



COTTONWOOD WATER AND SANITATION DISTRICT GENERAL NOTES

- ALL MAINS, SYSTEM PLANS AND CONSTRUCTION SHALL CONFORM TO THE COTTONWOOD WATER AND SANITATION DISTRICT (THE DISTRICT) SPECIFICATIONS AND SHALL BE SUBJECT TO CONSTRUCTION OBSERVATION BY DISTRICT PERSONNEL OR REPRESENTATIVES. ALL MATERIAL AND WORKMANSHIP SHALL BE IN CONFORMANCE WITH DISTRICT SPECIFICATIONS AND STANDARDS.
- THE OWNER, HIS/HER ENGINEER, OR CONTRACTOR SHALL SCHEDULE A PRECONSTRUCTION MEETING WITH THE DISTRICT MANAGER AND DISTRICT ENGINEER AT LEAST 48 HOURS PRIOR TO THE START OF CONSTRUCTION. PLANS WITH THE DISTRICT REVIEW STAMP WILL BE DISTRIBUTED PRIOR TO OR AT THE PRECONSTRUCTION MEETING. NO CONSTRUCTION WILL BE PERMITTED UNTIL FORMAL RECORDING OF EASEMENTS IS COMPLETE. NO CONSTRUCTION WILL BE PERMITTED PRIOR TO THE PRECONSTRUCTION MEETING.
- ALL WATER MAINS INSTALLED SHALL CONFORM TO DENVER WATER MATERIAL SPECIFICATIONS.  
 DUCTILE IRON PIPE MS-1 AWWA C151 CLASS 50 WITH POLYWRAP  
 POLYVINYL CHLORIDE (PVC) MS-2 AWWA C900-07 DR18 PC 235
- THE APPROVAL OF THE CONSTRUCTION PLANS SIGNIFIES ONLY THAT THE PLANS MEET THE MINIMUM REQUIREMENTS OF THE DISTRICT'S STANDARDS AND SPECIFICATIONS BASED ON THE INFORMATION PROVIDED BY THE DESIGN ENGINEER, OWNER-DEVELOPER, AND CONTRACTOR. APPROVAL IS NOT A REPRESENTATION OR WARRANTY THAT THE SYSTEM AND ASSOCIATED COMPONENTS WILL PERFORM ANY CERTAIN FUNCTIONS.
- THE DISTRICT, ITS REPRESENTATIVE, AND/OR THE DISTRICT ENGINEER, IS NOT A GUARANTOR OF THE CONSTRUCTION CONTRACTORS' OBLIGATIONS AND PERFORMANCE OF CONTRACT.
- OBSERVATION OF WORK IN PROGRESS AND ON-SITE VISITS ARE NOT TO BE CONSTRUED AS A GUARANTEE BY THE DISTRICT OR DISTRICT ENGINEER OF THE CONTRACTOR'S CONTRACTUAL COMMITMENT.
- THE DISTRICT AND/OR DISTRICT ENGINEER IS NOT RESPONSIBLE FOR SAFETY IN, ON, OR ABOUT THE PROJECT SITE, NOR FOR COMPLIANCE BY THE APPROPRIATE PARTY OF ANY REGULATIONS RELATING THERETO.
- THE DISTRICT AND/OR DISTRICT ENGINEER, EXERCISES NO CONTROL OF THE SAFETY OR ADEQUACY OF ANY EQUIPMENT, BUILDING COMPONENTS, SCAFFOLDING, FORMS, OR ANY OTHER WORK AIDS USED IN OR ABOUT THE PROJECT, OR IN THE SUPERINTENDING OF THE SAME.
- THE CONTRACTOR AGREES THAT HE/SHE SHALL ASSUME SOLE AND COMPLETE RESPONSIBILITY FOR JOB SITE CONDITIONS DURING THE COURSE OF CONSTRUCTION OF THE PROJECT, INCLUDING SAFETY OF ALL PERSONS AND PROPERTY; THAT THIS REQUIREMENT SHALL APPLY CONTINUOUSLY, AND NOT BE LIMITED TO NORMAL WORKING HOURS; AND THAT THE CONTRACTOR SHALL DEFEND, INDEMNIFY AND HOLD HARMLESS FROM ANY AND ALL LIABILITY, REAL OR ALLEGED, IN CONNECTION WITH THE PERFORMANCE OF WORK ON THIS PROJECT, EXCEPTING FOR LIABILITY ARISING FROM THE SOLE NEGLIGENCE OF THE OWNER, THE DESIGN ENGINEER, OR THE COUNTY.
- THE CONTRACTOR IS RESPONSIBLE FOR:
  - NOTIFYING ALL CUSTOMERS POSSIBLY AFFECTED BY OUTAGE OF WATER OR SEWER SERVICE DURING CONSTRUCTION PRIOR TO SHUTTING OFF SAID SERVICE.
  - OBTAINING, AT THE CONTRACTOR'S EXPENSE, ALL APPLICABLE LICENSES, PERMITS, BONDS, ETC. REQUIRED FOR MAIN INSTALLATION/SYSTEM MODIFICATIONS.
  - CONTACTING THE DISTRICT FOR A PRE-CONSTRUCTION MEETING AT 303-985-3636. CONSTRUCTION CANNOT START FOR AT LEAST 48 HOURS AFTER THE MEETING HAS BEEN HELD.
  - NOTIFYING THE DISTRICT 48 HOURS IN ADVANCE OF ANY NEEDS TO SHUT DOWN ANY PORTION OF THE EXISTING WATER AND/OR SANITARY SEWER SYSTEM.
  - NOTIFYING THE DISTRICT 48 HOURS IN ADVANCE FOR CONSTRUCTION OBSERVATIONS.
  - IN CASE OF AN EMERGENCY AFTER WORKING HOURS CALL THE DISTRICT OFFICE AT (303) 426-3167 FOR RECORDED INSTRUCTIONS.
- UNDERGROUND UTILITIES IN THE AREA OF CONSTRUCTION HAVE BEEN LOCATED FROM FIELD INVESTIGATION AND THE BEST AVAILABLE UTILITY RECORDS AND ARE APPROXIMATE ONLY. THE DISTRICT ENGINEER ASSUMES NO RESPONSIBILITY FOR UTILITY LOCATIONS. THE CONTRACTOR IS RESPONSIBLE TO FIELD VERIFY THE LOCATION OF ALL UTILITIES PRIOR TO THE COMMENCEMENT OF ANY CONSTRUCTION. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROTECTION OF ALL UTILITY LINES WHETHER SHOWN ON THE PLANS OR NOT. THE CONTRACTOR SHALL COORDINATE HIS/HER ACTIVITIES WITH THE AFFECTED UTILITY COMPANIES AND SHALL NOTIFY THE UTILITY NOTIFICATION CENTER, PHONE NO. 1-800-922-1987, 48 HOURS PRIOR TO STARTING CONSTRUCTION.
- CONTRACTOR SHALL PERFORM POTHOLING ON EXISTING UTILITIES PRIOR TO THE CONSTRUCTION OF THE WATER AND/OR SANITARY SEWER LINES. THIS WORK SHALL BE CONSIDERED INCIDENTAL TO THE INSTALLATION COST OF THE PIPELINE.
- THE CONTRACTOR SHALL HAVE IN HIS/HER POSSESSION AT ALL TIMES ONE (1) SIGNED COPY OF THE PROJECT PLANS SIGNED BY THE DISTRICT.
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR REMOVING AND REPLACING ANY EXISTING SIGNS, STRUCTURES, FENCES, ETC ENCOUNTERED ON THE JOB AND RESTORING THEM TO THEIR ORIGINAL CONDITION.
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR REMOVING ANY GROUNDWATER ENCOUNTERED DURING THE CONSTRUCTION OF ANY PORTION OF THIS PROJECT. GROUNDWATER SHALL BE PUMPED, PIPED, REMOVED AND DISPOSED OF IN A MANNER WHICH DOES NOT CAUSE FLOODING OF EXISTING STREETS NOR EROSION ON ABUTTING PROPERTIES IN ORDER TO CONSTRUCT THE IMPROVEMENTS SHOWN ON THESE PLANS. USE OF THE DISTRICTS SEWER SYSTEM FOR THE DISPOSAL OF GROUND WATER IS PROHIBITED WITHOUT WRITTEN CONSENT FROM THE DISTRICT. NO CONCRETE SHALL BE PLACED WHERE GROUNDWATER IS VISIBLE OR UNTIL THE GROUNDWATER TABLE HAS BEEN LOWERED BELOW THE PROPOSED IMPROVEMENTS. ANY UNSTABLE AREAS, AS A RESULT OF GROUNDWATER, ENCOUNTERED DURING THE CONSTRUCTION OF THE PROPOSED IMPROVEMENTS SHALL BE STABILIZED AS AGREED UPON BY THE DISTRICT AND THE DESIGN ENGINEER AT THE TIME OF THE OCCURRENCE.
- IT SHALL BE THE DESIGN ENGINEER'S RESPONSIBILITY TO RESOLVE CONSTRUCTION PROBLEMS WITH THE DISTRICT DUE TO CHANGED CONDITIONS ENCOUNTERED DURING THE PROGRESS OF ANY PORTION OF THE PROPOSED WORK. IF, IN THE OPINION OF THE DISTRICT, PROPOSED ALTERATIONS TO THE SIGNED CONSTRUCTION PLANS INVOLVES SIGNIFICANT CHANGES TO THE CHARACTER OF THE WORK, OR TO FUTURE CONTIGUOUS PUBLIC OR PRIVATE IMPROVEMENTS, THE DESIGN ENGINEER SHALL BE RESPONSIBLE FOR SUBMITTING REVISED PLANS TO THE DISTRICT FOR REVIEW PRIOR TO ANY FURTHER CONSTRUCTION RELATED TO THAT PORTION OF THE WORK.
- THE OWNER IS RESPONSIBLE FOR ALL COSTS ASSOCIATED WITH PLAN REVIEW AND CONSTRUCTION OBSERVATION.
- MAINTAIN MINIMUM OF 10 FEET SEPARATION BETWEEN WATER AND SANITARY SEWER MAINS AND SERVICES IN ACCORDANCE WITH COLORADO STATE DEPARTMENT OF HEALTH AND ENVIRONMENT STANDARDS.
- THE CONTRACTOR WILL BE REQUIRED TO PROVIDE A TRAFFIC CONTROL PLAN TO DOUGLAS COUNTY AND TO CDOT PRIOR TO ISSUANCE OF A STREET CUT PERMIT.
- SHOP DRAWINGS ARE TO BE SUBMITTED AT LEAST 48 HOURS PRIOR TO THE INSTALLATION OF ANY MATERIALS FOR ALL PIPES, FITTINGS AND APPURTENANCES.

COTTONWOOD WATER NOTES

- EXISTING VALVES IN THE DISTRICT SERVICE AREA MAY ONLY BE OPERATED BY DISTRICT PERSONNEL.
- BEFORE ANY TAPS ARE MADE TO MAINS, APPLICATION(S) FOR THE TAPS MUST BE RECEIVED AND APPROVED BY THE DISTRICT.
- IRRIGATION DEMANDS MUST BE FORMALLY SUBMITTED FOR ALL PROJECT REQUIRING WATER FOR LANDSCAPING PURPOSES.
- FINAL PLUMBING PLANS MUST BE RECEIVED AND REVIEWED BY THE DISTRICT ENGINEER BEFORE WATER SERVICE TAPS CAN BE AWARDED IN ORDER TO PREFORM FIXTURE UNIT ANALYSIS TO VERIFY TAP SIZE FOR ALL COMMERCIAL, INDUSTRIAL AND MULTI-FAMILY DEVELOPMENTS.
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROCUREMENT OF ALL PERMITS NECESSARY FOR THE CONSTRUCTION OF THE WATER LINE WORK.
- PRIOR TO INSTALLATION OF WATER MAINS, ROAD CONSTRUCTION MUST HAVE PROGRESSED TO AT LEAST THE "SUB-GRADE" STAGE. SUB-GRADE IS DEFINED AS AN ELEVATION OF NO MORE THAN SEVEN (7) INCHES BELOW THE FINISHED STREET GRADE. THE CONTRACTOR WILL ADJUST ALL VALVE BOXES AND FIRE HYDRANTS TO THE FINAL FINISHED GRADE.
- ALL WATER MAINS SHALL HAVE A MINIMUM OF FOUR AND ONE-HALF (4-1/2) FEET OF COVER AND ARE TO BE THREE (3) FEET FROM THE EDGE OF THE GUTTER PAN.
- DISTANCE FOR WATERLINES IS THE HORIZONTAL DISTANCE BETWEEN CENTER OF FITTING TO CENTER OF VALVE, METER, ETC. THEREFORE, THE DISTANCES SHOWN ON THE PLANS ARE APPROXIMATE AND COULD VARY DUE TO VERTICAL ALIGNMENT AT FITTING DIMENSIONS.
- ALL HYDRANT LATERALS AND FIRE LINES SHALL BE DUCTILE IRON PIPE CLASS 50 AND FULLY RESTRAINED WITH POLYWRAP.
- ALL WATER LINE VALVES SHALL BE SET AT THE INTERSECTION OF THE EXTENDED PROPERTY LINE AND WATER LINE, EXCEPT WHERE THAT POINT FALLS IN THE FLOW LINE OF A CONCRETE CROSS PAN. IN THAT CASE, THE VALVE SHALL BE LOCATED SO THAT THE SURFACE DRAINAGE DOES NOT INFILTRATE THE VALVE BOX. IF A TAPPING TEE IS NOT LOCATED ON A PROPERTY LINE THEN THE ASSOCIATED VALVE WILL NOT BE REQUIRED AS SHOWN ON THE PLANS. VALVE BOXES SHALL BE SET AT AN ELEVATION IN ACCORDANCE WITH COUNTY PAVING REQUIREMENTS.
- ALL VALVES, VALVE BOXES, CURB STOPS AND/OR METER PIT COVERS SHALL HAVE THE WORD "WATER" STAMPED ON THEM. ALL POTABLE WATER VALVES SHALL BE OPENED IN A CLOCKWISE DIRECTION. ALL VALVE BOXES AND FIRE HYDRANTS WILL BE ADJUSTED TO THE FINAL FINISHED GRADE BY THE CONTRACTOR.
- ALL IRRIGATION AND NON-POTABLE PIPE SHALL BE PURPLE IN COLOR OR SHALL BE LABELED WITH PURPLE TAPE READING "CAUTION NONPOTABLE WATER" ALONG THE FULL LENGTH OF THE PIPE.
- POLYETHYLENE WRAPPINGS SHALL BE INSTALLED AROUND ALL DUCTILE IRON PIPE, FITTINGS, VALVES, FIRE HYDRANT BARRELS, AND RODS AND CLAMPS. THE POLYETHYLENE SHALL HAVE A MINIMUM THICKNESS OF EIGHT (8) MILS.
- TRACER WIRE, GAUGE 12 COPPER, SHALL BE INSTALLED ON ALL WATER LINES, FIRE HYDRANTS LATERALS AND APPURTENANCES.
- INDIVIDUAL SERVICE LINES ARE REQUIRED TO HAVE PRV'S WHEN SYSTEM PRESSURE EXCEEDS 80 PSI IN ACCORDANCE WITH UNIFORM PLUMBING CODE.
- A BACKFLOW PREVENTION DEVICE APPROVED BY DENVER WATER IS REQUIRED ON THE TREATED WATER SERVICE LINE FOR:
  - ALL COMMERCIAL AND MULTI-FAMILY DOMESTIC TAPS.
  - FIRE LINES
- ALL WATER LINES SHALL BE CHLORINATED IN ACCORDANCE WITH AWWA C-651, "DISINFECTING WATER MAINS." THE REQUIRED METHOD IS TO USE SUFFICIENT CHLORINE TABLET TO PRODUCE A 25 MG/L SOLUTION. THESE TABLETS SHALL BE ADHERED TO THE TOP OF THE PIPE WITH A FOOD GRADE ADHESIVE SUCH AS PERMATED CLEAR R.T.V. CHLORINATION OF 16-INCH AND LARGER PIPE REQUIRE A CHLORINE SLURRY. THE CHLORINATION OF ANY FINISHED PIPELINE SHALL BE COMPLETED PRIOR TO HYDROSTATIC TESTING.
- THE WATER QUALITY CONTROL DIVISION OF THE COLORADO DEPARTMENT OF PUBLIC HEALTH AND ENVIRONMENT (CDPHE) REQUIRES ALL WATER LINE CONTRACTORS TO POSSESS A CURRENT DISCHARGE PERMIT FOR DISCHARGES OF CHLORINATED AND PROCESS WATERS ASSOCIATED WITH THE INSTALLATION OF NEW MAINS OR CONDUITS. CONTACT CDPHE WATER QUALITY CONTROL DIVISION AT (303) 692-3539 FOR INFORMATION ON OBTAINING THE REQUIRED PERMIT.
- HYDROSTATIC TESTING: ALL WATER LINES SHALL BE HYDROSTATIC TESTED IN ACCORDANCE WITH AWWA C-600 SECTION 4 "HYDROSTATIC TESTING". ALL WATER LINES SHALL BE TESTED TO A MINIMUM OF 150 PSI. THE TEST SHALL BE SCHEDULED WITH THE DISTRICT AUTHORITY AND COORDINATED WITH ANY OTHER REVIEWING OR APPROVING AGENCY. THE CONTRACTOR SHALL FURNISH ALL EQUIPMENT FOR TESTING. THE ALLOWABLE LEAKAGE RATES ARE AS FOLLOWS:
 

