NOTES:

1. THE WATER MAIN SHALL BE INSTALLED ON THE NORTH OR EAST SIDE OF THE STREET, THE CENTERLINE SHOULD BE A MINIMUM OF 6 FT FROM THE EDGE OF PAVEMENT WITH 5 FT TO 6 FT OF COVER OVER THE PIPE.
2. THE WASTEWATER MAIN SHALL BE INSTALLED IN THE CENTER OF PAVEMENT AS DEPICTED ABOVE, WITH A MAXIMUM COVER OF 20 FT OVER THE PIPE.
3. GAS AND ELECTRIC MAINS ARE USUALLY INSTALLED IN A JOINT TRENCH BEHIND THE CURB. WHEN THE GAS PRESSURE IS GREATER THAN 60 PSI THE GAS LINE IS INSTALLED, AT A DEPTH OF 4 FT, 10 FT FROM THE EDGE OF THE STORM SEWER MAIN.
4. IF THE STORM SEWER IS LOCATED 10 FT OR LESS FROM THE WASTEWATER MAIN OUTSIDE DIAMETER TO OUTSIDE DIAMETER, THE MATERIAL OF THE STORM SEWER SHALL BE EVALUATED ON A CASE BY CASE BASIS, BASED ON SOIL TYPES AND LOCATION OF GROUNDWATER, BY CITY ENGINEERING AND COLORADO SPRINGS UTILITIES.
TYPICAL ACCESS ROAD
CROSS SECTION

- **50° R**
- **33° R**
- **R = 30'**
- **20'**
- **60'**
- **FL CURB**
- **STREET**
- **FL CURB**
- **16' ACCESS DRIVE**
- **7' CLEAR (TYP.)**
- **EXISTING/PROPOSED MANHOLE (HS-20 LOADING)**
- **PROPOSED SIDEWALK RE-INFORCED WITHIN ACCESS AREA**
- **GRavel AREA TO BE CONSTRUCTED TO HS-20 LOADING**
- **16' WIDE ACCESS ROAD FOR SERVICE VEHICLES**
- **TURNAROUND REQUIRED IF: TEE OR Y CONFIGURATION ACCESS ROAD EXCEEDS 100'**
- **VARIES WITH SITE REQUIREMENTS**
- **60'**
- **R = 30'**
- **120 Degrees**
- **30' EASEMENT**
- **30' EASEMENT**
- **60'**
- **VARIES WITH SITE REQUIREMENTS**
- **Dated 03/2014**
MANDATORY DESIGN REQUIREMENTS:

1. ALL DRIVE AISLES AND UTILITY INSTALLATIONS SHALL BE IN ACCORDANCE WITH CITY SPECIFICATIONS AND THE COLORADO SPRINGS UTILITIES' LINE EXTENSION & SERVICE STANDARDS.
2. THE GAS MAIN MAY BE CENTERED IN THE DRIVE AISLE AS DIRECTED BY COLORADO SPRINGS UTILITIES FIELD ENGINEERS.
3. ELECTRIC CONDUIT IS REQUIRED FOR ALL SECONDARY SERVICE CONDUCTORS. THE DEVELOPER/CONTRACTOR SHALL PROVIDE AND INSTALL THE SECONDARY SERVICES WITH THE APPROVAL AND INSPECTION BY COLORADO SPRINGS UTILITIES FIELD ENGINEERS.
4. ADEQUATE SPACE FOR TRANSFORMERS SHALL BE PROVIDED OUTSIDE THE DRIVE AISLE AND THE LOCATION OF THE TRANSFORMER MUST BE APPROVED BY COLORADO SPRINGS UTILITIES FIELD ENGINEERS. REFERENCE THE ELECTRIC LINE EXTENSION & SERVICE STANDARDS.
5. BOLLARDS ARE REQUIRED FOR THE PROTECTION OF GAS METERS AND TRANSFORMERS. REFERENCE THE GAS LINE EXTENSION & SERVICE STANDARDS.

WASTEWATER:

1. THE DIAMETER OF THE WASTEWATER MAIN SHALL NOT BE GREATER THAN 8 INCHES.
2. THE MAXIMUM DEPTH OF THE WASTEWATER MAIN SHALL NOT BE GREATER THAN 14 FEET MEASURED FROM FINAL GRADE (PAVEMENT) TO THE WASTEWATER PIPE INVERT.
3. COLORADO SPRINGS UTILITIES-APPROVED, LOAD-RATED, SLIP TYPE VALVE BOX TOP SECTIONS ARE REQUIRED OVER STANDARD WASTEWATER SERVICE LINE CLEANOUTS. VALVE BOX TOPS TO BE MARKED WITH "SEWER". CLEANOUT LIDS SHALL BE RECESSED 3-4" BELOW FINAL GRADE. SEE DETAIL BELOW.

WATER:

1. THE DIAMETER OF THE WATER MAIN SHALL BE NOT GREATER THAN 8 INCHES.
2. COLORADO SPRINGS UTILITIES-APPROVED, LOAD-RATED, SLIP TYPE VALVE BOX TOP SECTIONS ARE REQUIRED OVER STANDARD WATER STOP BOXES. CURB STOP LID SHALL BE RECESSED 3-4 INCHES BELOW FINAL GRADE. VALVE BOX TOPS TO BE MARKED WITH "WATER". SEE DETAIL BELOW.

NOTE:

1. THE UTILITY SERVICE PLAN FOR THE PROPOSED TOWNHOUSE DEVELOPMENT SHALL SHOW THE PROJECT-SPECIFIC LOCATION OF ALL UTILITIES AND APPURTENANCES SHOWN ON DRAWINGS A3-13 AND A3-14. APPROVAL SHALL BE ON A CASE BY CASE BASIS.
NOTES:

THE DRIVE AISLE RESTRICTIONS:

1. NO STORM DRAIN FACILITIES
2. NO SIDEWALKS
3. NO STREET LIGHTS
4. NO TRANSFORMERS
5. NO PARKING
6. NO EDIFICE (BUILDING) PROJECTIONS IN THE UTILITY EASEMENT, (i.e. DECKS) WITH THE EXCEPTION FOR THE ROOF SOFFITT.
7. THE CURB STOP SHALL BE LOCATED WITHIN THE ASPHALT, A MINIMUM OF 2 FEET FROM THE EDGE OF ASPHALT.

TO BE READ IN CONJUNCTION WITH NOTES ON SHEET A3-12 AND A3-14
NOTES:

1. GAS AND ELECTRIC LOCATED IN JOINT TRENCH PER CROSS SECTIONS.
2. THE MINIMUM HORIZONTAL CLEARANCE BETWEEN THE WATER SERVICE AND GAS OR ELECTRIC SERVICE LINE MUST BE 3 FEET.
3. WHERE THE DRIVEWAY IS LESS THAN 14 FEET, THE CURB STOP SHALL BE LOCATED IN THE DRIVE AISLE, A MINIMUM OF 2 FEET FROM THE EDGE OF ASPHALT OR THE BACK OF CURB AND GUTTER.
4. THE CURB STOP SHALL BE LOCATED WITHIN THE ASPHALT A MINIMUM OF 2 FEET FROM THE EDGE OF ASPHALT.

