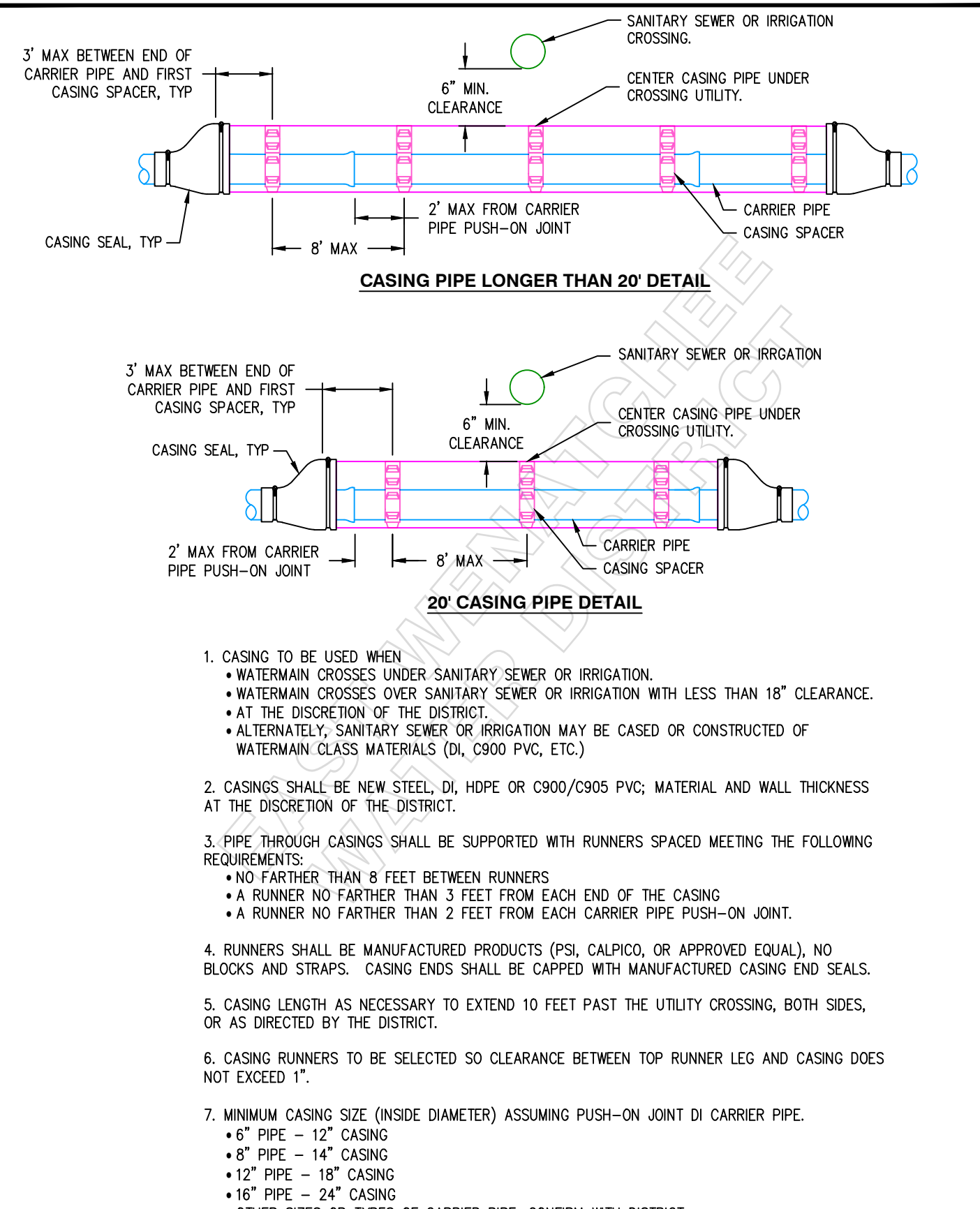
WATER SYSTEM STANDARD DETAIL  
**VERTICAL THRUST BLOCKING**

DRAWING NO. W-05 SHEET NO. 5

**East Wenatchee Water District**

WATER SYSTEM STANDARD DETAIL  
**RESTRAINED JOINT PIPE**

DRAWING NO. W-16 SHEET NO. 6



**East Wenatchee Water District**

WATER SYSTEM STANDARD DETAIL  
**PIPE CASING**

DRAWING NO. W-32 SHEET NO. 7

**ASTM A242 (COR-TEN® OR EQUAL) STEEL** ROD DIAMETER: 5/8" OR (3/4")

PIPE SIZE (INCH)	TEST PRESSURE (PSI)	NUMBER OF THE RODS PER JOINT		MAXIMUM TIE ROD LENGTH, FEET						
		45° BEND	22 1/2° BEND	45° BEND	22 1/2° BEND	11 1/4° BEND	11 1/4° BEND			
3	2	2	2	2	2	100	100	100	100	100
4	2	2	2	2	2	100	100	100	100	100
6	2	2	2	2	2	60	80	100	100	100
8	4	3	2	2	2	50	50	70	80	100
10	6	4	2	2	2	40	60	60	80	100
12	8	6	4	2	2	30	60	60	80	100
14	10	6	4	2	2	20	60	60	80	100
16	12	8	6	4	2	20	60	60	80	100
18	18	12	8	6	4	20	60	60	80	100

**304SS OR OTHER STEELS** ROD DIAMETER: 5/8" OR (3/4")

PIPE SIZE (INCH)	TEST PRESSURE (PSI)	NUMBER OF THE RODS PER JOINT		MAXIMUM TIE ROD LENGTH, FEET						
		45° BEND	22 1/2° BEND	45° BEND	22 1/2° BEND	11 1/4° BEND	11 1/4° BEND			
3	2	2	2	2	2	100	100	100	100	100
4	2	2	2	2	2	100	100	100	100	100
6	2	2	2	2	2	60	80	100	100	100
8	4	3	2	2	2	50	50	70	80	100
10	6	4	2	2	2	40	60	60	80	100
12	8	6	4	2	2	30	60	60	80	100
14	10	6	4	2	2	20	60	60	80	100
16	12	8	6	4	2	20	60	60	80	100
18	18	12	8	6	4	20	60	60	80	100

**TIE ROD DETAIL**

**SHACKLE PLATE DETAIL**

**GENERAL NOTES**

- THE RODS SHALL BE "ALL THREAD" ROD OF ONE OF THE APPROVED MATERIALS:
  - ASTM A242 (COR-TEN)
  - 304 STAINLESS STEEL
  - ASTM F1558 A325 TYPE 3
  - ASTM A578
  - ASTM A709 OR SOW
- 304 STAINLESS STEEL WILL NOT BE ALLOWED UNLESS ASTM A320 GRADE A OR B ROD IS ALLOWED, BUT MUST BE FIELD COATED AFTER ASSEMBLY WITH EPOXY, COAT-TAR OR RUBBER.
- THE RODS SHALL HAVE "NATIONAL-COARSE" THREAD WITH EITHER TWO NUTS OR ONE SELF