PIPE I.D.	ALLOWABLE LEAKAGE PER 1000 FEET	
	D.I.P	PVC
4"	0.37 GAL/HOUR	0.33 GAL/HOUR
6"	0.55 GAL/HOUR	0.50 GAL/HOUR
8"	0.74 GAL/HOUR	0.66 GAL/HOUR
12"	1.10 GAL/HOUR	1.00 GAL/HOUR
16"	1.47 GAL/HOUR	
20"	1.84 GAL/HOUR	
- ONLY ONE (1) POINT OF CONNECTION WILL BE ALLOWED UNTIL ALL TESTING OF NEW INSTALLATIONS IS COMPLETED TO THE DISTRICT'S SATISFACTION.
- PROBATIONARY ACCEPTANCE OF THE NEW WATER LINES IS CONTINGENT UPON RECEIVING COPIES OF:
  - PASSING WATER LINE TRENCH COMPACTION TEST RESULTS;
  - PASSING HYDROSTATIC PRESSURE TEST RESULTS;
  - RECORD DRAWINGS
  - PASSING HEALTH DEPARTMENT TESTS (CHLORINE AND/OR CLEAR WATER AS REQUIRED)
- THE COST OF THE WATER LINE CONSTRUCTION IS \$\_\_\_\_\_
- THE STATIC PRESSURE MEASURED AT THE PUMP STATION LOCATED AT NORTH OF COTTONWOOD DRIVE IS 120 PSI.

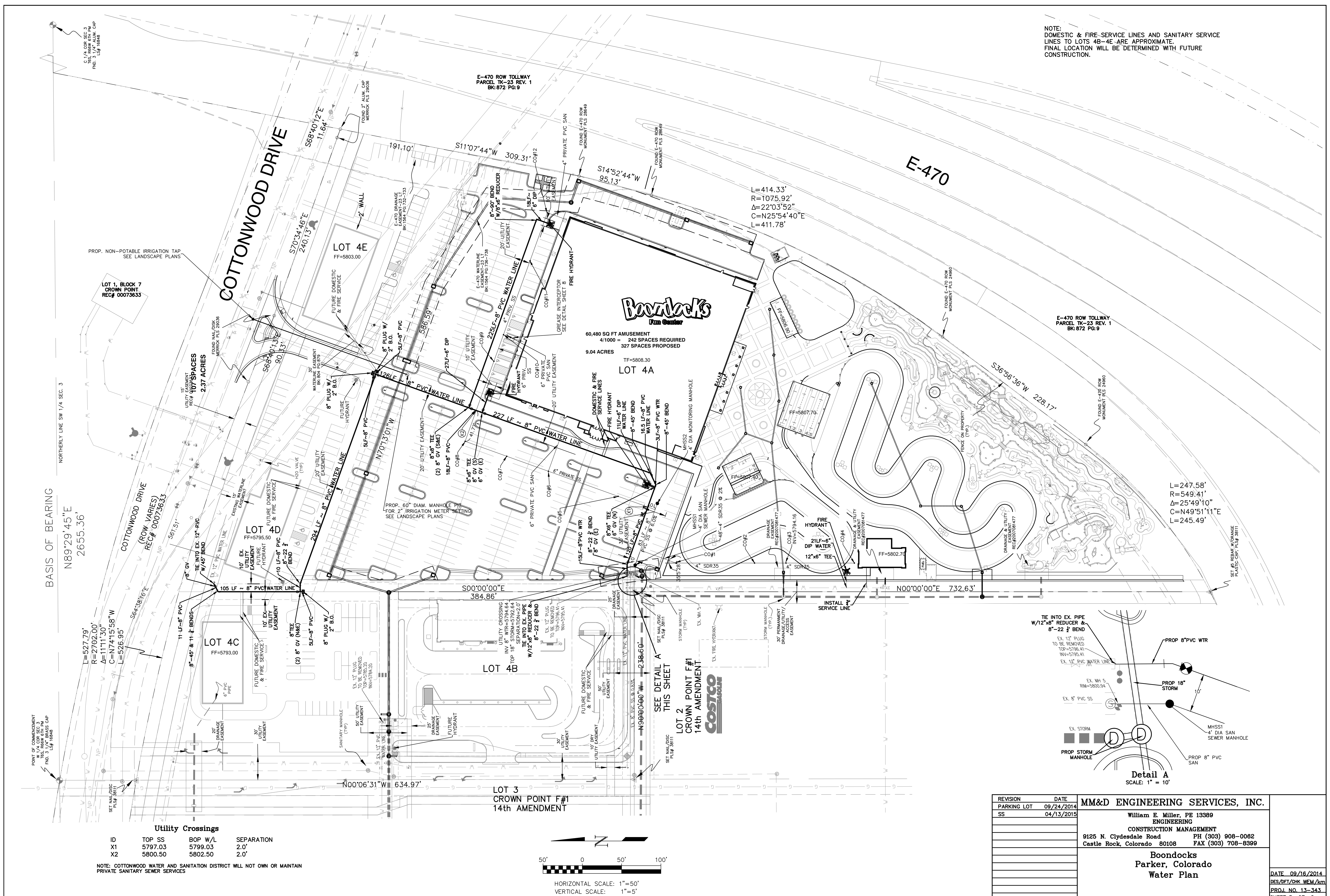
COTTONWOOD SANITARY SEWER NOTES

- THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROCUREMENT OF ALL PERMITS NECESSARY FOR THE CONSTRUCTION OF THE SANITARY SEWER LINE WORK.
- THE CONTRACTOR IS RESPONSIBLE FOR:
  - NOTIFYING THE DISTRICT 48 HOURS IN ADVANCE OF ANY NEED TO SHUT DOWN ANY PORTION OF THE EXISTING SANITARY SEWER SYSTEM.
  - NOTIFYING THE DISTRICT 48 HOURS IN ADVANCE OF THE WORK.
  - IN CASE OF AN EMERGENCY AFTER WORKING HOURS, CALL THE DISTRICT OFFICE AT (303) 986-2275 FOR RECORDED INSTRUCTIONS.
- UNDERDRAINS ARE NOT PART OF THE SANITARY SEWER LINES OR SYSTEM AND WILL NOT BE ALLOWED IN THE SAME TRENCH AS THE SANITARY SEWER MAINS. UNDERDRAINS SHALL NOT BE ACCEPTED, MAINTAINED OR SUBJECT TO CONSTRUCTION OBSERVATION BY THE DISTRICT. THE DISTRICT HAS NO SPECIFICATIONS FOR UNDERDRAINS AND WILL ONLY REVIEW THEIR PROPOSED LOCATION RELATIVE TO THE SANITARY SEWER LINES.
- THE CONTRACTOR SHALL VERIFY EXISTING MANHOLE INVERTS TO BE CONNECTED TO PRIOR TO CONSTRUCTION STAKING AND CONSTRUCTION.
- PRIOR TO INSTALLATION OF SANITARY SEWER MAINS, ROAD CONSTRUCTION MUST HAVE PROGRESSED TO AT LEAST THE SUB-GRADE STAGE. SUB-GRADE IS DEFINED AS AN ELEVATION OF NO MORE THAN SEVEN (7) INCHES BELOW THE FINISHED STREET GRADE. THE CONTRACTOR SHALL ADJUST ALL MANHOLE COVERS TO THE FINAL FINISHED GRADE.
- THE LENGTH OF SANITARY SEWER IS THE HORIZONTAL DISTANCE BETWEEN CENTERS OF MANHOLE. THEREFORE DISTANCES SHOWN ON THE PLANS ARE APPROXIMATE AND COULD VARY DUE TO VERTICAL ALIGNMENT AND MANHOLE DIMENSIONS.
- THE PIPE USED FOR SANITARY SEWER MAINS SHALL BE IN ACCORDANCE WITH ASTM D-3034 SDR 35 PVC PIPE IN PAVED RIGHTS-OF-WAY AND EASEMENTS, AND AWWA C-900 CLASS 165 (DR25) IN UNPAVED EASEMENTS OR AS NOTED ON THE PROJECT PLANS.
- MANHOLE RIMS SHALL BE SET AT AN ELEVATION RELATIVE TO THE PAVEMENT, IN ACCORDANCE WITH COUNTY STANDARDS. WHETHER THE MANHOLE IS IN A PAVED OR UNPAVED GRADE, A MAXIMUM ACCEPTABLE VERTICAL ADJUSTMENT UTILIZING CONCRETE RINGS IS TWELVE (12) INCHES.
- THE CONTRACTOR SHALL TAKE CARE TO PROPERLY SHAPE ALL MANHOLE INVERTS AND BENCHES IN ACCORDANCE WITH DISTRICT STANDARDS AND SPECIFICATIONS, TO PROMOTE SMOOTH FLOW THROUGH THE MANHOLE. INVERTS OF LINES INTERSECTING AT 90 DEGREES AND AT HIGHLY DIVERGENT OR FLAT SLOPES ARE ESPECIALLY CRITICAL. MANHOLE INVERTS SHALL BE CONSTRUCTED WITH A SMOOTH TROWEL FINISH, AND BENCHES FINISHED WITH A LIGHT BROOM, NON-SKID FINISH.
- TRACER WIRE, GAUGE 12 COPPER, SHALL BE INSTALLED ON ALL SEWER LINES, MANHOLES, AND CLEANOUTS.
- THE SANITARY SEWER SERVICE SHALL BE STUBBED OUT. THE END OF THE STUB SHALL BE WITNESSED BY A WOOD, CARBONITE OR METAL POST AT LEAST FOUR FEET LONG, BURIED TO EXPOSE ONE FOOT. THE CONTRACTOR SHALL FURNISH THE AUTHORITY WITH AN AS-BUILT LOCATION OF THE WYE.
- THE SANITARY SEWER SYSTEM WILL BE TESTED IN ACCORDANCE WITH THE DISTRICT STANDARDS AND SPECIFICATIONS. THE DISTRICT WILL REQUIRE THE DEVELOPER TO:
  - LOW PRESSURE AIR TEST 100% OF THE NEW SYSTEM, AND
  - DEFLECTION TEST, AT A MINIMUM 33% OF THE SYSTEM FIFTEEN (15) FEET OR LESS IN DEPTH, AND 100% OF THE SYSTEM GREATER THAN FIFTEEN (15) FEET IN DEPTH.
  - JET AND TV/VIDEO TAPE 100% OF THE SYSTEM.
- PROBATIONARY ACCEPTANCE OF THE NEW SANITARY SEWER MAINS IS CONTINGENT UPON RECEIVING COPIES OF:
  - SANITARY SEWER TRENCH COMPACTION TEST RESULTS,
  - RECORD DRAWINGS, AND
  - COMPLETION OF SYSTEM TESTING.
- CONNECTIONS TO EXISTING DISTRICT LINES WILL BE PERMITTED UPON ACCEPTANCE OF THE NEW SANITARY SEWER SYSTEM. EXISTING PIPE AT THE POINT OF CONNECTION SHALL NOT BE "BROKEN OUT" UNTIL THE NEW SYSTEM IS ACCEPTED.
- MONITORING MANHOLES ARE REQUIRED FOR ALL COMMERCIAL AND INDUSTRIAL SANITARY SERVICE LINES.
- PIPE BEDDING UP TO 16-FEET IN DEPTH IS TO BE SQUEEGEE. PIPE BEDDING IN EXCESS OF 16-FEET IN DEPTH IS TO BE 3/4-INCH AGGREGATE. PIPE BEDDING IN EXCESS OF 22-FEET MUST BE SPECIFIED BY THE DISTRICT ENGINEER.



REVISION	DATE	MM&D ENGINEERING SERVICES, INC.
		William E. Miller, PE 13389 ENGINEERING CONSTRUCTION MANAGEMENT 9125 N. Clydesdale Road PH (303) 908-0062 Castle Rock, Colorado 80108 FAX (303) 708-8399
		Boondocks Parker, Colorado Water & Sanitary Sewer Notes Utility Plan
		submittal 03/10/2015 DATE 09/16/2014 DES/DFI/CHK WEM/km PROJ. NO. 13-343 SHEET 2 OF 8

NOTE:  
DOMESTIC & FIRE-SERVICE LINES AND SANITARY SERVICE LINES TO LOTS 4B-4E ARE APPROXIMATE. FINAL LOCATION WILL BE DETERMINED WITH FUTURE CONSTRUCTION.