TO BE READ IN CONJUNCTION WITH NOTES ON SHEET A3-12 AND A3-13

DATED 03/2014
# PER SLIP JOINT OF DIP PIPE

<table>
<thead>
<tr>
<th>PIPE SIZE</th>
<th>MFRS. DEFL.</th>
<th>DESIGN DEFL. (80% MAX.)</th>
<th>APPROX. RADIUS FOR DEFLECTING CURVES WITHOUT BENDS</th>
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<tbody>
<tr>
<td></td>
<td></td>
<td>(HORZ. DEFL.)</td>
<td>(VERT. DEFL.)</td>
</tr>
<tr>
<td>4&quot;</td>
<td>5'00'</td>
<td>4'00'</td>
<td>6.99%</td>
</tr>
<tr>
<td>6&quot;</td>
<td>5'00'</td>
<td>4'00'</td>
<td>6.99%</td>
</tr>
<tr>
<td>8&quot;</td>
<td>5'00'</td>
<td>4'00'</td>
<td>6.99%</td>
</tr>
<tr>
<td>10&quot;</td>
<td>5'00'</td>
<td>4'00'</td>
<td>6.99%</td>
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<tr>
<td>12&quot;</td>
<td>5'00'</td>
<td>4'00'</td>
<td>6.99%</td>
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<tr>
<td>14&quot;</td>
<td>4'00'</td>
<td>3'12'</td>
<td>5.59%</td>
</tr>
<tr>
<td>16&quot;</td>
<td>10&quot;</td>
<td>1'36&quot;</td>
<td>2.79%</td>
</tr>
</tbody>
</table>

**NOTES:**
- COLORADO SPRINGS UTILITIES USES A 1.25 SAFETY FACTOR TO AVOID OVER DEFORMATION OF THE PIPE.
- SLIP JOINT PVC PIPE SHALL NOT BE DEFLECTED WITHOUT THE USE OF HIGH DEFLECTION COUPLINGS (HDC).

---

# PER SLIP JOINT OF PVC PIPE W/HIGH DEFLECTION COUPLINGS

<table>
<thead>
<tr>
<th>PIPE SIZE</th>
<th>MFRS. DEFL.</th>
<th>DESIGN DEFL. (80% MAX.)</th>
<th>MIN. RADIUS FOR DEFLECTING CURVES WITH HIGH DEFL. COUPLINGS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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<td>(HORZ. DEFL.)</td>
<td>(VERT. DEFL.)</td>
</tr>
<tr>
<td>4&quot;</td>
<td>5'00'</td>
<td>4'00'</td>
<td>6.99%</td>
</tr>
<tr>
<td>6&quot;</td>
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<td>4'00'</td>
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</tr>
<tr>
<td>12&quot;</td>
<td>5'00'</td>
<td>4'00'</td>
<td>6.99%</td>
</tr>
</tbody>
</table>

16" NO DEFLECTION COUPLINGS FOR 16" OR GREATER

**NOTES:**
- SHADED COLUMN IS MANUFACTURERS REFERENCE ONLY

---

# MAXIMUM PIPELINE DEFLECTION DATA FOR DIP AND PVC PIPE

DATED 03/2014
1. THE MINIMUM BEARING SURFACE AREAS SHOWN ARE BASED ON A MAX STATIC PIPE PRESSURE OF 170/250 POUNDS PER SQUARE INCH PLUS A SAFE TY FACTOR OF 1.5 AND AN ALLOWABLE SOIL BEARING CAPACITY OF 1500 POUNDS PER SQUARE FOOT. BEARING SURFACE AREA IS ROUNDED UP TO THE NEAREST 0.25 SQUARE FEET. REFERENCE AWWA M-23 AND M-41.

2. THE DESIGN ENGINEER IS RESPONSIBLE FOR VERIFYING ASSUMPTIONS BASED ON ACTUAL SITE CONDITIONS. IF SITE CONDITIONS VARY FROM THE ASSUMPTIONS THE DESIGN ENGINEER SHALL PROVIDE A SITE SPECIFIC DESIGN IN ACCORDANCE WITH AWWA M-23, PVC PIPE - DESIGN AND INSTALLATION AND AWWA M-41, DUCTILE-IRON PIPE AND FITTINGS. SITE SPECIFIC DESIGNS INCLUDING GEOTECHNICAL INFORMATION SHALL BE SUBMITTED TO COLORADO SPRINGS UTILITIES FOR REVIEW.

3. THE MINIMUM BEARING SURFACE AREA AND APPROXIMATE VOLUME OF CONCRETE SHALL BE SHOWN ON THE CONSTRUCTION PLANS FOR ALL CONCRETE THRUST BLOCKS. CONCRETE MIX SHALL BE PER MATERIAL CHAPTER 4.

4. THE APPROXIMATE VOLUMES SHOWN ARE BASED ON THE MINIMUM BEARING SURFACE AREA AND THE MINIMUM TRENCH DIMENSIONS. THE APPROXIMATE VOLUME IS ROUNDED UP TO THE NEAREST 0.25 CUBIC YARDS. SITE SPECIFIC DESIGNS INCLUDING GEOTECHNICAL INFORMATION SHALL BE SUBMITTED TO COLORADO SPRINGS UTILITIES FOR REVIEW.

5. THESE CHARTS MAY ONLY BE USED IF THE BLOCK HEIGHT (Ay) IS EQUAL TO OR LESS THAN ONE HALF THE TOTAL DEPTH (H) FROM THE FINISHED GRADE TO THE BOTTOM OF THE BLOCK. THE MINIMUM DIMENSIONS SHOWN ARE BASED ON A PIPE DEPTH OF 5 FEET. SEE DETAIL DRAWING A4-3.

6. A SITE SPECIFIC DESIGN SHALL BE REQUIRED FOR PIPES LARGER THAN 16 INCHES OR MAX STATIC PIPE PRESSURES GREATER THAN 250 POUNDS PER SQUARE INCH. THE DESIGN ENGINEER HAS THE OPTION OF PROVIDING A SITE SPECIFIC DESIGN FOR PIPES SMALLER THAN 16 INCHES OR MAX STATIC PRESSURES LESS THAN 250 POUNDS PER SQUARE INCH.