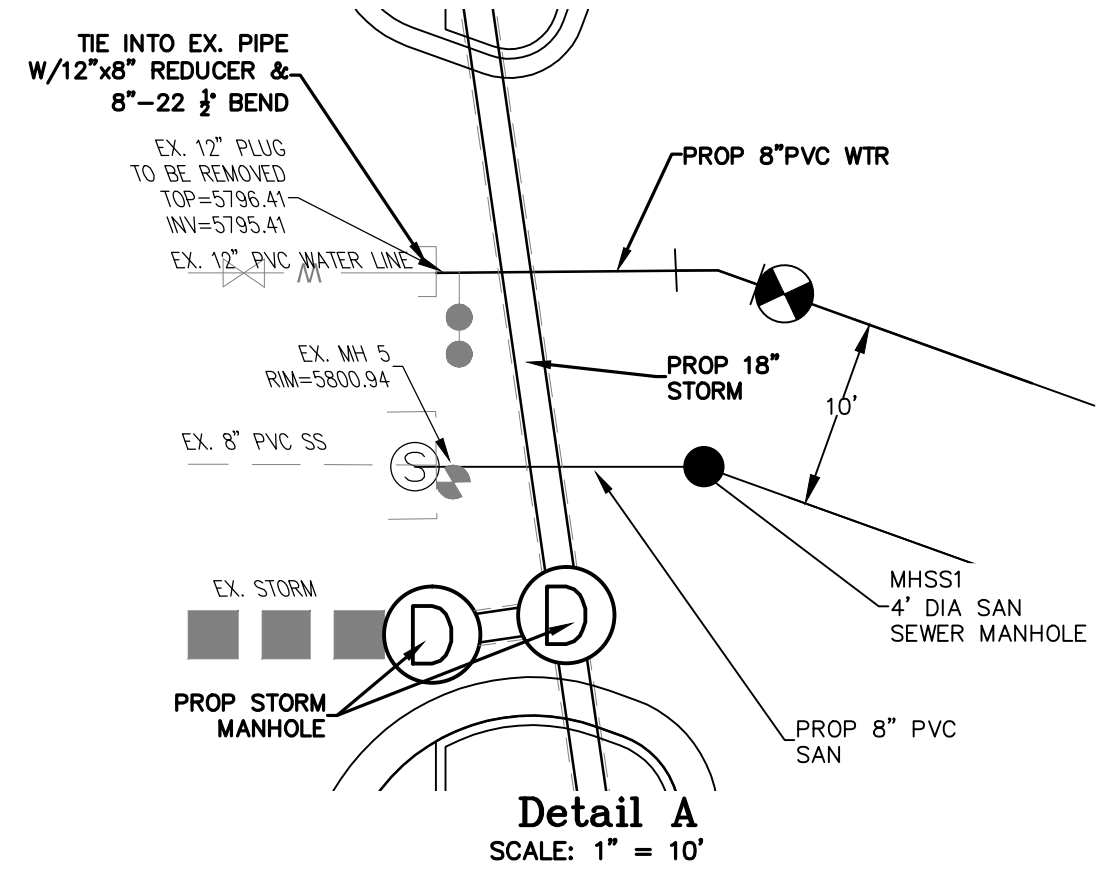
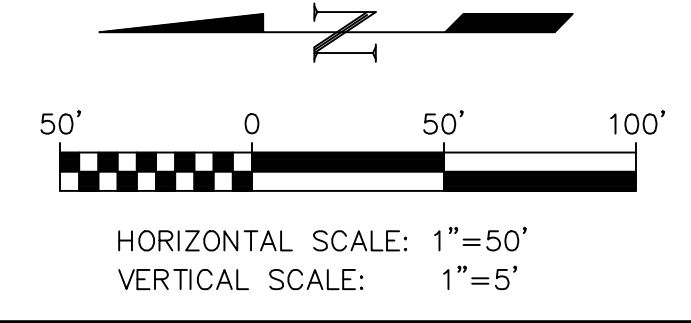


BASIS OF BEARING  
N89°29'45"E  
2655.36'

**Utility Crossings**

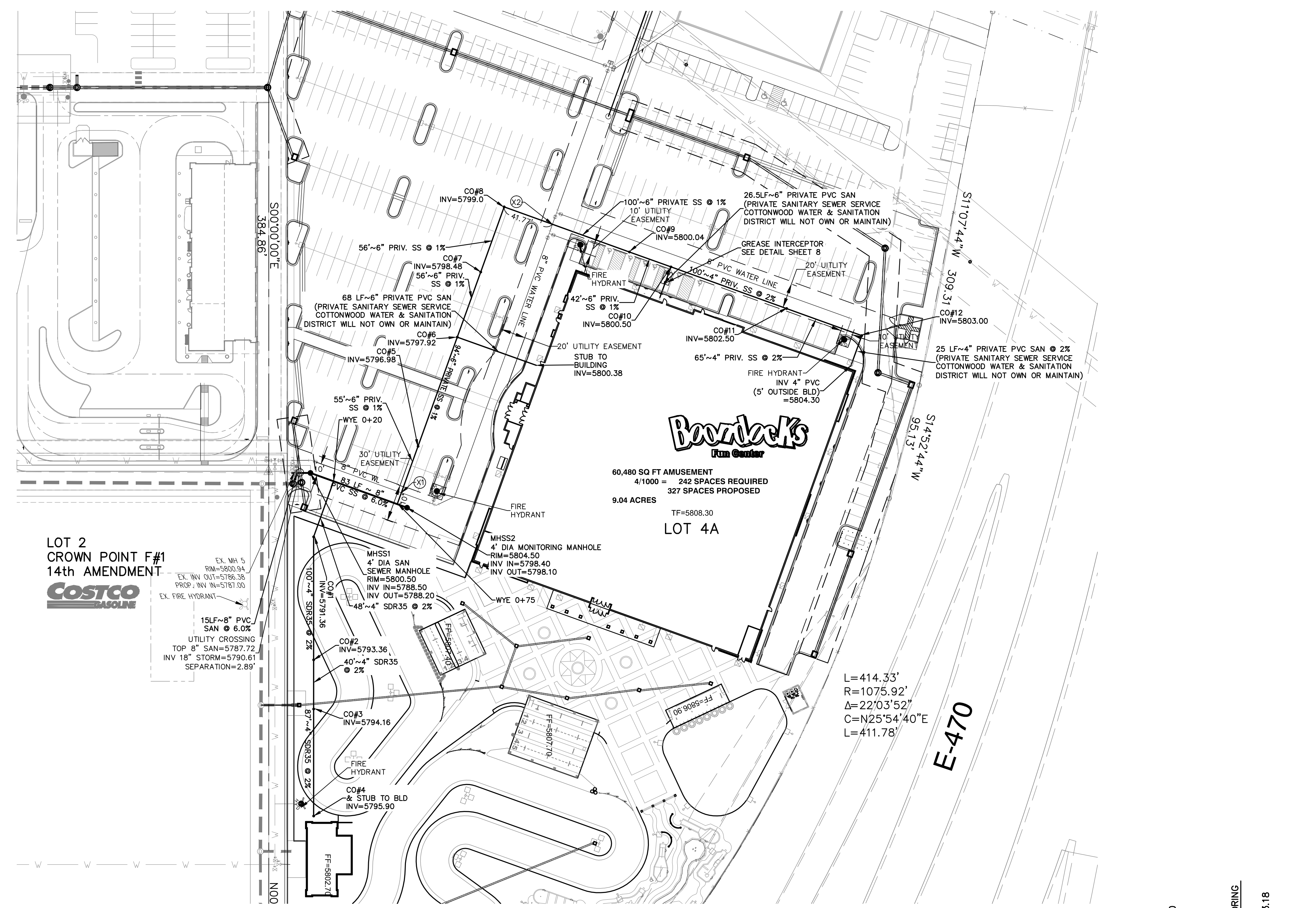
ID	TOP SS	BOP W/L	SEPARATION
X1	5797.03	5799.03	2.0'
X2	5800.50	5802.50	2.0'

NOTE: COTTONWOOD WATER AND SANITATION DISTRICT WILL NOT OWN OR MAINTAIN PRIVATE SANITARY SEWER SERVICES



REVISION	DATE	MM&D ENGINEERING SERVICES, INC. William E. Miller, PE 13389 ENGINEERING CONSTRUCTION MANAGEMENT 8125 N. Clydesdale Road PH (303) 908-0082 Castle Rock, Colorado 80108 FAX (303) 708-8399
PARKING LOT	09/24/2014	
SS	04/13/2015	
		Boondocks Parker, Colorado Water Plan
		DATE 09/16/2014 DES/DFT/CHK WEM/km PROJ. NO. 13-343 SHEET 3 OF 8

NOTE:  
DOMESTIC & FIRE SERVICE LINES AND SANITARY SERVICE LINES TO LOTS 4B-4E, ARE APPROXIMATE. FINAL LOCATION WILL BE DETERMINED WITH FUTURE CONSTRUCTION.



LOT 2  
CROWN POINT F#1  
14th AMENDMENT  
**COSTCO**  
GASOLINE

**Boondocks**  
Park Center  
60,480 SQ FT AMUSEMENT  
4/1000 = 242 SPACES REQUIRED  
327 SPACES PROPOSED  
9.04 ACRES  
TF=5808.30  
LOT 4A

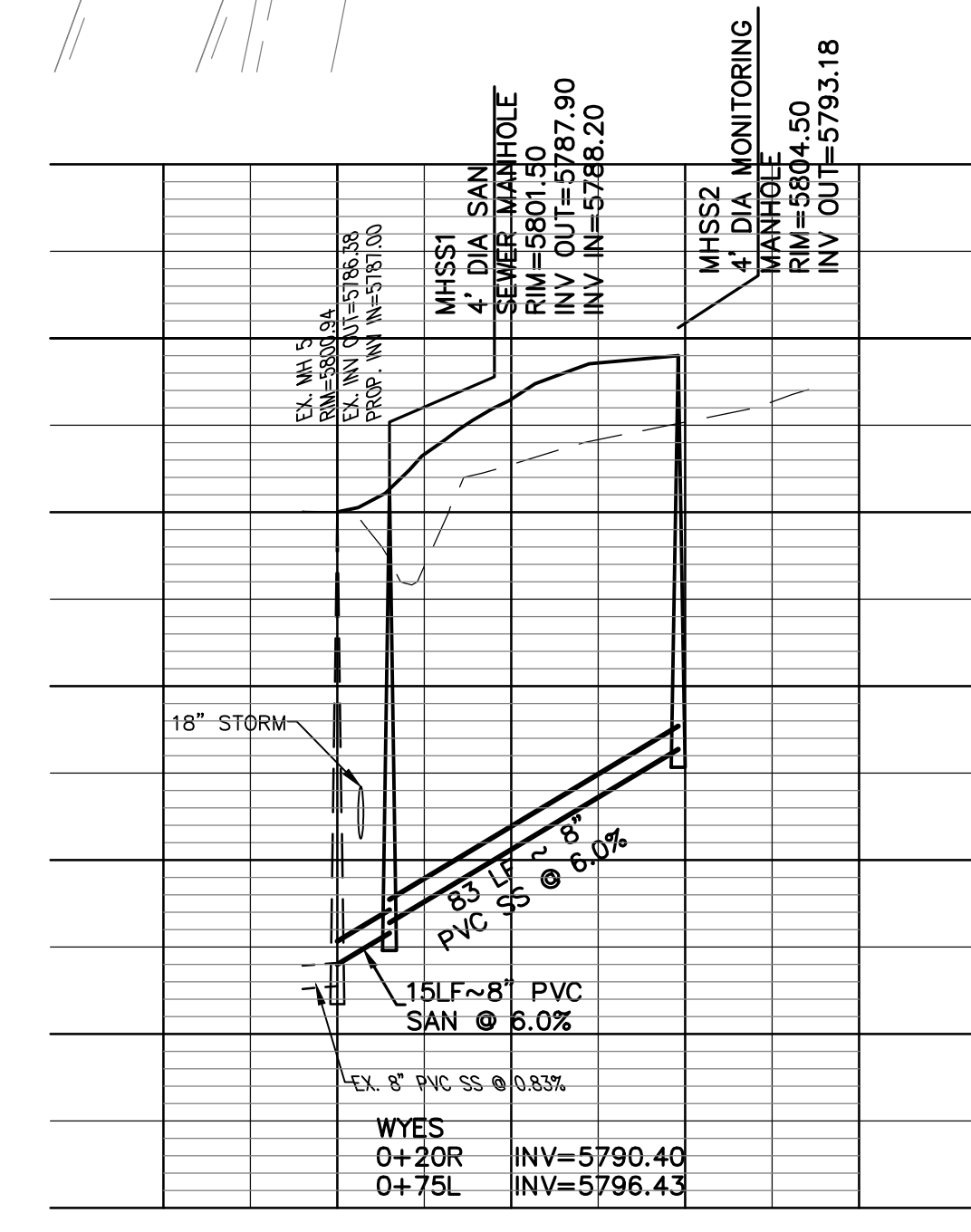
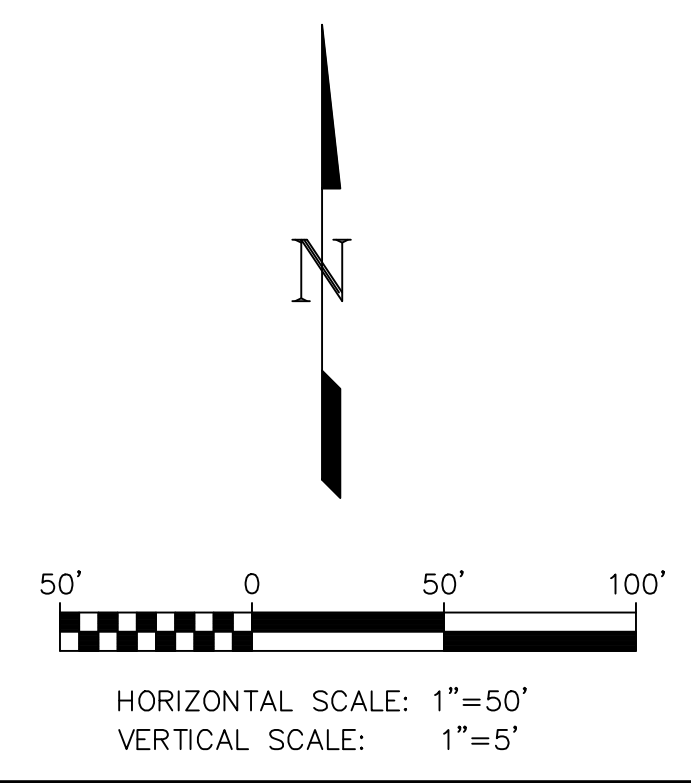
L=414.33'  
R=1075.92'  
Δ=22°03'52"  
C=N25°54'40"E  
L=411.78'

E-470

**Utility Crossings**

ID	TOP SS	BOP W/L	SEPARATION
X1	5797.03	5799.03	2.0'
X2	5800.50	5802.50	2.0'

NOTE: COTTONWOOD WATER AND SANITATION DISTRICT WILL NOT OWN OR MAINTAIN PRIVATE SANITARY SEWER SERVICES



REVISION	DATE	MM&D ENGINEERING SERVICES, INC.
PARKING LOT	09/24/2014	William E. Miller, PE 13389 ENGINEERING CONSTRUCTION MANAGEMENT 9125 N. Clydesdale Road PH (303) 908-0062 Castle Rock, Colorado 80108 FAX (303) 708-8399
SS	04/13/2015	
		Boondocks Parker, Colorado Sanitary Sewer Plan & Profile

DATE 09/16/2014  
DES/DFT/CHK WEM/km  
PROJ. NO. 13-343  
SHEET 4 OF 8

RING AND COVER ELEVATION SHALL BE IN ACCORDANCE WITH THE CITY/ COUNTY REQUIREMENTS.

CEMENT GROUT OR MORTAR

24" MH RING AND COVER (SEE DETAIL)

BRICK LEVELING COURSE OR CONCRETE RISER SECTION (12" VERTICAL ADJUSTMENT MAX.)

1 BRICK COURSE MIN. 4 BRICK COURSE MAX.

ECCENTRIC CONE

NOTES:

- MANHOLE BARREL MIN. DIA. SHALL CONFORM TO TABLE BELOW.
- SHAPING FOR SMOOTH MANHOLE INVERTS MUST BE DONE BY FORMING OR SHAPING BASE CONCRETE.
- MANHOLE STEPS SHALL BE ALCOA NO. 12653B OR APPROVED EQUAL (SEE ALUMINUM STEP DETAIL FOR FURTHER INFORMATION)
- PRECAST CONCRETE SECTIONS SHALL CONFORM TO ASTM C-478.
- BLOCK-OUTS WHEN APPROVED SHALL EXTEND A MAX. OF 6" PAST MANHOLE O.D. AND BE SATISFACTORILY PLUGGED AND SEALED.
- CONCRETE MANHOLES MAY BE POURED IN PLACE ONLY WITH PRIOR APPROVAL.
- ALL MORTAR GROUT SHALL BE MIXED WITH TYPE II CEMENT.
- BENCH MUST HAVE A BRUSHED, NON-SKID SURFACE.
- OUTFALL OR DROP MANHOLES SHALL BE LINED WITH STRONG SEAL, POLYTRIPLEX SEWER SHIELD, OR AN APPROVED EQUAL, COATED WITH 20 MIL. MIN. APPLIED IN 4-7 MIL. LAYERS, PER MANUFACTURER'S SPECIFICATIONS.
- PRE-CAST CONCRETE BASES SHALL NOT BE USED WITHOUT PRIOR APPROVAL OF THE DISTRICT.

PIPE I.D.	MANHOLE I.D.	RING & COVER
18" & SMALLER	4'-0"▲	24"
21" TO 48"	5'-0"	30"
54"	6'-0"	30", 36" W/ 24"
60" & LARGER	SPECIAL DESIGN	INNER COVER

▲WHENEVER MORE THAN A TWO WAY MANHOLE OF MAX. PIPE I.D. IS REQUIRED, THE MANHOLE SHOULD BE INCREASED TO LARGER DIA., EG. 18"x18"x18", REQUIRES 5'-0" I.D.

**Kennedy/Jenks Consultants** **COTTONWOOD WATER AND SANITATION DISTRICT** **PRECAST MANHOLE**  
 (303) 985-3636 DRAWING NO.: CTWD-2S DATE: 7/2013

**THROUGH MANHOLE**

**INTERMEDIATE ANGLE**

**SHARP ANGLE**

CURVED DEFLECTOR "POINT" SHALL EXTEND COMPLETELY ACROSS THE OPPOSED LATERALS AS SHOWN.

CURVED DEFLECTOR "POINTS" SHALL EXTEND ACROSS THE CENTERLINE OF THE OPPOSED LATERALS AS SHOWN.

**OPPOSED LATERALS**

**THROUGH MANHOLE TWO COLLECTION LINES**

NOTES:

- PIPE INVERT ELEVATIONS AND DROP THROUGH MANHOLES SHALL BE IN CONFORMANCE WITH THE REVIEWED AND SIGNED CONSTRUCTION PLANS. THE INTENTION IS TO PROMOTE SMOOTH, NON-TURBULENT FLOW THROUGH THE MANHOLES BY KEEPING THE LARGER LINES LOWER IN THE MANHOLE AND BRINGING THE SMALLER LINES IN SLIGHTLY HIGHER.
- MAXIMUM INSIDE DROP THROUGH ANY MANHOLE SHALL BE 12 INCHES.
- MINIMUM DROP THROUGH ANY MANHOLE SHALL BE 0.2 FT.
- ALL INVERT DEFLECTORS SHALL BE CURVED IN SHAPE TO PROVIDE SMOOTH FLOW TRANSITIONS AS SHOWN ON THIS DETAIL.
- MINIMUM ANGLE BETWEEN THE CENTERLINE OF ANY INCOMING PIPE AND THE CENTERLINE OF THE OUTGOING PIPE SHALL BE 90 DEGREES.

**Kennedy/Jenks Consultants** **COTTONWOOD WATER AND SANITATION DISTRICT** **BASE AND DEFLECTOR**  
 (303) 985-3636 DRAWING NO.: CTWD-3S DATE: 7/2013

**PLASTIC STEP**

COPOLYMER POLYPROPYLENE PLASTIC

1-3/16"

9-3/4"

3-3/8"

15-7/16"

14"

6-3/8"

1/2" GRADE 60 STEEL REINFORCEMENT

**SECTION-A-A**

**Kennedy/Jenks Consultants** **COTTONWOOD WATER AND SANITATION DISTRICT**  
 (303) 985-3636 DRAWING NO.: CTWD-5S DATE: 7/2013

**24" MANHOLE RING AND COVER**

RAISED LETTERS (1/8"±)

SEWER 1 1/8"

4 3/4"

25 3/4"±

LIFTING NOTCH

PLAN

FRONT VIEW

SIDE VIEW

LIFTING NOTCH

SECTION A-A

NOTE:

- CASTING SPECIFICATIONS: ASTM A-48 WITH A MINIMUM TENSILE STRENGTH OF 25 KSI (CLASS 25)
- ALL CASTINGS TO BE DIPPED IN ASPHALT BASE PAINT (OR APPROVED EQUAL)
- CASTINGS SHALL BE AS SPECIFIED BELOW OR EQUAL: (CAST IRON ONLY)

MANUFACTURES CAT. #  
 NEENAH R-1706  
 CASTINGS, INC. MH-400-24 C.I.  
 HUTCHINSON FDRY. & STL. INC. MH-400

**Kennedy/Jenks Consultants** **COTTONWOOD WATER AND SANITATION DISTRICT**  
 (303) 985-3636 DRAWING NO.: CTWD-6S DATE: 7/2013

**IN-LINE CLEANOUT**

SURFACE

12" 12"

LAMP HOLE COVER (SEE DETAIL BELOW)

CONCRETE PAD POURED AT TIME OF FINAL GRADE

4" REDUCER

PVC

45° BEND

CONCRETE CRADLE

PLAN VIEW

COVER DETAIL

NOTES:

- COVER SHALL HAVE A LOCKING LID MARKED "SEWER".
- TYLER SERIES 6855 SLIP TYPE TOP SECTION, D & L SUPPLY SERIES M8056 OR EQUAL.
- I.D. = 6 1/8"

**Kennedy/Jenks Consultants** **COTTONWOOD WATER AND SANITATION DISTRICT**  
 (303) 985-3636 DRAWING NO.: CTWD-10S DATE: 7/2013

**TYPICAL TRENCH SECTION**

IN OPEN FIELD

IN STREET

NEW STREET SURFACE

UNIFORM OUT LINE ASPHALT/CONCRETE

EXISTING STREET SURFACE

EXISTING BASE COURSE

NEW BASE COURSE

COMPACTED BACKFILL

WIDTH SEE NOTE 4

PIPE LINE

BEDDING TO BE EITHER SQUEEGEE OR SAND

NOTES:

- MINIMUM COVER TO BE 4.5' BELOW OFFICIAL STREET GRADE.
- TRENCH TO BE BRACED OR SHEETED AS NECESSARY FOR THE SAFETY OF THE WORKMEN AND PROTECTION OF OTHER UTILITIES IN ACCORDANCE WITH APPLICABLE LOCAL, STATE AND FEDERAL SAFETY REGULATIONS.
- PIPE SHALL BE BEDDED FROM 6" BELOW THE BOTTOM OF THE PIPE TO 12" ABOVE THE TOP OF THE PIPE.
- TRENCH WIDTH SHALL NOT BE MORE THAN 16" NOR LESS THAN 12" WIDER THAN THE LARGEST OUTSIDE DIAMETER OF THE PIPE.
- SHOULD THE TRENCH BE EXCAVATED WIDER THAN ALLOWED, A CONCRETE CRADLE SHALL BE PLACED WITH 2500 P.S.I. CONCRETE FROM TRENCH BOTTOM TO PIPE SPRINGLINE.
- COMPACTION SHALL BE AS FOLLOWS: PIPE ZONE BEDDING 6" UNDER AND 12" OVER PIPE WILL REQUIRE 70% RELATIVE DENSITY TRENCH ZONE ABOVE BEDDING MATERIALS, FULL TRENCH SECTION IN ROADWAY OR STREET R.O.W. LIMITS WILL REQUIRE 95% S.P.D. TRENCH ZONE ABOVE BEDDING MATERIALS, OUTSIDE OF STREET R.O.W. WILL REQUIRE 90% S.P.D.

**Kennedy/Jenks Consultants** **COTTONWOOD WATER AND SANITATION DISTRICT** **STANDARD BEDDING**  
 (303) 985-3636 DRAWING NO.: CTWD-14S DATE: 7/2013

**SEWER SERVICE CONNECTION TO NEW**

PVC PIPE "WYE"

3'-0" MIN.

3'-0" MIN.

**SECTION A-A**

NOTE:

TAPS IN STAGGERED CONFIGURATION AT 10 O'CLOCK OR 2 O'CLOCK POSITION

NOTES:

- SANITARY SEWER SERVICE TAPS SHALL BE LOCATED ON THE MAIN AT THE 2 O'CLOCK OR 10 O'CLOCK POSITION.
- THE MINIMUM DISTANCE BETWEEN ANY TWO CONSECUTIVE FITTINGS SHALL BE 3 FEET, MEASURED BETWEEN FITTING CENTERLINES.
- SANITARY SEWER SERVICE TAPS SHALL NOT BE MADE WITHIN 3 FEET OF A PIPE JOINT, OR 5 FEET FROM EDGE OF MANHOLE BASE.
- A MAXIMUM OF FOUR SERVICE TAPS ARE ALLOWED PER 20 FOOT LENGTH OF PIPE.
- ALL SANITARY SEWER TAPS SHALL USE "WYE" STYLE FITTINGS. TEES ARE NOT ALLOWED.
- SERVICE CONNECTIONS TO MANHOLES SHALL BE PERFORMED IN ACCORDANCE WITH THE "SERVICE CONNECTION TO DEAD-END MANHOLE" CONSTRUCTION DETAIL.

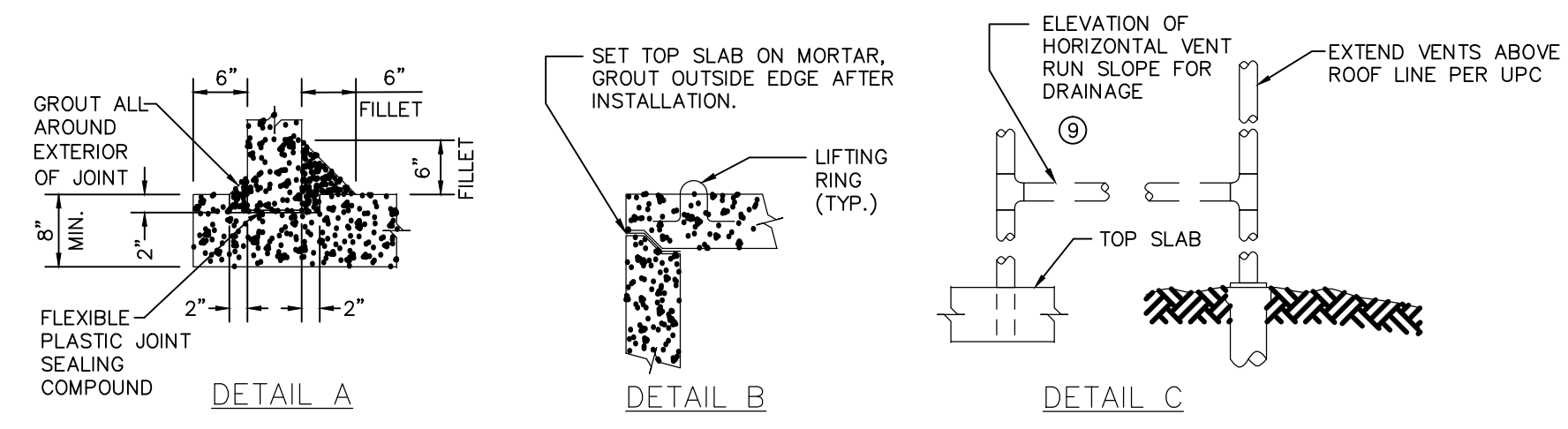
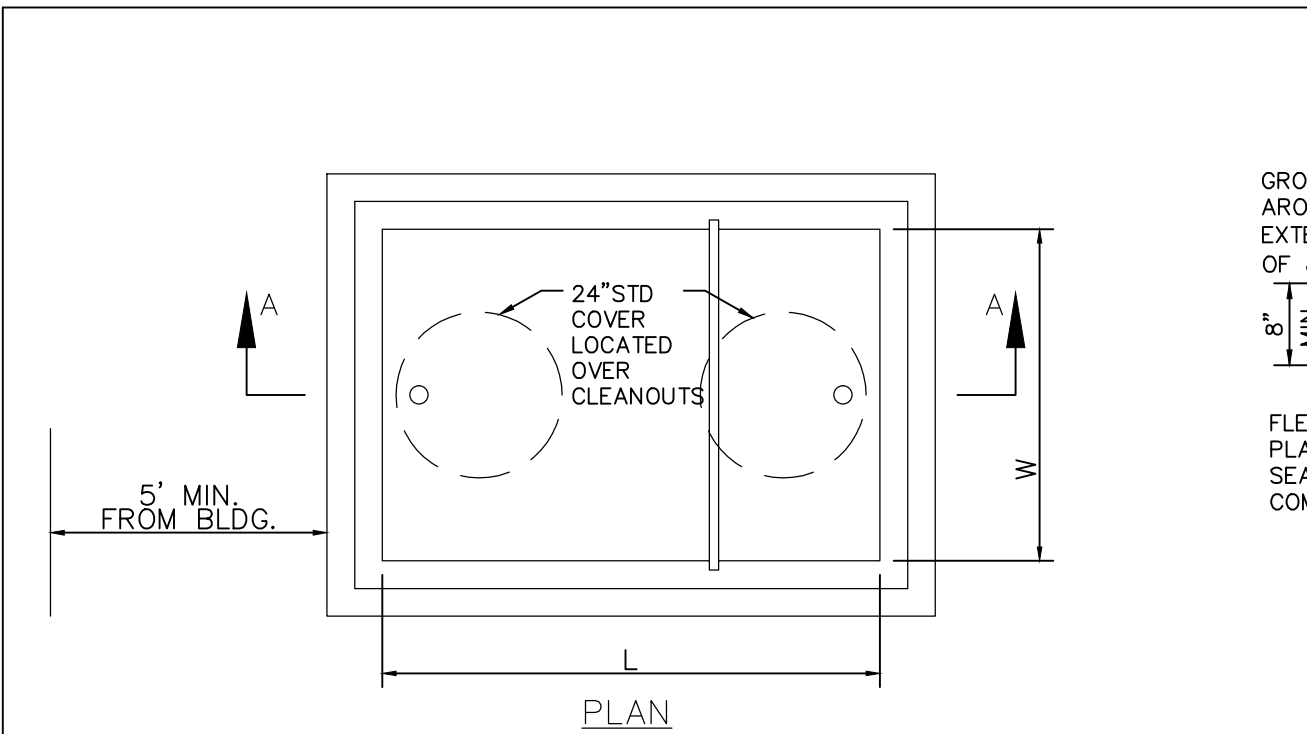
**Kennedy/Jenks Consultants** **COTTONWOOD WATER AND SANITATION DISTRICT**  
 (303) 985-3636 DRAWING NO.: CTWD-19BS DATE: 7/2013