7. ALL CALCULATIONS SHALL BE PROVIDED TO COLORADO SPRINGS UTILITIES FOR REVIEW.

---

<table>
<thead>
<tr>
<th>MAIN SIZE (in.)</th>
<th>TYPE OF FITTING</th>
<th>MINIMUM BEARING SURFACE AREA (ft²)</th>
<th>MINIMUM A (ft)</th>
<th>MINIMUM A (ft)</th>
<th>MINIMUM C (ft)</th>
<th>MINIMUM B (ft)</th>
<th>APPROXIMATE VOLUME (yd³)</th>
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<td>1.00</td>
<td>1.00</td>
<td>1.00</td>
<td>0.25</td>
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<td>1.41</td>
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<td>0.42</td>
<td>0.33</td>
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<tr>
<td>4</td>
<td>TEE &amp; DEAD END</td>
<td>4.75</td>
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<td>0.50</td>
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<td>0.48</td>
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<td>3.57</td>
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<td>0.67</td>
<td>2.00</td>
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<td>8</td>
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</table>

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<table>
<thead>
<tr>
<th>MAIN SIZE (in.)</th>
<th>TYPE OF FITTING</th>
<th>MINIMUM BEARING SURFACE AREA (ft²)</th>
<th>MINIMUM A (ft)</th>
<th>MINIMUM A (ft)</th>
<th>MINIMUM C (ft)</th>
<th>MINIMUM B (ft)</th>
<th>APPROXIMATE VOLUME (yd³)</th>
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<td>1.00</td>
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<th>MINIMUM BEARING SURFACE AREA (ft²)</th>
<th>MINIMUM A (ft)</th>
<th>MINIMUM A (ft)</th>
<th>MINIMUM C (ft)</th>
<th>MINIMUM B (ft)</th>
<th>APPROXIMATE VOLUME (yd³)</th>
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<td>0.64</td>
<td>1.00</td>
<td>2.00</td>
</tr>
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<td>7.17</td>
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CONCRETE THRUST REACTION BLOCK REQUIREMENTS FOR TEES OR TAPS

<table>
<thead>
<tr>
<th>WATER MAIN SIZE (INCHES)</th>
<th>4 6 8 10 12 14 16 18 20 22 24 26 28 30 36 42</th>
</tr>
</thead>
<tbody>
<tr>
<td>CONNECTION OR FITTING SIZE (INCHES)</td>
<td>4 6 8 10 12 14 16 18 20 22 24 26 28 30</td>
</tr>
</tbody>
</table>

- Indicates that a concrete thrust reaction block is required

NOTES:
1. A site specific design shall be required for connections or fitting size combinations not shown above.
2. The concrete thrust reaction block shall bear against undisturbed soil.
3. The concrete thrust reaction block shall be installed with a 45° angle from the fitting to the undisturbed soil as shown in the drawing above.
4. Refer to detail drawing A4-2 for standard concrete thrust reaction block dimensions and volumes.
5. Ductile iron fittings and pipe shall be wrapped in polyethylene tubing where adjacent to concrete.
### Notes:

1. **Pressure Greater Than 200 PSI Require Special Design Approved by Springs Utilities. Approved by Colorado Springs Utilities.**

2. Length is based on minimum 5 feet of ground cover and soil compacted according to Chapter 5 of these Water Less. If the depth is less than 5 feet restrained length must be designed by the design engineer.

3. Approved methods of restrained pipe beyond initial fitting shall be in accordance with Chapter 4.

4. **Restrained pipe length applies to conditions where no concrete thrust reaction block is present.**

5. Calculations are based on a poorly graded sands, gravel and gravel-sand mixture, little or no fines, type 4 bedding conditions - "Pipe Bedded in Sand, Gravel or Crushed Stone to a Depth of 1/8 Pipe Diameter (4" Min.)," Factor of Safety 2.1.

6. Figures are based on Dip wrapped in Polyethylene Material.

7. Measurements are in feet.

8. Use CRA for down turning bends.

9. **Restrained length for dead end may be used at the discretion of Colorado Springs Utilities.**

### Restained Pipe Length (Feet) W/mechanical joint restraints

<table>
<thead>
<tr>
<th>Pipe Diameter</th>
<th>45° Bend</th>
<th>22-1/2° Bend</th>
<th>11-1/4° Bend</th>
</tr>
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<tbody>
<tr>
<td>Max. Static Pressure (PSI)</td>
<td>&lt;100</td>
<td>100-150</td>
<td>150-200</td>
</tr>
<tr>
<td>Ductile Iron and PVC</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6 Inch</td>
<td>6</td>
<td>9</td>
<td>12</td>
</tr>
<tr>
<td>8 Inch</td>
<td>8</td>
<td>12</td>
<td>16</td>
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<td>29</td>
</tr>
<tr>
<td>20 Inch</td>
<td>18</td>
<td>26</td>
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<tr>
<td>24 Inch</td>
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</tr>
<tr>
<td>30 Inch</td>
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<td>36</td>
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</tr>
<tr>
<td>36 Inch</td>
<td>28</td>
<td>42</td>
<td>56</td>
</tr>
</tbody>
</table>

**Use concrete reverse anchor.**

**Note:** Figures are based on Dip wrapped in Polyethylene Material.
1. MECHANICAL JOINT RESTRAINTS SHALL BE APPROVED ACCORDING TO CHAPTER 4 FOR DIP AND PVC PIPE.
2. DUCTILE IRON FITTINGS AND PIPE SHALL BE WRAPPED IN POLYETHYLENE TUBING WHERE ADJACENT TO CONCRETE.

TEE INSTALLATION

IN LINE VALVE INSTALLATION

CROSS INSTALLATION
NOTES:
1. MECHANICAL JOINT RESTRAINTS SHALL BE APPROVED ACCORDING TO CHAPTER 4 FOR DIP AND PVC PIPE.
2. LENGTH OF PIPE REQUIRING JOINT RESTRAINT SHALL BE DETERMINED FROM CHART ON DETAIL DRAWING A4-4.
3. DUCTILE IRON FITTINGS AND PIPE SHALL BE WRAPPED IN POLYETHYLENE TUBING WHERE ADJACENT TO CONCRETE.
**PLAN**

DEAD END OR REVERSE ANCHOR

**ELEVATION**

DEAD END OR REVERSE ANCHOR

---

### NOTES:

1. THE MINIMUM BEARING SURFACE AREAS SHOWN ARE BASED ON A MAX STATIC PIPE PRESSURE OF 170/250 POUNDS PER SQUARE INCH PLUS A SAFETY FACTOR OF 1.5, AND AN ALLOWABLE SOIL BEARING CAPACITY OF 1500 POUNDS PER SQUARE FOOT. REFERENCE AWWA M-23 AND M-41.

2. THE DESIGN ENGINEER IS RESPONSIBLE FOR VERIFYING ASSUMPTION BASED ON ACTUAL SITE CONDITIONS. IF SITE CONDITIONS VARY FROM THE ASSUMPTIONS THE DESIGN ENGINEER SHALL PROVIDE A SITE SPECIFIC DESIGN IN ACCORDANCE WITH AWWA M-23, PVC PIPE - DESIGN AND INSTALLATION AND AWWA M-41, DUCTILE-IRON PIPE AND FITTINGS. SITE SPECIFIC DESIGNS INCLUDING GEOTECHNICAL INFORMATION SHALL BE SUBMITTED TO COLORADO SPRINGS UTILITIES FOR REVIEW.

3. THE MINIMUM LATERAL BEARING SURFACE AREA (Ab) AND APPROXIMATE VOLUME OF CONCRETE (Vol) SHALL BE SHOWN ON THE CONSTRUCTION PLANS FOR ALL CONCRETE REVERSE ANCHORS.

4. THE APPROXIMATE VOLUMES SHOWN ARE BASED ON THE MINIMUM DIMENSIONS IN THE TABLE. APPROXIMATE VOLUME IS ROUNDED UP TO THE NEAREST 0.25 CUBIC YARDS.