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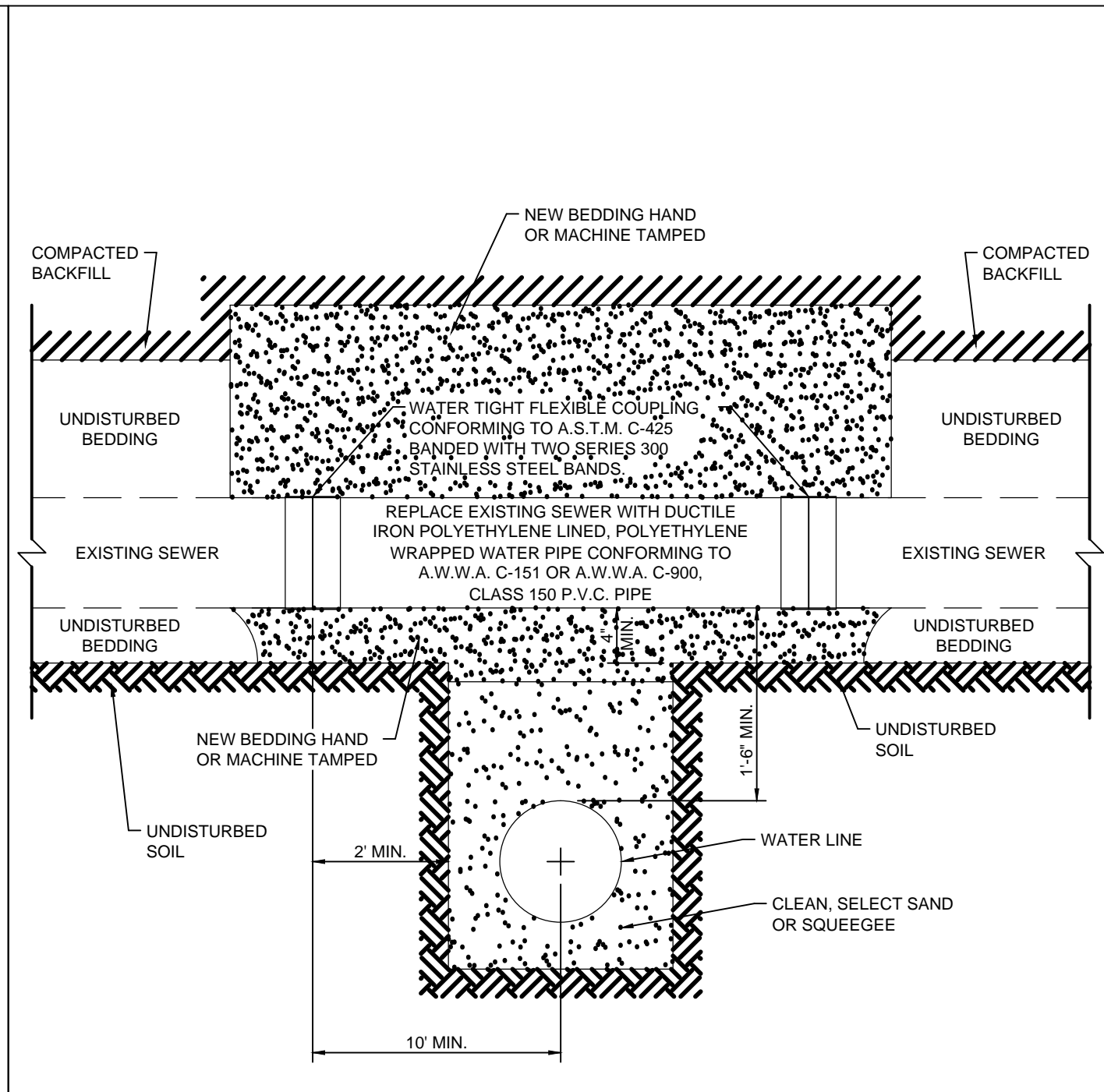
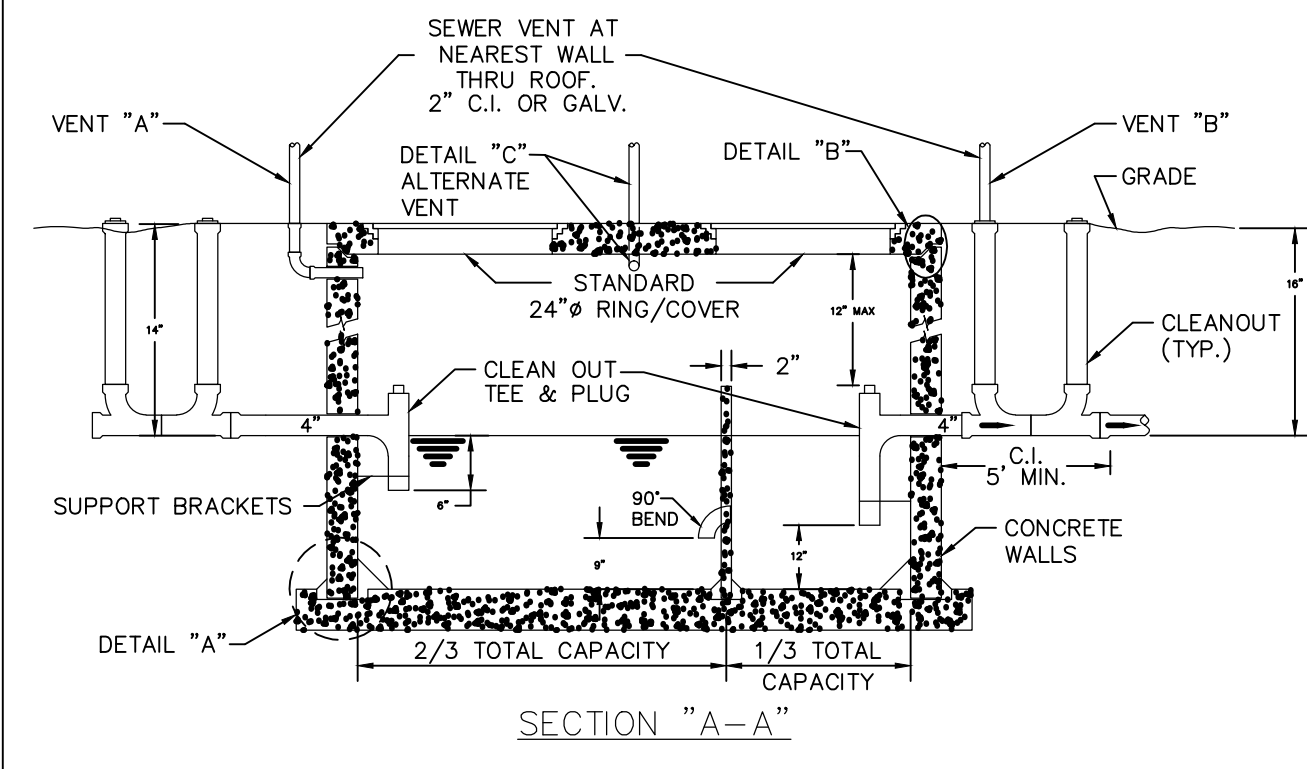
REVISION	DATE	MM&D ENGINEERING SERVICES, INC.
		William E. Miller, PE 13389 ENGINEERING
		CONSTRUCTION MANAGEMENT
		9125 N. Clydesdale Road PH (303) 908-0062
		Castle Rock, Colorado 80108 FAX (303) 708-8399
		Boondocks
		Parker, Colorado
		Sanitary Sewer Details
		Utility Plan

submittal 03/10/2015  
 DATE 09/16/2014  
 DES/DFY/CHK WEM/km  
 PROJ. NO. 13-343  
 SHEET 5 OF 8

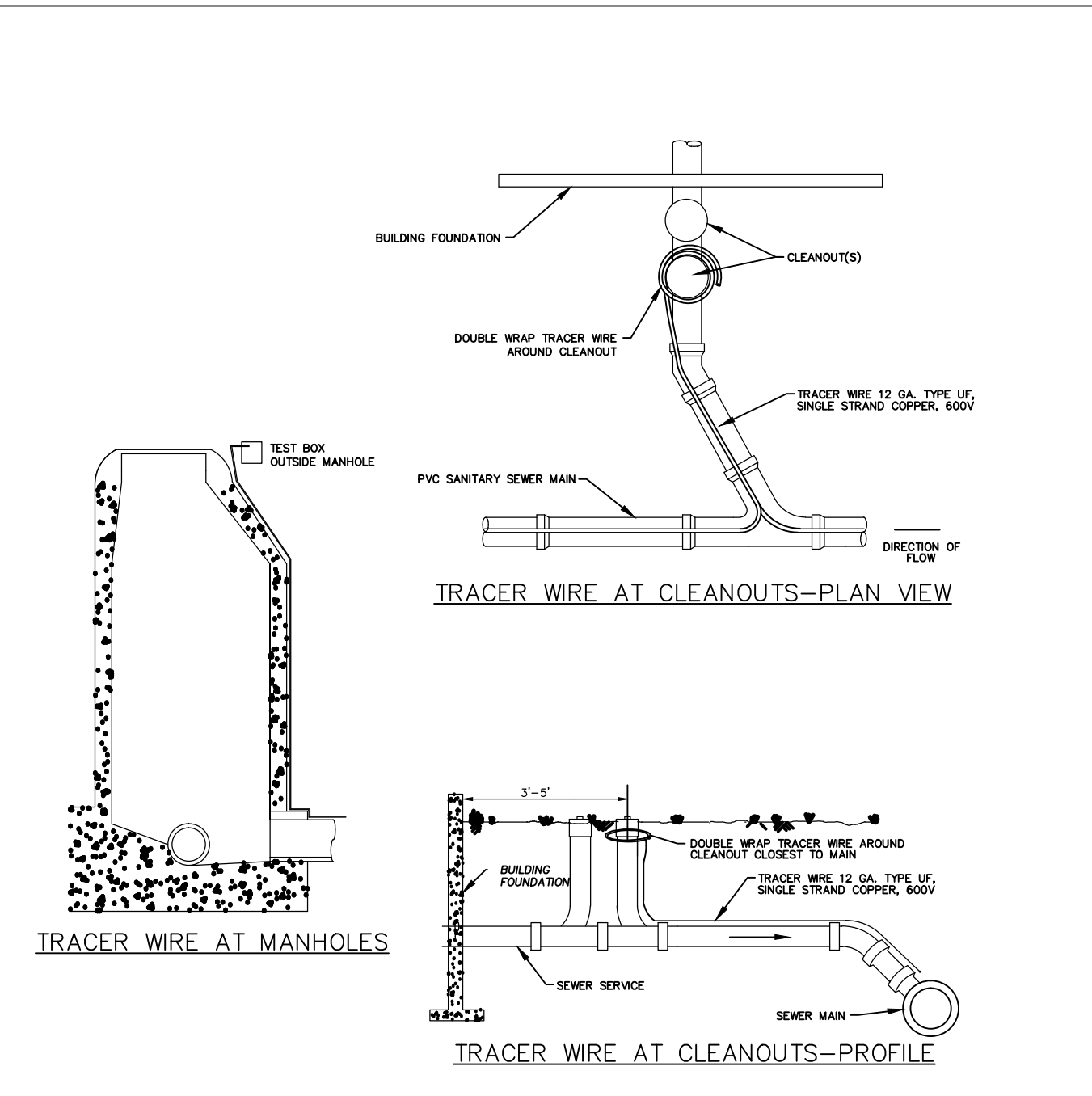


- GENERAL NOTES:**
- THESE STANDARD DETAILS SHALL ONLY BE CONSTRUED TO SHOW CONCEPTUAL AND STANDARD DIMENSIONAL REQUIREMENTS FOR SAND & OIL INTERCEPTOR AND SHALL NOT BE USED FOR CONSTRUCTION. THE ARCHITECT/ENGINEER SHALL FURNISH STRUCTURAL DESIGN CRITERIA, HYDRAULIC LOADING, VOLUME & RETENTION REQUIREMENTS AND DETAILED CONSTRUCTION DRAWINGS, INCLUDING SITE PLAN FOR APPROVAL PRIOR TO CONSTRUCTION.
  - SECONDARY TANK HAS VOLUME EQUAL TO 1/3 OF TOTAL CAPACITY.
  - ALL PIPE AND FITTINGS TO BE SCHEDULE 40 PVC EXCEPT WHERE NOTED OTHERWISE AND SHALL BE 4" MINIMUM DIAMETER.
  - WELLS, BOTTOM AND TOP SLAB TO BE REINFORCED THROUGHOUT. ADDITIONAL DIAGONAL REINFORCING TOP AND BOTTOM IS REQUIRED AROUND ACCESS OPENINGS. ALL REBAR SHALL HAVE A 3" MINIMUM COVER TO FACE OF CONCRETE.
  - THICKNESS OF WALLS, BOTTOM AND TOP SLAB TO BE DETERMINED FROM STRUCTURAL LOADING REQUIREMENTS BY ARCHITECT/ENGINEER. CAST-IN-PLACE BOTTOM SLAB SHALL NOT BE LESS THAN 8" THICK.
  - INLET AND OUTLET PIPE SIZES SHALL BE DETERMINED BY ARCHITECT/ENGINEER BUT SHALL NOT BE LESS THAN 4" DIAMETER (OUTLET PIPE INVERT TO BE 2" LOWER THAN INLET).
  - REINFORCED CONCRETE BOTTOM SLAB SHOWN. (MAY BE INTEGRALLY CAST WITH PRE-CAST WALL SECTIONS AT CONTRACTOR'S OPTION).
  - ALL JOINTS IN PRE-CAST SECTIONS TO BE SEALED WITH FLEXIBLE PLASTIC JOINT SEALING COMPOUND TO FED. SPEC. S-SS-00210 (EXCEPT TOP SLAB).
  - VENT PIPE MATERIALS AND LOCATION SHALL BE IN ACCORDANCE WITH THE PLUMBING CODE.
  - ROUND OR OBLONG GREASE INTERCEPTOR WILL REQUIRE SPECIAL DESIGN AND APPROVAL.
  - PRE-CAST CONCRETE SHAPES ARE SHOWN. CAST-IN-PLACE CONCRETE STRUCTURE IS OPTIONAL.
  - PRE-CAST REINFORCED CONCRETE SECTIONS SHALL BE IN ACCORDANCE WITH ASTM-C-478.
  - DESIGN CRITERIA: (MINIMUM)
 

UNIT HEIGHT OF "SOIL"	120 PCF
EQUIVALENT FLUID PRESSURE	30 PCF
LEVELLOADS (IF APPLICABLE)	ASHTO H=20
CONCRETE STRENGTH (F <sub>c</sub> ) (TYPE II CEMENT)	4000 PSI
  - TOP SLAB MAY BE ONE PIECE OF MULTIPLE SEGMENT CONSTRUCTION AT CONTRACTOR'S OPTION.
  - SUPPORT BRACKETS AND CLEAN-OUT PLUGS SHALL BE BRASS.
  - OTHER VARIOUS COMBINATIONS OF TANK DIMENSIONS MAY BE SUBMITTED FOR APPROVAL, PROVIDED THAT ANY ALTERNATE DESIGN SHALL HAVE THE SAME BASIC PROPORTIONAL DIMENSIONS, COMPARABLE VOLUMES AND FUNCTIONAL CAPABILITIES AS THESE STANDARD DETAILS.
  - DRAWINGS ARE NOT TO SCALE.
  - DEPENDING ON THE SEWAGE LOADING TYPE, A SAMPLING STATION OR MANHOLE MAY BE REQUIRED. DISTRICT TO DETERMINE UPON REVIEW.
  - VENT "A" MAY RISE A MINIMUM OF 42" ABOVE FIXTURE FLOOD LINE AND MAY COMBINE WITH VENT "B" ABOVE THE 42" LINE TO FORM A SINGLE VENT THROUGH THE ROOF.
  - PLUMBING PER CITY/COUNTY STANDARDS.
  - MINIMUM CAPACITY SHALL BE 500 GALLONS UNLESS OTHERWISE APPROVED BY THE DISTRICT.
  - SUBMIT SHOP DRAWING DETAILS TO DISTRICTS ENGINEER, FOR APPROVAL, PRIOR TO CONSTRUCTION.