5. A SITE SPECIFIC DESIGN SHALL BE REQUIRED FORPIPES LARGER THAN 16 INCHES OR MAX STATIC PIPE PRESSURES GREATER THAN 250 POUNDS PER SQUARE INCH. THE DESIGN ENGINEER HAS THE OPTION OF PROVIDING A SITE SPECIFIC DESIGN FOR PIPES SMALLER THAN 16 INCHES OR MAX STATIC PRESSURES LESS THAN THE PRESSURE LISTED IN THE TABLE.

6. FOR CORROSION PROTECTION OF THE RODS SEE DETAIL DRAWING A8-11.

7. A TRENCH WIDTH OF 4 FEET AND 6" BEDDING UNDER THE PIPE ARE ASSUMED FOR BEARING CALCULATIONS, (Ax, Ay, x AND y).

8. THE DESIGN ENGINEER SHALL ENSURE THE CONSTRUCTION OF THE CONCRETE REVERSE ANCHOR SHALL NOT CONFLICT WITH OTHER UTILITIES.

9. DUCTILE IRON FITTINGS AND PIPE SHALL BE WRAPPED IN POLYETHYLENE TUBING WHERE ADJACENT TO CONCRETE.
NOTES:

1. THE MINIMUM BEARING SURFACE AREAS SHOWN ARE BASED ON A MAX STATIC PIPE PRESSURE OF 170/250 POUNDS PER SQUARE INCH PLUS A SAFETY FACTOR OF 1.5, AND AN ALLOWABLE SOIL BEARING CAPACITY OF 1500 POUNDS PER SQUARE FOOT. FOR HDPE ADDITIONAL ASSUMPTIONS INCLUDE A MAX 50°F TEMPERATURE CHANGE AND A POISSON RATIO OF 0.45. REFERENCE AWWA M-23, M-41 AND M-55.

2. THE DESIGN ENGINEER IS RESPONSIBLE FOR VERIFYING ASSUMPTION BASED ON ACTUAL SITE CONDITIONS. IF SITE VARY FROM THE ASSUMPTIONS THE DESIGN ENGINEER SHALL PROVIDE A SITE SPECIFIC DESIGN THAT SHALL BE IN ACCORDANCE WITH AWWA M-23, PVC PIPE - DESIGN AND INSTALLATION AND AWWA M-41, DUCTILE-IRON PIPE AND FITTINGS. SITE SPECIFIC DESIGNS USING GEOFTECHNICAL INFORMATION SHALL BE SUBMITTED TO COLORADO SPRINGS UTILITIES FOR APPROVAL.

3. THE MINIMUM LATERAL BEARING SURFACE AREA (Ab) AND APPROXIMATE VOLUME OF CONCRETE (Vol) SHALL BE SHOWN ON THE CONSTRUCTION PLANS FOR ALL CONCRETE REVERSE ANCHORS.

4. THE APPROXIMATE VOLUMES SHOWN ARE BASED ON THE MINIMUM DIMENSIONS IN THE TABLE. THE APPROXIMATE VOLUME IS ROUNDED UP TO THE NEAREST 0.25 CUBIC YARDS.

5. A SITE SPECIFIC DESIGN SHALL BE REQUIRED FORPIPES LARGER THAN 16 INCHES OR MAX STATIC PIPE PRESSURES GREATER THAN 250 POUNDS PER SQUARE INCH. THE DESIGN ENGINEER HAS THE OPTION OF PROVIDING A SITE SPECIFIC DESIGN FOR PIPES SMALLER THAN 16 INCHES OR MAX STATIC PRESSURES LESS THAN THE PRESSURE LISTED IN THE TABLE.

6. FOR CORROSION PROTECTION OF THE RODS SEE DETAIL DRAWING A8-11.

7. A TRENCH WIDTH OF 4 FEET AND 6" BEDDING UNDER THE PIPE ARE ASSUMED FOR BEARING CALCULATIONS. (Ax, Ay, X AND Y).

8. THE DESIGN ENGINEER SHALL ENSURE THE CONSTRUCTION OF THE CONCRETE REVERSE ANCHOR SHALL NOT CONFLICT WITH OTHER UTILITIES.

9. DUCTILE IRON FITTINGS AND PIPE SHALL BE WRAPPED IN POLYETHYLENE TUBING WHERE ADJACENT TO CONCRETE.
NOTES:

1. HYDRANT NOZZLE SHALL BE POSITIONED AT RIGHT ANGLES TO THE NEAREST CURB. IF NO CURB OR SIDEWALK EXIST, NOZZLE SHALL BE PLACED AT RIGHT ANGLE TO STREET OR ALLEY.

2. HYDRANTS INSTALLED AT FLAG LOT LINES SHALL BE OFFSET 3' FROM THE LOT LINE.

3. HYDRANTS SHALL BE PLACED A MINIMUM OF 5.0 FEET FROM ANY UTILITY OR DRAINAGE STRUCTURE. (TO BE COORDINATED WITH JOINT TRENCH INSTALLATION).

4. EASEMENTS MUST BE PROVIDED FOR ANY PUBLIC HYDRANT WHICH IS CLOSER THAN 5.0 FEET INSIDE THE RIGHT-OF-WAY LINE.

5. A SAFE WORKING CLEARANCE IS NECESSARY FOR THE FIRE DEPARTMENT TO IDENTIFY, ATTACH HOSES TO AND OPERATE A FIRE HYDRANT IN CASE OF AN EMERGENCY. A 3 FOOT CLEAR SPACE SHALL BE MAINTAINED AROUND THE CIRCUMFERENCE OF FIRE HYDRANTS EXCEPT AS OTHERWISE REQUIRED OR APPROVED BY THE COLORADO SPRINGS FIRE DEPARTMENT.

6. FIRE HYDRANTS SHALL BE INSTALLED WITH CLEARANCES PER THE MOST CURRENT APPROVED IFC.
NOTES:

1. THE FIRE HYDRANT SHALL BE LOCATED BEHIND THE POINT OF CURB RETURN FOR CURB RETURN RADIUS 25 FEET OR GREATER.

2. WHERE THE CURB RETURN RADIUS IS 20 FEET OR LESS THE CENTER OF THE HYDRANT SHALL BE LOCATED 20 FEET OFF OF THE BACK OF CURB OF THE INTERSECTING STREET.

3. IN ALL CASES THE FIRE HYDRANT SHALL BE LOCATED A MINIMUM OF 2 FEET OUTSIDE OF THE PEDESTRIAN RAMP OR SIDEWALK.

4. IT SHALL BE THE RESPONSIBILITY OF THE DEVELOPER OR THE DEVELOPER'S ENGINEER TO VERIFY THAT PROPOSED HYDRANT LOCATIONS WILL NOT CONFLICT WITH ANY OTHER UTILITIES, FACILITIES, PEDESTRIAN RAMP INSTALLATIONS, DRAINAGE FACILITIES, PROPOSED PROPERTY STRUCTURES OR IMPROVEMENTS PRIOR TO BEGINNING CONSTRUCTION.
FIRE HYDRANT INSTALLATION

NOTES:
1. MECHANICAL JOINT RESTRAINTS SHALL BE INSTALLED PER DETAIL DRAWINGS A4-4, A4-5, & CHAPTER 5.
2. TRACER WIRE AND GROUND LEVEL TEST BOX TO BE INSTALLED WITH EACH FIRE HYDRANT. PLACE TEST BOX WITHIN 6" FROM THE HYDRANT.
3. REFERENCE DETAIL DRAWINGS A5-1 & A5-2 FOR FIRE HYDRANT LOCATION.
4. INSTALLATION OF A PRIVATE FIRE HYDRANT WILL REQUIRE A SECONDARY VALVE INSTALLED AT THE PROPERTY LINE.
5. HYDRANT BASE BLOCK SHALL BE PLACED ON UNDISTURBED EARTH.
6. DO NOT BLOCK WEEP HOLE WITH POLYWRAP.
7. COVER DRAIN ROCK WITH POLYWRAP PRIOR TO BACKFILL.
8. FOR HDPE HYDRANT CONNECTION SEE DETAIL DRAWING A10-9.
9. FOR PRIVATE FIRE HYDRANTS A SECONDARY VALVE SHALL BE INSTALLED ON THE PROPERTY LINE OR RIGHT-OF-WAY LINE.
BOLLARD PLACEMENT (TOP VIEW)

FILLED W/4000 PSI CONCRETE MIX AND VIBRATE TO ELIMINATE AIR POCKETS; ROUND TOP FOR DRAINAGE.

1. POST, REMOVABLE, AND ASSEMBLE WITH SCRAP 4" PVC DUCT SLEEVE, 10" X 1/2" EYEBOLT, 4" PVC PIPE PLUG, 2" BLACK TAPE AND 4" ORANGE REFLECTIVE TAPE AS SHOWN.

2. USE BANDS OF REFLECTIVE TAPE ON TOP OF POSTS TO WARN MOTORISTS, CYCLISTS, ETC. THE FIRST BAND SHOULD BE NO LOWER THAN 4" FROM THE TOP OF THE POST.

3. INTERMEDIATE POSTS ACROSS AT LEAST ONE SIDE (PREFERABLY THE FRONT) OF THE APPARATUS SHALL BE OF THE REMOVABLE TYPE; ALL OTHERS CAN BE PERMANENT.

4. BARRICADE POSTS SHALL BE INSTALLED PLUMB AND LEVEL ACROSS THE TOPS FROM ONE TO ANOTHER WHEN TWO ARE USED.

5. USE 4" GRC PIPE AND PAINT WITH TWO COATS OF SILVER PAINT.

6. DIG 12" X 36" HOLE - CONDUIT TO BE CENTERED IN HOLE.

7. CONCRETE FOR ANCHORING POSTS SHALL BE 4000PSI MIX #2, APPROXIMATELY 8.3 CU.FT./POLE

CONCRETE FILLED POST

1. BARRICADE POSTS SHALL BE INSTALLED PLUMB AND LEVEL ACROSS THE TOPS FROM ONE TO ANOTHER WHEN TWO ARE USED.

2. USE 4" GRC PIPE AND PAINT WITH TWO COATS OF SILVER PAINT.

3. DIG 12" X 36" HOLE - CONDUIT TO BE CENTERED IN HOLE.

4. CONCRETE FOR ANCHORING POSTS SHALL BE 4000PSI MIX #2, APPROXIMATELY 8.3 CU.FT./POLE

REMOVABLE CAPPED - PIPE POST (WITH APPROVAL OF CSFD)

1. POST, REMOVABLE, AND ASSEMBLE WITH SCRAP 4" PVC DUCT SLEEVE, 10" X 1/2" EYEBOLT, 4" PVC PIPE PLUG, 2" BLACK TAPE AND 4" ORANGE REFLECTIVE TAPE AS SHOWN.

2. USE BANDS OF REFLECTIVE TAPE ON TOP OF POSTS TO WARN MOTORISTS, CYCLISTS, ETC. THE FIRST BAND SHOULD BE NO LOWER THAN 4" FROM THE TOP OF THE POST.

3. INTERMEDIATE POSTS ACROSS AT LEAST ONE SIDE (PREFERABLY THE FRONT) OF THE APPARATUS SHALL BE OF THE REMOVABLE TYPE; ALL OTHERS CAN BE PERMANENT.
1. Flush hydrant before connecting backflow and meter configuration with stand.

2. Hydrants shall be fully opened when in use; do not throttle hydrant flow with the hydrant stem valve. Flow shall be controlled with the outlet gate valve only. Where ball valves are provided for isolation and testing of the RP, the handle shall be removed from the valves. These valves are only to be used in servicing and testing RP and shall not be used to control hydrant flows and shall be in the full open position at all times during hydrant flows.

3. Use of hydrant requires a permit, and adherence to all terms and conditions of the permit and associated requirements. Contact Springs Utilities Contract Administration at (719) 668-8111.

4. See reference hydrant use permit in construction section 5.7.

5. Use of a hydrant without a backflow prevention device is in violation of the Colorado Springs Water Code for cross connection control (City Code 12.4.1203). All hydrant connections require a reduced pressure principle backflow preventer (RP) type per Colorado primary drinking water regulation. Keep the RP center discharge outlet at least 12 inches above grade.

6. No hose shall be connected between the hydrant and backflow device.

7. Contractor shall use a hydrant wrench with tapered square box designed specifically for Colorado Springs Utilities fire hydrants to operate the fire hydrant. No other type of wrench shall be used.

8. Permits will not be issued for fire hydrants with water pressure greater than 120 PSI.
NOTE:

1. TRACER WIRE AND 17lb ANODE TO BE INSTALLED WITH EACH POST HYDRANT.
2. WHEN LATERAL IS GREATER THAN ONE PIPE LENGTH A RESTRAINING COUPLING IS REQUIRED AT EACH JOINT.
3. MAINTAIN 5' MIN. CLEARANCE AROUND POST HYDRANT FROM ABOVE GROUND STRUCTURE/VAULTS.
4. REFERENCE DETAIL DRAWING A5-1 FOR POST HYDRANT LOCATION.
1. ALL CONCRETE WORK SHALL COMPLY WITH THE LATEST ACI-318 SPECIFICATIONS.
2. ALL LADDER RUNGS MUST LINE UP BOTH HORIZONTALLY AND VERTICALLY.
3. JOINT HARNESS TIE BOLTS AND LUGS SHALL CONFORM TO AWWA M11 FOR STEEL PIPE.
4. ALL CHECK VALVES GREATER THAN 12" SHALL BE SPECIALLY DESIGNED AND APPROVED BY COLORADO SPRINGS UTILITIES.
5. ALL MATERIALS SHALL BE SUPPLIED AND INSTALLED BY CONTRACTOR. INTERNAL COMPONENTS MAY BE REIMBURSED BY COLORADO SPRINGS UTILITIES. SEE CHAPTER 2.
6. CONCRETE VAULTS SHALL BE DESIGNED FOR HS-20 TRAFFIC LOADING CONDITIONS AND 300 PSF SURCHARGE LOAD WITH A CAST IN PLACE FOUNDATION AS SHOWN.
PRESSURE RELIEF MAIN LINE SHALL BE MADE UP OF 2" GALVANIZED STEEL FITTINGS WITH A 2" RELIEF VALVE.