- NOTES:**
- THIS STANDARD APPLIES ONLY FOR NON-PRESSURIZED SANITARY SERVICE TAPS AND SANITARY SEWERS EIGHT (8) INCH AND SMALLER. SANITARY SEWERS MAY NOT BE CUT WITHOUT THE EXPRESSED CONSENT OF THE DISTRICT. A DISTRICT REPRESENTATIVE WILL BE ON SITE DURING CONSTRUCTION.
  - DUCTILE IRON PIPE USED TO REPLACE SECTION OF SANITARY SEWER SHALL BE PLACED IN A TRENCH, BEDDED, BACKFILLED AND COMPACTED IN ACCORDANCE WITH THE DISTRICT SPECIFICATIONS.



PVC SANITARY SEWER MAIN & SERVICE TRACER WIRE INSTALLATION DETAIL

Kennedy/Jenks Consultants (303) 985-3636  
 COTTONWOOD WATER AND SANITATION DISTRICT  
 CLASS A COMMERCIAL OIL AND SAND TRAP  
 DRAWING NO.: CTWD-21S DATE: 8/2014

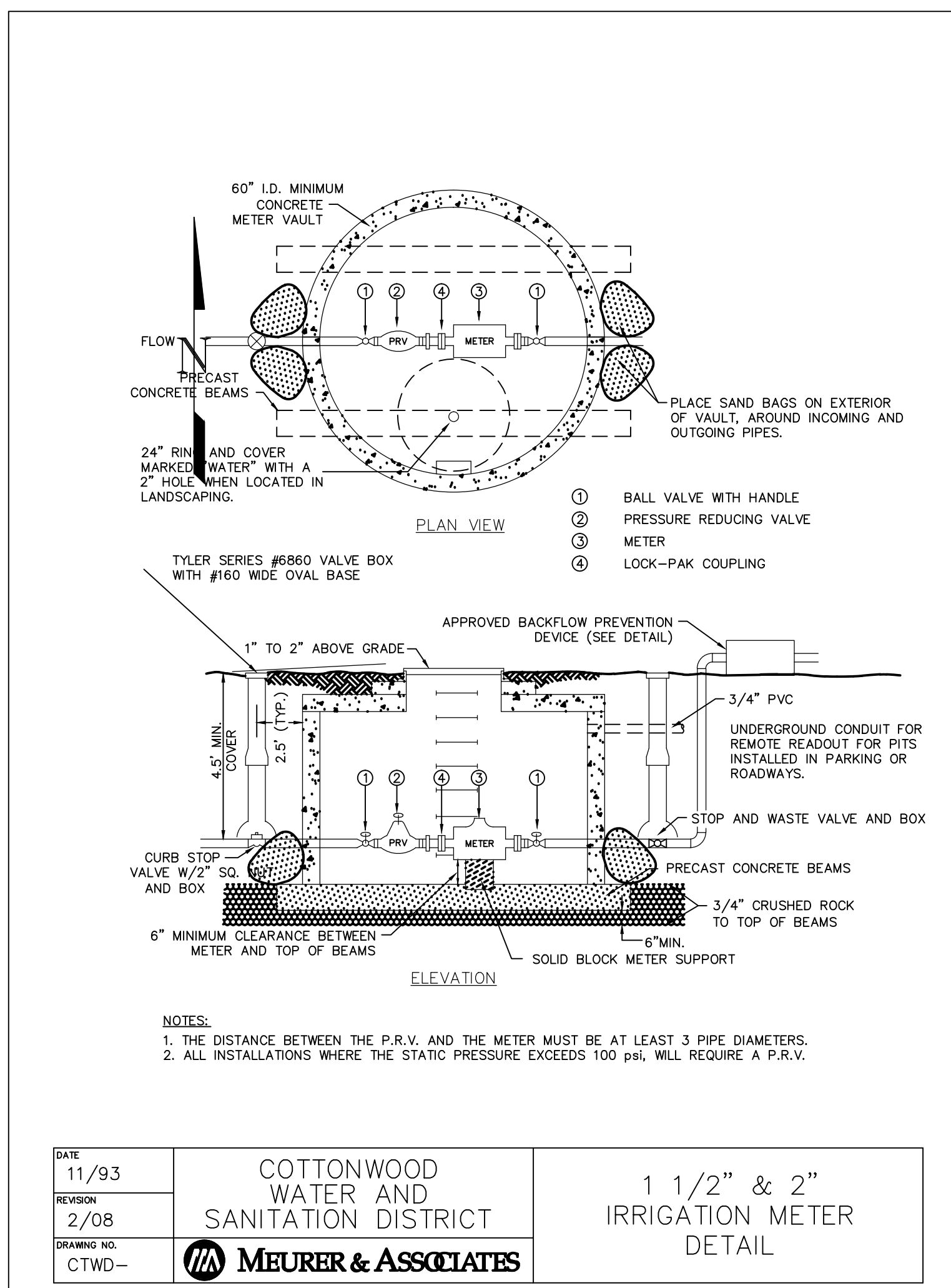
Kennedy/Jenks Consultants (303) 985-3636  
 COTTONWOOD WATER AND SANITATION DISTRICT  
 SEWER CROSSING  
 DRAWING NO.: DATE:

Kennedy/Jenks Consultants (303) 985-3636  
 COTTONWOOD WATER AND SANITATION DISTRICT  
 TRACER WIRE  
 DRAWING NO.: DATE:

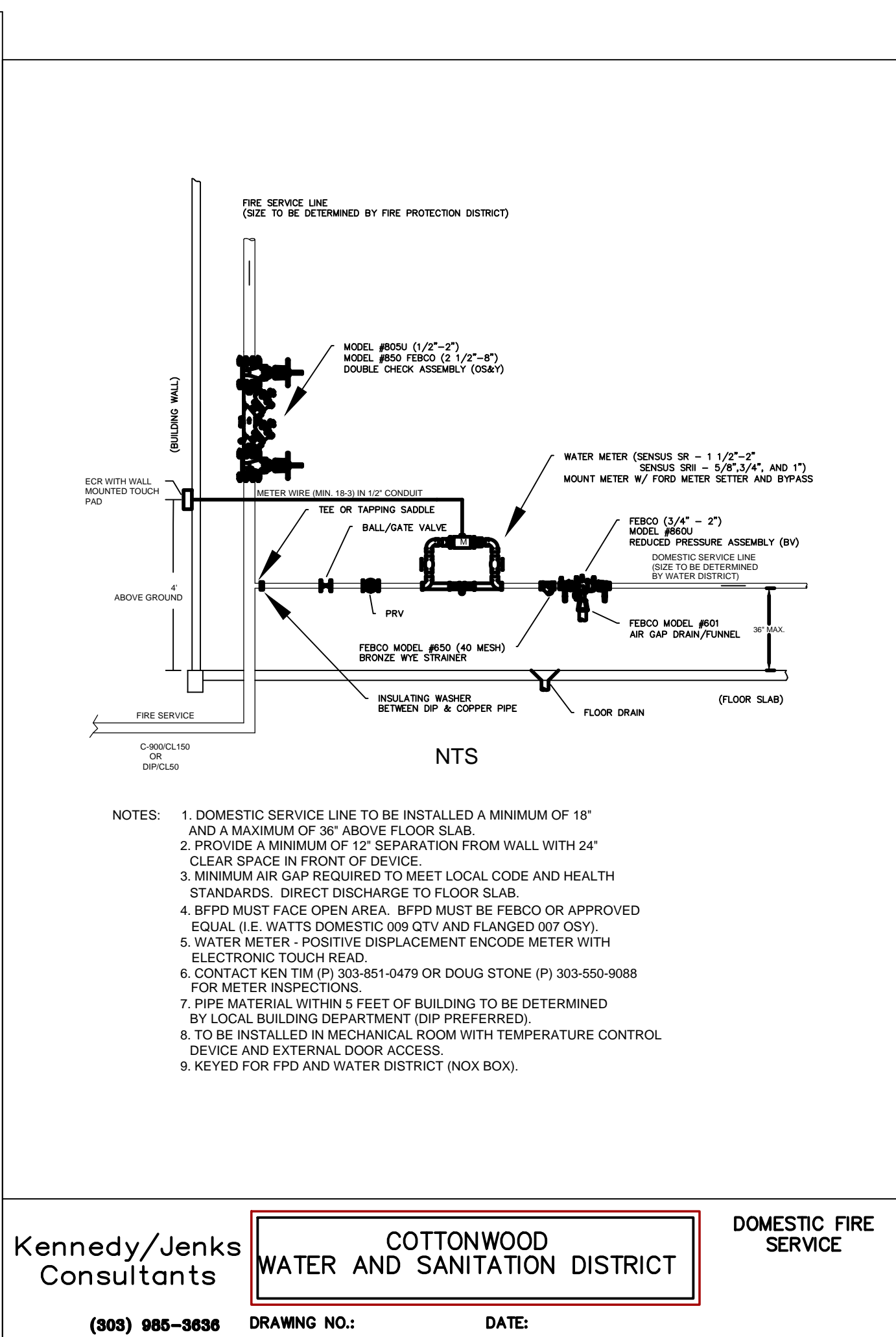


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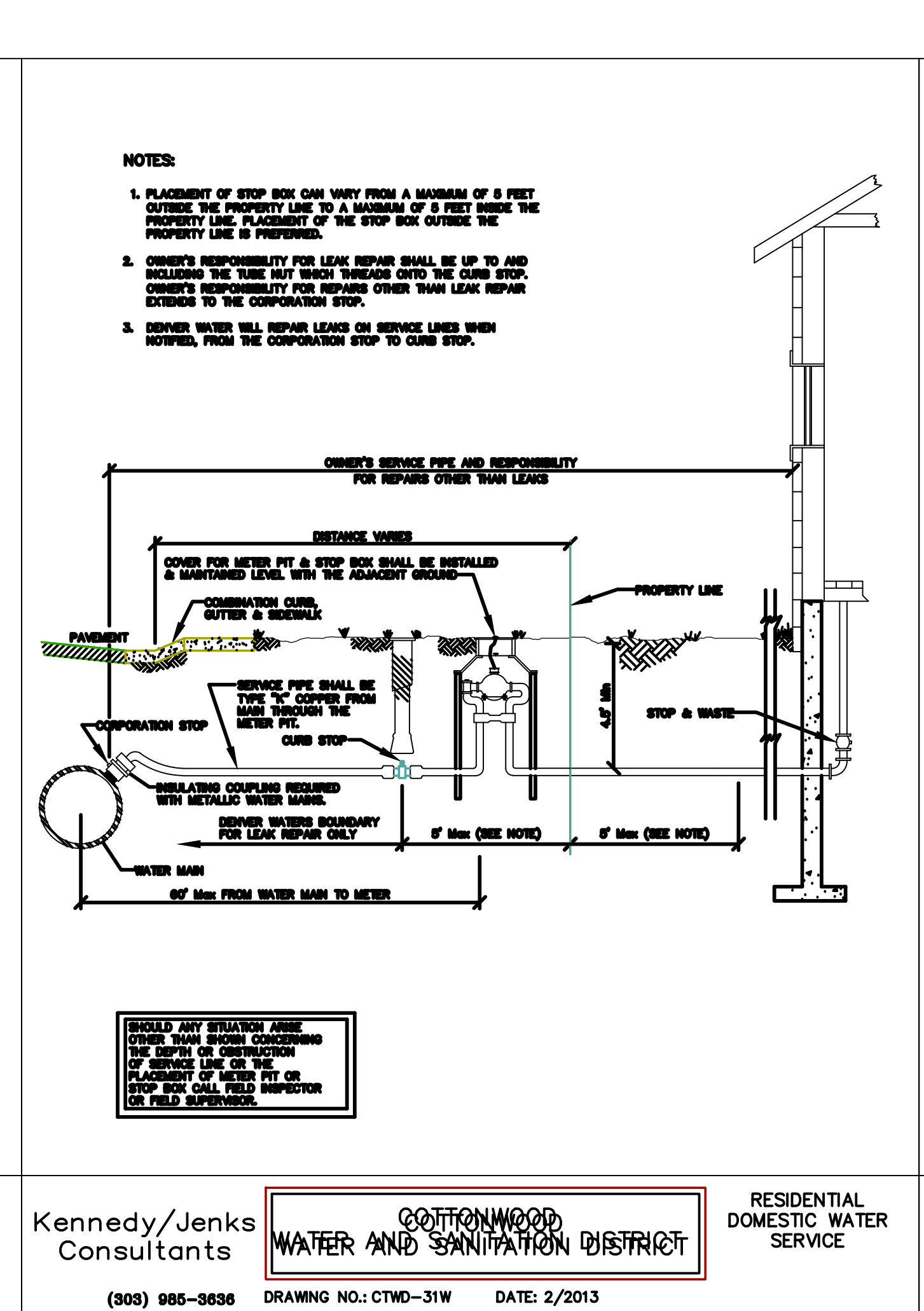
REVISION	DATE	MM&D ENGINEERING SERVICES, INC.
		William E. Miller, PE 13389 ENGINEERING CONSTRUCTION MANAGEMENT 9125 N. Clydesdale Road Castle Rock, Colorado 80108 PH (303) 908-0062 FAX (303) 708-8399
		Boondocks Parker, Colorado Sanitary Sewer Details Utility Plan
		submittal 03/10/2015 DATE 09/16/2014 DES/DFI/CHK WEM/km PROJ. NO. 13-343 SHEET 6 OF 8