VAULT SIZE PER DETAIL DRAWINGS A6-4, A6-5 AND A6-6

CONCRETE REVERSE ANCHOR, SEE DETAIL DRAWING A4-8 (TYP)

PRESSURE RELIEF STATION

NOTE:

1. MECHANICAL JOINT RESTRAINTS OR FLANGES SHALL BE USED BETWEEN TEES AND VALVES.
2. CONTRACTOR SHALL DETERMINE DIMENSIONS OF ALL 2" MATERIALS FOR PROPER INSTALLATION.
3. CONCRETE VAULTS SHALL MEET ALL CRITERIA AS OUTLINED ON DETAIL DRAWINGS A6-4, A6-5 AND A6-6.
4. ALL MATERIAL INSIDE VAULT SUPPLIED BY CONTRACTOR AND REIMBURSED BY COLORADO SPRINGS UTILITIES. SEE CHAPTER 2.
5. PIPE SIZES AND MATERIALS TO BE BASED ON HYDRAULIC MODELING FOR PIPES LARGER THAN 8 INCH.
6. MAIN LINE VALVE IS NORMALLY CLOSED IN ALL APPLICATIONS.
7. PIPE SHALL BE RESTRAINED BETWEEN THE CRA AND THE VAULT.
8. ALL CONCRETE VAULTS SHALL BE DESIGNED FOR HS-20 TRAFFIC LOADING CONDITIONS AND 300 PSF SURCHARGE LOAD.
PRV MATERIALS:

A - DRESSER COUPLINGS
B - FLANGE (ANSI CL 300) x SPIGOT STEEL FITTING (7'-0" STEEL TAILPIECE)
C - FLANGE x FLANGE (ANSI CL 300) STEEL TEE
D - 250 VALVE BODY GATE VALVE W / ANSI CL 300 FLANGES
E - CLASS 300 VALVE BODY, DI, CLA-VAL REGULATORS
F - FLANGE (ANSI CL 300) x SPIGOT STEEL FITTING
G - RESTRAINED FLANGE ADAPTOR
H - 250 VALVE BODY GATE VALVE W / ANSI CL 150 FLANGES

NOTE: ANSI CL 300 FLANGES MAY BE REQUIRED THROUGHOUT VAULT AT THE DISCRETION OF COLORADO SPRINGS UTILITIES.

NOTES:
1. ALL GATE VALVES SHALL BE 250 PSI, TESTED TO AWWA C509/C515 WITH FLANGED ENDS TO ASME/ANSI B16.1.
2. ALL PRESSURE REGULATORS SHALL BE CLA-VAL (ASTM A536) WITH ASME/ANSI B16.42/B16.5, CL 300 FLANGES.
3. ALL STEEL PIPE DIMENSIONS SHALL COMPLY WITH ANSI/AWWA C208-07.
4. ALL STEEL PIPE FLANGE DIMENSIONS FOR OUTSIDE AND INSIDE DIAMETER OF FLANGE, BOLT CIRCLE PATTERN, NUMBER OF BOLTS AND DIAMETER OF BOLT HOLES SHALL COMPLY WITH ANSI B16.42 / B16.5, CL 150 OR CL 300. ALL STEEL PIPE FLANGE THICKNESS SHALL COMPLY WITH ANSI/AWWA C207-07, CLASS E.
5. JOINT HARNESS TIE BOLTS AND LUGS SHALL CONFORM TO AWWA M11 FOR STEEL PIPE.
6. REFER TO DETAIL DRAWINGS A6-4, A6-5 AND A6-6 FOR VAULT DIMENSIONS AND DETAILS.
7. A SITE SPECIFIC DESIGN SHALL BE REQUIRED FOR ALL PRESSURE REGULATOR STATIONS WITH PRESSURE REGULATORS LARGER THAN 12 INCH.
8. ALL MATERIALS SHALL BE SUPPLIED AND INSTALLED BY THE CONTRACTOR. INTERNAL COMPONENTS MAY BE REIMBURSED BY COLORADO SPRINGS UTILITIES. SEE CHAPTER 2.
9. ALL CONCRETE VAULTS SHALL BE DESIGNED FOR HS-20 TRAFFIC LOADING CONDITIONS AND 300 PSF SURCHARGE LOAD.
PRESSURE REGULATOR STATIONS
6", 8" & 12"
VAULT DIMENSIONS

NOTES:
1. ALL CONCRETE VAULTS SHALL BE DESIGNED FOR HS-20 TRAFFIC LOADING CONDITIONS AND 300 PSF SURCHARGE LOAD WITH A CAST IN PLACE FOUNDATION AS SHOWN.

PLAN
NOT TO SCALE

LADDER RUNGS AT 12" O.C. CAST IN VAULT WITH FIRST RUNG 3" BELOW TOP OF PIT ROOF SLAB

<table>
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<tr>
<th>PRV VAULT SIZE</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>G</th>
<th>H</th>
<th>J</th>
<th>K</th>
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<tr>
<td>MAIN SIZE 6&quot; &amp; 8&quot;</td>
<td>12'-6&quot;</td>
<td>13'-10&quot;</td>
<td>9'-2&quot;</td>
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<td>7'-8&quot;</td>
<td>0'-4&quot;</td>
<td></td>
</tr>
<tr>
<td>MAIN SIZE 12&quot;</td>
<td>14'-8&quot;</td>
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<td>6'-10&quot;</td>
<td>7'-8&quot;</td>
<td>0'-4&quot;</td>
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ELEVATION
NOT TO SCALE

FIRST RUNG OF LADDER
3"

3'-2 1/2" DIA

4" MANHOLE VENT
(COATED STEEL) SEE DETAIL DRAWING A6-1 FOR VENT REQUIREMENTS

12" MIN 15" MAX

3'-2 1/2" DIA

DESIGN INDIVIDUAL ARCHES PER DETAIL DETAIL DRAWINGS A6-5 & A6-6

NO. 5 REBAR 12" O.C. EACH WAY; CENTERED IN SLAB
12" DIAMETER SUMP, 6" DEEP, WATERTIGHT

12" MIN

FIRST RUNG OF LADDER
3"

4" MANHOLE VENT
(COATED STEEL) SEE DETAIL DRAWING A6-1 FOR VENT REQUIREMENTS

FINALE GRAD

DETAIL "A"
CONCRETE RISER FOR MANHOLE
CIRCULAR CONCRETE RISER

NO. 5 REBAR 12" O.C. EACH WAY; CENTERED IN SLAB
12" DIAMETER SUMP, 6" DEEP, WATERTIGHT

6 ANCHOR RODS IN ROOF AROUND RISER

DATE 03/2014

Colorado Springs Utilities
It's how we're all connected

PRESSURE REGULATOR STATIONS
6", 8" & 12"
VAULT DIMENSIONS

A6-4
NOTES:

1. ALL CONCRETE WORK SHALL COMPLY WITH COLORADO SPRINGS UTILITIES STANDARD SPECIFICATIONS AND THE LATEST ACI-318 CODE.
2. ALL CONCRETE VAULTS SHALL BE DESIGNED FOR HS 20 TRAFFIC LOADING CONDITIONS AND 300 PSF SURCHARGE LOAD.
3. VAULTS FOR PRESSURE REGULATOR STATIONS LARGER THAN 12 INCH WILL BE SPECIFICALLY DESIGNED BY THE ENGINEER AND APPROVED BY COLORADO SPRINGS UTILITIES.
4. SHOP DETAIL DRAWINGS FOR ALL VAULTS ARE REQUIRED AND WILL BE APPROVED BY COLORADO SPRINGS UTILITIES.
5. SEE DETAIL DRAWING A6-4 FOR VAULT DETAILS.
LIFT ANCHORS FOR REMOVABLE SLAB: MEADOWBURKE CX-41x1-1/4" DIAMETER COIL LIFTING INSERT W/PR22 LOCATOR PLUG, (4) REQUIRED, (1) EACH CORNER W/15" MIN. EDGE DISTANCE (TYP)

ADD RISERS AS NECESSARY TO MEET FINAL GRADE, SEE DETAIL DRAWING A6-4. WHERE DETERMINED NECESSARY, A CONCRETE RISER SHALL BE FORMED ON THE ROOF OF THE PIT TO MATCH THE SLOPE OF THE STREET SURFACE. THE RISER SHALL BE A CIRCULAR RING OF 6 INCHES THICK AND A MINIMUM OF 3 INCHES HIGH. INSTALL SAFETY POST.