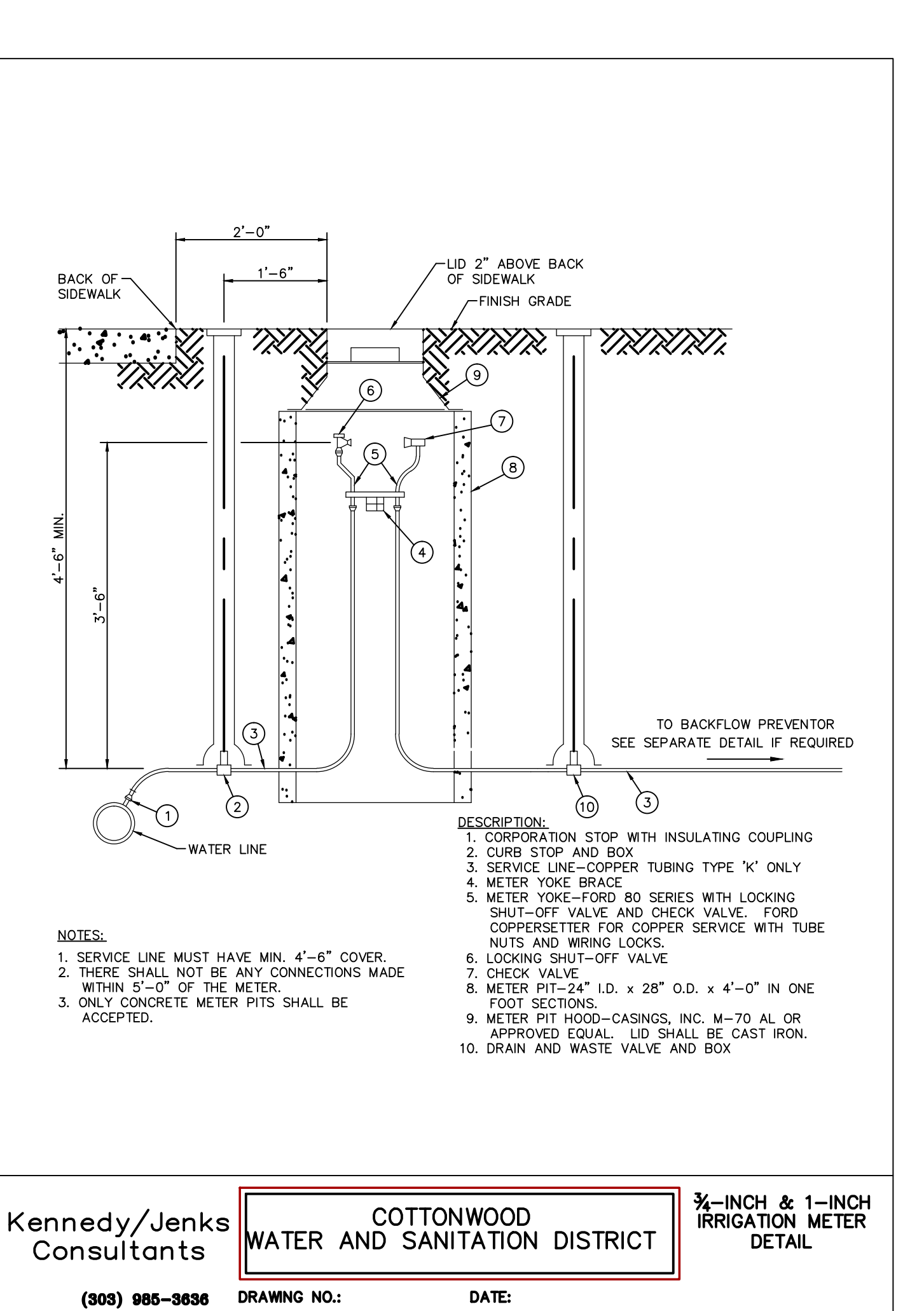
DATE 11/93	COTTONWOOD WATER AND SANITATION DISTRICT	1 1/2" & 2" IRRIGATION METER DETAIL
REVISION 2/08		
DRAWING NO. CTWD-	MEURER & ASSOCIATES	



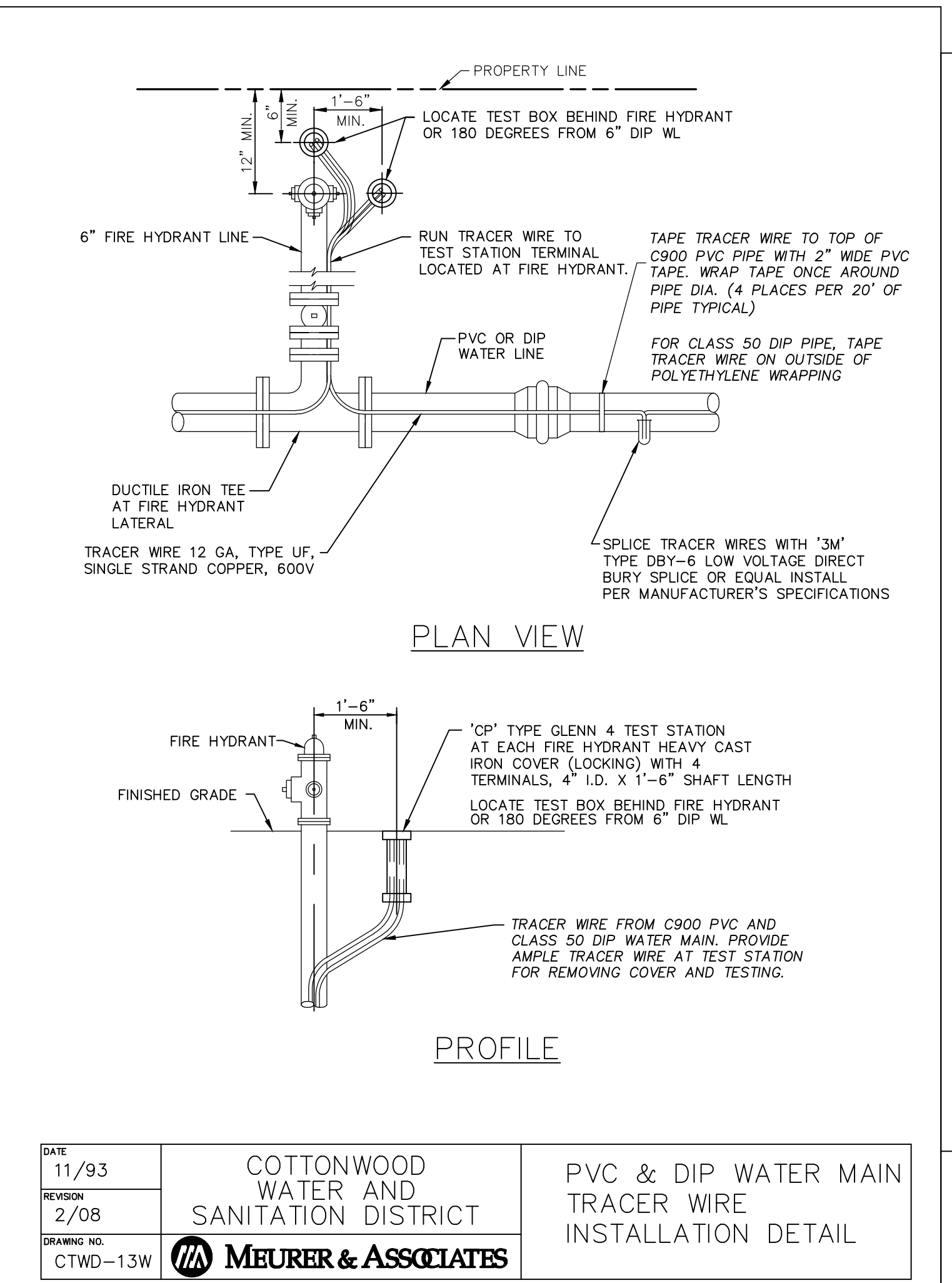
Kennedy/Jenks Consultants	COTTONWOOD WATER AND SANITATION DISTRICT	DOMESTIC FIRE SERVICE
(303) 985-3636	DRAWING NO.: DATE:	



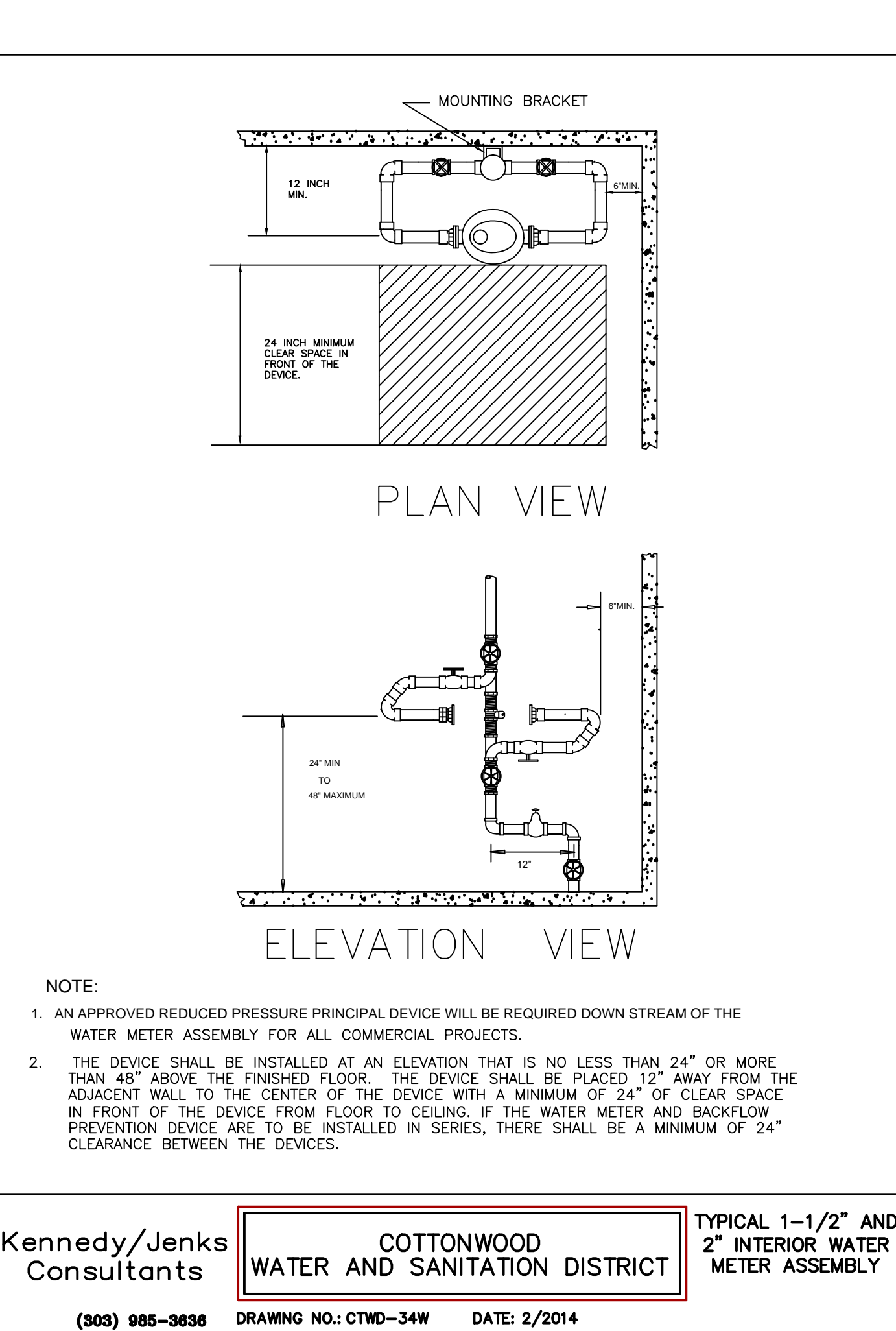
Kennedy/Jenks Consultants	COTTONWOOD WATER AND SANITATION DISTRICT	RESIDENTIAL DOMESTIC WATER SERVICE
(303) 985-3636	DRAWING NO.: CTWD-31W DATE: 2/2013	



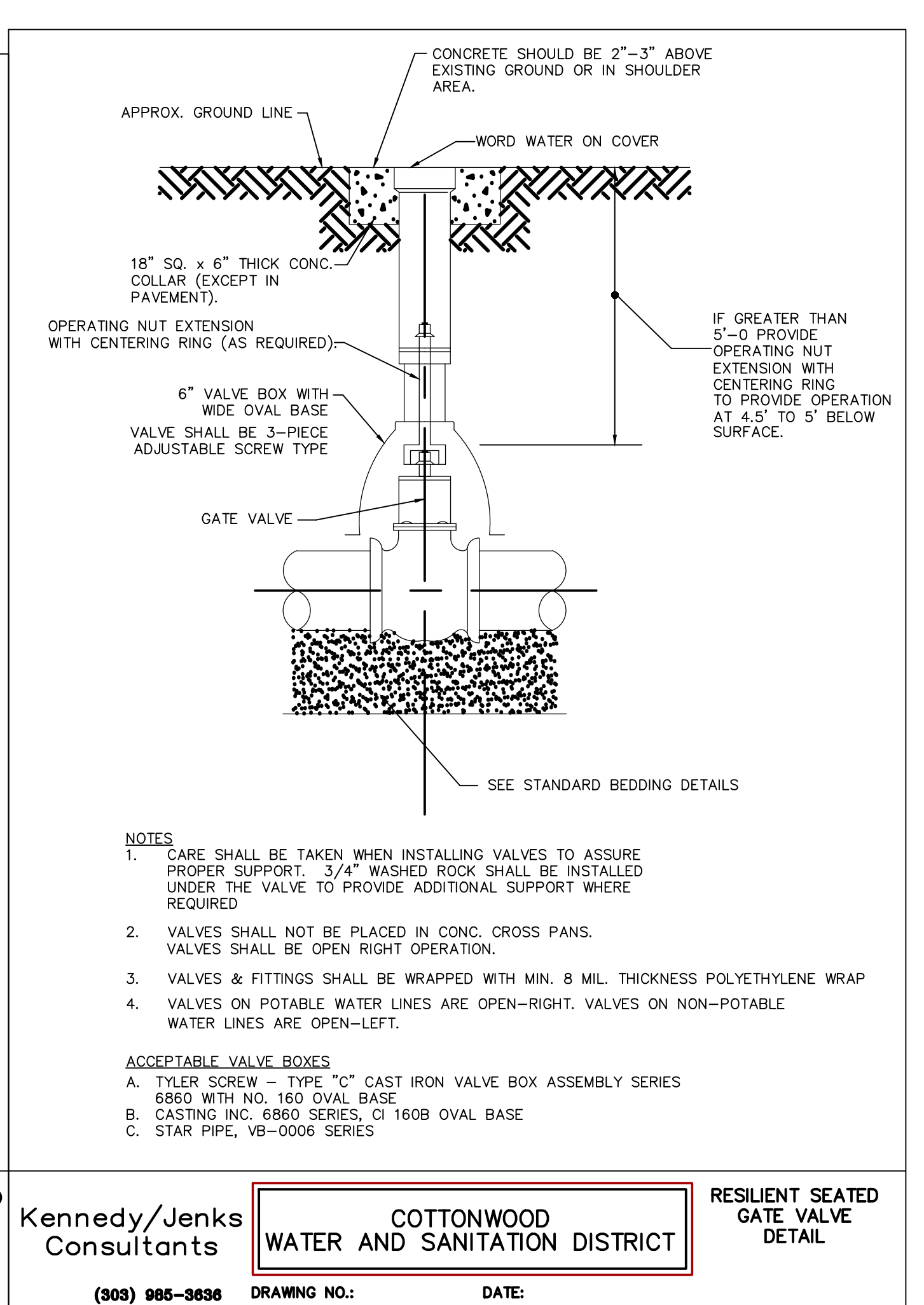
Kennedy/Jenks Consultants	COTTONWOOD WATER AND SANITATION DISTRICT	3/4-INCH & 1-INCH IRRIGATION METER DETAIL
(303) 985-3636	DRAWING NO.: DATE:	



DATE 11/93	COTTONWOOD WATER AND SANITATION DISTRICT	PVC & DIP WATER MAIN TRACER WIRE INSTALLATION DETAIL
REVISION 2/08		
DRAWING NO. CTWD-13W	MEURER & ASSOCIATES	



Kennedy/Jenks Consultants	COTTONWOOD WATER AND SANITATION DISTRICT	TYPICAL 1-1/2" AND 2" INTERIOR WATER METER ASSEMBLY
(303) 985-3636	DRAWING NO.: CTWD-34W DATE: 2/2014	



Kennedy/Jenks Consultants	COTTONWOOD WATER AND SANITATION DISTRICT	RESILIENT SEATED GATE VALVE DETAIL
(303) 985-3636	DRAWING NO.: DATE:	



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REVISION	DATE	MM&D ENGINEERING SERVICES, INC.
		William E. Miller, PE 13389 ENGINEERING
		CONSTRUCTION MANAGEMENT
		9125 N. Clydesdale Road Castle Rock, Colorado 80108
		PH (303) 908-0062 FAX (303) 708-8399
		Boondocks Parker, Colorado Water Details Utility Plan
		submittal 03/10/2015 DATE 09/16/2014 DES/DF/CHK WEM/km PROJ. NO. 13-343 SHEET 7 OF 8

**ROD DIAMETER, GRADE & LENGTH OF RESTRAINED PIPE**

ONLY THE FOLLOWING FIRE HYDRANTS AND VALVE BOXES LISTED BELOW SHALL BE ACCEPTED FOR CONSTRUCTION.

**FIRE HYDRANTS**

A. AMERICAN A.W. SERIES 27  
 B. MEULLER CENTURION MODEL A-473.  
 C. WATEROUS PACER MODEL WB-67-250.

**ACCEPTABLE VALVE BOXES**

A. TYLER SCREW - TYPE "C" CAST IRON VALVE BOX ASSEMBLY SERIES 6860 WITH NO. 160 OVAL BASE  
 B. CASTING INC. 6860 SERIES, CI 160B OVAL BASE  
 C. STAR PIPE, VB-0006 SERIES

KENNEDY/JENKS CONSULTANTS  
 COTTONWOOD WATER AND SANITATION DISTRICT  
 (303) 985-3636 DRAWING NO.: WB-4W DATE: 8/2014

PIPE SIZE	4"		6"		8"		12"		16"		20"		24"	
	D	L	D	L	D	L	D	L	D	L	D	L	D	L
90° BEND, TEE, PLUG	3/4"	30'	1/2"	40'	1/2"	60'	3/4"	80'	1"	100'	1 1/4"	120'	-	100'
VALVE	3/4"	30'	1/2"	40'	1/2"	60'	3/4"	80'	1"	100'	1 1/4"	120'	-	100'
45° BEND	3/4"	15'	1/2"	20'	1/2"	30'	3/4"	40'	1"	50'	1 1/4"	60'	-	40'
22 1/2° BEND	3/4"	1'	1/2"	3'	1/2"	5'	3/4"	7'	1"	9'	1 1/4"	10'	-	12'
11 1/4° BEND	-	-	-	-	3/4"	1'	1/2"	3'	3/4"	2'	1"	3'	-	3'

**NOTES:**

- LENGTH OF RESTRAINED PIPE MEASURED EACH WAY FROM VALVES AND BENDS.
- CLAMPS, RODS & MEGALUGS NOT ALLOWED FOR 24" & LARGER PIPES.
- D=DIA, L=LENGTH, G=GRADE, MS=MILD STEEL, HS=HIGH STRENGTH.
- MIN 4.5" GROUND COVER REQD.
- BASED ON 150 PSI INTERNAL PRESSURE.
- MS = MILD STEEL ROD ASTM A 36.
- HS = HIGH STRENGTH ROD ASTM A 193 GRADE B7.
- NUTS SHALL BE ASTM A 307 GRADE A OR B HEXAGON HEAVY SERIES. HS NUTS SHALL CONFORM TO MS-22.
- SEE TIE ROD DETAIL DRAWING, ALSO, TIE ROD COUPLING DETAILS, CLAMP DETAILS AND SET CLAMP DETAILS.
- LENGTH REFERS TO THE AMOUNT OF PIPE WHICH MUST BE RESTRAINED TOGETHER AND IS NOT NECESSARILY THE LENGTH OF THE JOINT RESTRAINT FOR MEGALUGS.
- LENGTH OF RESTRAINED PIPE CHART IS ALSO FOR THE LENGTH OF JOINT RESTRAINT FOR MEGALUGS.
- CROSSES MUST BE RESTRAINED IN ALL APPLICABLE DIRECTIONS.
- 12" AND SMALLER IN LINE VALVES AND TEES SHALL HAVE A MECHANICAL JOINT RESTRAINT DEVICE ON EACH SIDE OF THE FITTING OR VALVE. MECHANICAL JOINT RESTRAINT SHALL BE PER MS-2.
- A SECOND VALVE WILL BE REQD TO BE CLOSED WHEN EXCAVATING NEXT TO A EXIST VALVE.
- ON PLUGS, TEES AND BENDS KICKBLOCK SHALL BE USED IN ADDITION TO RESTRAINT.
- WHEN REDUCERS ARE USED ON VALVE INSTALLATIONS THE LENGTH OF RESTRAINT SHALL BE BASED ON THE SIZE OF THE PIPE NOT THE SIZE OF THE VALVE.

KENNEDY/JENKS CONSULTANTS  
 COTTONWOOD WATER AND SANITATION DISTRICT  
 (303) 985-3636 DRAWING NO.: WB-9W DATE: 8/2014

**FIELD INSTALLATION-POLYETHYLENE WRAP**

**STEP-1** PLACE TUBE OF POLYETHYLENE MATERIAL AROUND PIPE PRIOR TO LOWERING PIPE INTO TRENCH.

**STEP-2** PULL THE TUBE OVER THE LENGTH OF THE PIPE. TUBE TIE TO PIPE AT JOINT. FIELD MATERIAL AROUND THE JOINT SHOULD BE WRAPPED WITH THREE CONCENTRIC TURNS OF TWO-INCH WIDE PLASTIC TAPE TO HOLD PLASTIC TUBE AROUND JOINT END.

**STEP-3** REMOVE TUBE OVERLAP FIRST TUBE AND IS SECURED WITH PLASTIC ADHESIVE TAPE. THE POLYETHYLENE TUBE MATERIAL COVERING THE PIPE WILL BE LOOSE. EXCESS MATERIAL SHALL BE NEATLY DRIVEN UP AROUND THE PIPE DURING, FOLDED INTO AN OVERLAP ON TOP OF THE PIPE AND HELD IN PLACE BY MEANS OF PIECES OF THE PLASTIC TAPE AT APPROXIMATELY THREE TO FIVE FOOT INTERVALS.

KENNEDY/JENKS CONSULTANTS  
 COTTONWOOD WATER AND SANITATION DISTRICT  
 (303) 985-3636 DRAWING NO.: CTWD-10W DATE: 8/2014

**MINIMUM BEARING SURFACE AREA (IN SQUARE FEET)**

SIZE OF PIPE	B E N D S				TEE OR DEAD END
	11.25'	22.5'	45'	90'	
4"	1.00	1.00	1.00	2.00	1.50
6"	1.00	1.25	2.25	4.25	3.00
8"	1.00	2.00	4.00	7.50	5.25
12"	2.25	4.50	8.75	16.00	11.25
16"	3.75	7.50	14.50	27.00	19.00
20"	5.00	10.00	19.50	35.50	25.00
24"	7.00	14.00	27.75	51.00	36.00

**NOTES:**

- BEARING AREAS SHOWN ON THE CHART ARE MINIMUM AREAS AND ARE DESIGNED USING THE FOLLOWING CRITERIA:  
 1.1. INTERNAL WORKING PRESSURE OF 150 PSI.  
 1.2. TRANSIENT (WATER HAMMER) PRESSURE OF 120 PSI FOR 6 AND 8-INCH DIAMETER LINES, 110 PSI FOR 12-INCH LINES, AND 90 PSI FOR 16-INCH AND 20-INCH LINES.  
 1.3. MINIMUM UNDISTURBED SOIL BEARING CAPACITY OF 3000 PSI.
- ALL SIZES OF BENDS, TEES, AND DEAD ENDS SHALL HAVE KICKBLOCKS.
- RODDING IS ALSO REQUIRED ON FITTINGS. SEE LENGTH OF PIPE RESTRAINT DETAIL FOR SPECIFIC REQUIREMENTS.
- ALL BENDS SHALL BE RESTRAINED.

KENNEDY/JENKS CONSULTANTS  
 COTTONWOOD WATER AND SANITATION DISTRICT  
 (303) 985-3636 DRAWING NO.: CTWD-12W DATE: 8/2014

**TYPICAL TRENCH SECTION**

**NOTES:**

- MINIMUM COVER TO BE 4.5" BELOW OFFICIAL STREET GRADE.
- TRENCH TO BE BRACED OR SHEETED AS NECESSARY FOR THE SAFETY OF THE WORKMEN AND PROTECTION OF OTHER UTILITIES IN ACCORDANCE WITH APPLICABLE LOCAL, STATE AND FEDERAL SAFETY REGULATIONS.
- PIPE SHALL BE BEDDED FROM 6" BELOW THE BOTTOM OF THE PIPE TO 12" ABOVE THE TOP OF THE PIPE.
- TRENCH WIDTH SHALL NOT BE MORE THAN 16" NOR LESS THAN 12" WIDER THAN THE LARGEST OUTSIDE DIAMETER OF THE PIPE.
- SHOULD THE TRENCH BE EXCAVATED WIDER THAN ALLOWED, A CONCRETE CRADLE SHALL BE PLACED WITH 2500 P.S.I. CONCRETE FROM TRENCH BOTTOM TO PIPE SPRINGLINE.
- COMPACTION SHALL BE AS FOLLOWS: PIPE ZONE BEDDING 6" UNDER AND 12" OVER PIPE WILL REQUIRE 70% RELATIVE DENSITY TRENCH ZONE ABOVE BEDDING MATERIALS, FULL TRENCH SECTION IN ROADWAY OR STREET R.O.W. LIMITS WILL REQUIRE 90% S.P.D. TRENCH ZONE ABOVE BEDDING MATERIALS, OUTSIDE OF STREET R.O.W. WILL REQUIRE 90% S.P.D.

KENNEDY/JENKS CONSULTANTS  
 COTTONWOOD WATER AND SANITATION DISTRICT  
 (303) 985-3636 DRAWING NO.: CTWD-16 DATE: 2/2014

**SECTION A-A**

**WATER SERVICE TAPS - WATER SERVICE TAPS SHALL BE MADE AT EITHER THE 2 O'CLOCK OR THE 10 O'CLOCK POSITION ON THE CIRCUMFERENCE OF A WATER MAIN. THE MINIMUM DISTANCE BETWEEN A TAP MADE AT THE 2 O'CLOCK POSITION AND THE ONE MADE AT THE 10 O'CLOCK POSITION SHALL BE 18-INCHES MEASURED ALONG THE PIPE. THE MINIMUM DISTANCE BETWEEN SUCCESSIVE TAPS MADE EITHER AT THE 2 O'CLOCK OR THE 10 O'CLOCK POSITION SHALL BE 3- FEET. THE MINIMUM DISTANCE FROM EITHER THE BELL OR THE SPIGOT END OF A PIPE TO A TAP SHALL BE 2- FEET. A MAXIMUM OF 4 WATER SERVICE TAPS SHALL BE ALLOWED PER LENGTH OF PIPE. REFERENCE IS MADE TO THE DENVER WATER DEPARTMENT ENGINEERING STANDARDS CHAPTER 3, SECTION 3.07, FOR THE REQUIREMENTS ON TAPPING METHODS AND CONNECTIONS. ALL TAPS SHALL BE MADE USING BRASS SADDLES CONFORMING TO DISTRICT AND DENVER WATER DEPARTMENT SPECIFICATIONS.**

KENNEDY/JENKS CONSULTANTS  
 COTTONWOOD WATER AND SANITATION DISTRICT  
 (303) 985-3636 DRAWING NO.: CTWD-20W DATE: 2/2014

**MECHANICAL JOINT RESTRAINT**

**WEDGE DETAIL**

**DIMENSIONS**

NOMINAL PIPE SIZE	NO. OF BOLTS	NO. OF WEDGES	K2 INCHES	J INCHES	F INCHES	M INCHES
4"	2	2	9.13	7.50	4.90	0.50
6"	6	3	11.13	9.50	7.00	0.50
8"	6	4	13.38	11.75	9.15	0.62
10"	8	6	15.63	14.00	11.20	0.62
12"	8	8	17.88	16.25	13.30	0.62
4"	4	2	9.12	7.50	4.90	0.75
6"	6	3	11.12	9.50	7.00	0.88
8"	6	4	13.37	11.75	9.15	1.00
10"	8	6	15.62	14.00	11.20	1.00
12"	8	8	17.88	16.25	13.30	1.25

**NOTES:**

- USE EBAA IRON "MEGALUG" SERIES 1100 (D.I.P.), SERIES 2000PV (P.V.C.) OR APPROVED EQUAL.
- IF ENCASED IN CONCRETE, POLYETHYLENE WRAP MUST BE USED TO PREVENT CONCRETE INTRUSION INTO WEDGE PACKET.

KENNEDY/JENKS CONSULTANTS  
 COTTONWOOD WATER AND SANITATION DISTRICT  
 (303) 985-3636 DRAWING NO.: CTWD-23W DATE: 8/2014

**811**  
 Know what's below.  
 Call before you dig.

REVISION	DATE	MM&D ENGINEERING SERVICES, INC.
		William E. Miller, PE 13389 ENGINEERING
		CONSTRUCTION MANAGEMENT
		9125 N. Clydesdale Road PH (303) 908-0062
		Castle Rock, Colorado 80108 FAX (303) 708-8399
		Boondocks Parker, Colorado
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submittal 03/10/2015  
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 DES/DF/CHK WEM/km  
 PROJ. NO. 13-343  
 SHEET 8 OF 8