NOTES:
1. ALL CONCRETE WORK SHALL COMPLY WITH COLORADO SPRINGS UTILITIES STANDARD SPECIFICATIONS AND THE LATEST ACI-318 CODE.
2. ALL CONCRETE VAULTS SHALL BE DESIGNED FOR HS 20 TRAFFIC LOADING CONDITIONS AND 300 PSF SURCHARGE LOAD.
3. VAULTS FOR PRESSURE REGULATOR STATIONS LARGER THAN 12 INCH WILL BE SPECIFICALLY DESIGNED BY THE ENGINEER AND APPROVED BY COLORADO SPRINGS UTILITIES.
4. SHOP DETAIL DRAWINGS FOR ALL VAULTS ARE REQUIRED AND WILL BE APPROVED BY COLORADO SPRINGS UTILITIES.
5. SEE DETAIL DRAWING A6-4 FOR VAULT DETAILS.
DETAIL UNDER DESIGN
NOTES:

1. ALL CONCRETE VAULTS SHALL BE DESIGNED FOR HS-20 TRAFFIC LOADING CONDITIONS AND 300 PSF SURCHARGE LOAD.
2. ALL PRESSURE REGULATOR INSTALLATIONS LARGER THAN 12" SHALL BE DESIGNED BY DESIGN ENGINEER AND APPROVED BY COLORADO SPRINGS UTILITIES.
3. ALL MATERIAL INSIDE VAULT SUPPLIED BY CONTRACTOR AND REIMBURSED BY COLORADO SPRINGS UTILITIES. SEE CHAPTER 2.
4. LOCATION OF PRV VAULT MAY VARY DUE TO WIDTH OF ROW AND SIDEWALKS. COORDINATE WITH GAS AND ELECTRIC DEPARTMENT PRIOR TO INSTALLATION. ADDITIONAL EASEMENT MAY BE NECESSARY TO PROVIDE A MINIMUM OF 5.0' FROM THE OUTSIDE EDGE OF EXTERIOR VAULT WALLS.
5. PRV DETAILS SHOWN IN DETAIL DRAWINGS, A6-3, A6-4, A6-5 AND A6-6.
6. ALL FITTINGS TO BE MECHANICALLY JOINT (MJ) RESTRAINED.
7. IF REDUCER IS REQUIRED, IT SHALL BE PLACED BETWEEN THE CRA AND 45° BEND. SEE DETAIL ABOVE.
8. JOINT HARNESS TIE BOLTS AND LUGS SHALL CONFORM TO AWWA M11 FOR STEEL PIPE.
NOTES:
1. ALL CONCRETE WORK SHALL COMPLY WITH LATEST ACI-318 SPECIFICATIONS.
2. ALL LADDER RUNGS MUST LINE UP BOTH HORIZONTALLY AND VERTICALLY.
3. ALL SUPPORT MATERIALS SHALL BE GIVEN 2 COATS OF RUST INHIBITIVE PAINT.
4. AIR AND VACUUM VALVE STATIONS TO BE HOUSED IN A 6' DIAMETER PRECAST CONCRETE VAULT DESIGNED FOR HS-20 LOADING CONDITIONS AND 300 PSF SURCHARGE LOAD.
5. AIR AND VACUUM VALVE STATIONS TO BE HOUSED IN A 6' DIAMETER PRECAST CONCRETE VAULT DESIGNED FOR HS-20 LOADING CONDITIONS AND 300 PSF SURCHARGE LOAD.
6. GROUT ALL ARCHES FULL W/PORTLAND CEMENT, NON-SHRINK GROUT. SEAL AS NECESSARY FOR WATERTIGHT CONNECTION.
7. FOR HDPE MAIN LINE, TRANSITION TO APPROVED PIPE MATERIAL (PVC OR DIP) TO 10 FT OUTSIDE MANHOLE; SEE DETAIL DRAWING A6-4. INSTALL SAFETY POST.

36" NOMINAL DIAMETER RING AND COVER. SET TOP LEVEL WITH PAVEMENT, (1" ABOVE GROUND WHEN OUT OF PAVEMENT).

ADD RISERS WHERE NECESSARY TO MEET FINAL GRADE. A CONCRETE RISER SHALL BE FORMED ON THE ROOF OF THE PIT TO MATCH THE SLOPE OF THE STREET SURFACE, SEE DETAIL DRAWING A6-4. INSTALL SAFETY POST.

COAT EXTERIOR WITH ASPHALT DAMP PROOFING.

MECHANICAL JOINT PLUG, TAPPED TO MATCH AIR RELEASE AND VACUUM BREAK VALVE.

MECHANICAL JOINT TEE; LATERAL SIZE VARIES.

DESIGN ARCH TO MEET INDIVIDUAL CONDITIONS WITH POLYETHYLENE BOND BREAKER BOTH ENDS.

INSTALL "CONSEAL" WATERTIGHT SEALANT

AIR RELEASE & VACUUM BREAK VALVE FOR VERTICAL INSTALLATION. (VENT-O-MAT RBX SERIES OR APPROVED EQUAL). INSTALL PER MANUFACTURER RECOMMENDATIONS.

IN AND OUT VENT FOR CONSTANT AIR CIRCULATION

COVER END OF VENTS WITH SCREENS

VARIES; LOCATION TO BE SHOWN ON DETAIL DRAWINGS

VALVE BOX TOP WITH SLIP LID TO BE CAST IN TO VAULT

AIR RELEASE & VACUUM BREAK VALVE FOR VERTICAL INSTALLATION. (VENT-O-MAT RBX SERIES OR APPROVED EQUAL). INSTALL PER MANUFACTURER RECOMMENDATIONS.

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IN AND OUT VENT FOR CONSTANT AIR CIRCULATION

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IN AND OUT VENT FOR CONSTANT AIR CIRCULATION

COVER END OF VENTS WITH SCREENS

VARIES; LOCATION TO BE SHOWN ON DETAIL DRAWINGS

VALVE BOX TOP WITH SLIP LID TO BE CAST IN TO VAULT

AIR RELEASE & VACUUM BREAK VALVE FOR VERTICAL INSTALLATION. (VENT-O-MAT RBX SERIES OR APPROVED EQUAL). INSTALL PER MANUFACTURER RECOMMENDATIONS.

IN AND OUT VENT FOR CONSTANT AIR CIRCULATION

COVER END OF VENTS WITH SCREENS

VARIES; LOCATION TO BE SHOWN ON DETAIL DRAWINGS

VALVE BOX TOP WITH SLIP LID TO BE CAST IN TO VAULT

AIR RELEASE & VACUUM BREAK VALVE FOR VERTICAL INSTALLATION. (VENT-O-MAT RBX SERIES OR APPROVED EQUAL). INSTALL PER MANUFACTURER RECOMMENDATIONS.

IN AND OUT VENT FOR CONSTANT AIR CIRCULATION

COVER END OF VENTS WITH SCREENS

VARIES; LOCATION TO BE SHOWN ON DETAIL DRAWINGS

VALVE BOX TOP WITH SLIP LID TO BE CAST IN TO VAULT

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VALVE BOX TOP WITH SLIP LID TO BE CAST IN TO VAULT

AIR RELEASE & VACUUM BREAK VALVE FOR VERTICAL INSTALLATION. (VENT-O-MAT RBX SERIES OR APPROVED EQUAL). INSTALL PER MANUFACTURER RECOMMENDATIONS.
NOTES:

1. METER VAULTS TO HAVE TWO (2) EACH 2" KNOCKOUTS FOR INSTALLATION OF 115 VAC ELECTRICAL AND REMOTE SIGNAL WIRE. LOCATION TO BE DETERMINED PER INDIVIDUAL APPLICATION BY COLORADO SPRINGS UTILITIES.

2. ELECTRICAL EQUIPMENT AND DISPLAY UNIT TO BE MOUNTED IN A DRY LOCATION.

3. METER TO BE COMPATIBLE WITH COLORADO SPRINGS UTILITIES CURRENT DATA COLLECTION PROGRAM.

4. CONCRETE VAULTS SHALL BE DESIGNED FOR HS-20 TRAFFIC LOADING CONDITIONS AND 300 PSF SURCHARGE LOAD WITH A CAST IN PLACE FOUNDATION AS SHOWN.

FLOW METER INSTALLATION

36" NOMINAL DIAMETER RING AND COVER. SET TOP LEVEL WITH PAVEMENT, (1" ABOVE GROUND WHEN OUT OF PAVEMENT).

ADD RISERS WHERE NECESSARY TO MEET FINAL GRADE. A CONCRETE RISER SHALL BE FORMED ON THE ROOF OF THE PIT TO MATCH THE SLOPE OF THE STREET SURFACE, SEE DETAIL DRAWING A6-4. INSTALL SAFETY POST.

COAT EXTERIOR WITH ASPHALT DAMP PROOFING.

OFFSET TO BE INSTALLED A MIN OF 2 x PIPE DIAMETER DOWNSTREAM.

COAT EXTERIOR WITH ASPHALT DAMP PROOFING.

OFFSET TO BE INSTALLED A MIN OF 2 x PIPE DIAMETER DOWNSTREAM.

INSTALL "CONSEAL" WATERTIGHT SEALANT.

4"x18"x18" (MIN) CONCRETE BLOCKS; OR ADJUSTABLE JACK STAND.

NO. 5 REBAR 12" O.C. EACH WAY; 3" ABOVE GROUND.

DESIGN ARCH TO MEET INDIVIDUAL CONDITIONS WITH POLYETHYLENE BOND BREAKER BOTH ENDS.

PRESSURE LINE ONLY

MECHANICAL JOINT ISOLATION VALVE TO BE INSTALLED A MINIMUM OF 2 x PIPE DIAMETER DOWNSTREAM.

4" MANHOLE VENT (COATED STEEL) SEE DETAIL DRAWING A6-1 FOR VENT REQUIREMENTS.

FLOW

OFFSET (TYP) 6", 8", 12", 18", 24"

8'-0" x 8'-0" SQUARE CONCRETE PAD ON UNDISTURBED SOIL WITH VAPOR BARRIER.

FLOW

DISCHARGE LINE ONLY

NOT TO SCALE

MIN 6" OFFSET

DISPLAY UNIT (SEE NOTE 1)

MIN 6" OFFSET

DISPLAY UNIT (SEE NOTE 1)

MECHANICAL JOINT ISOLATION VALVE

MECHANICAL JOINT ISOLATION VALVE

MIN 4" ABOVE FLOOR

MIN 4" ABOVE FLOOR

4"x18"x18" (MIN) CONCRETE BLOCKS; OR ADJUSTABLE JACK STAND.

4"x18"x18" (MIN) CONCRETE BLOCKS; OR ADJUSTABLE JACK STAND.

DIP

DIP

DIP

DIP

FINIAL GRADE

FINIAL GRADE

36" NOMINAL DIAMETER RING AND COVER. SET TOP LEVEL WITH PAVEMENT, (1" ABOVE GROUND WHEN OUT OF PAVEMENT).

ADD RISERS WHERE NECESSARY TO MEET FINAL GRADE. A CONCRETE RISER SHALL BE FORMED ON THE ROOF OF THE PIT TO MATCH THE SLOPE OF THE STREET SURFACE, SEE DETAIL DRAWING A6-4. INSTALL SAFETY POST.

COAT EXTERIOR WITH ASPHALT DAMP PROOFING.

OFFSET TO BE INSTALLED A MIN OF 2 x PIPE DIAMETER DOWNSTREAM.

INSTALL "CONSEAL" WATERTIGHT SEALANT.

4"x18"x18" (MIN) CONCRETE BLOCKS; OR ADJUSTABLE JACK STAND.

NO. 5 REBAR 12" O.C. EACH WAY; 3" ABOVE GROUND.

DESIGN ARCH TO MEET INDIVIDUAL CONDITIONS WITH POLYETHYLENE BOND BREAKER BOTH ENDS.

PRESSURE LINE ONLY

MECHANICAL JOINT ISOLATION VALVE TO BE INSTALLED A MINIMUM OF 2 x PIPE DIAMETER DOWNSTREAM.

4" MANHOLE VENT (COATED STEEL) SEE DETAIL DRAWING A6-1 FOR VENT REQUIREMENTS.

FLOW

OFFSET (TYP) 6", 8", 12", 18", 24"

8'-0" x 8'-0" SQUARE CONCRETE PAD ON UNDISTURBED SOIL WITH VAPOR BARRIER.

FLOW
NOTES:
1. HYDRANTS TO BE LOCATED NOT MORE THAN 40 FT FROM EACH OTHER AND NO MORE THAN 20 FT FROM VEHICULAR ACCESS.
2. HYDRANT LOCATIONS TO BE DETERMINED BY SITE LAYOUT CONDITIONS.
3. DETAIL DRAWING A6-12 TO BE USED WHEN PRESSURES EXCEED THE PRESSURE RATING OF THE FIRE HYDRANTS.
NOTES:
1. THIS DETAIL TO BE USED WHEN THE PRESSURES EXCEED THE PRESSURE RATING OF THE FIRE HYDRANTS.
2. TEE SHALL BE 4" LATERAL FROM EXISTING WATER MAIN SIZE, I.E., 8" x 4", 12" x 4", ETC.
3. PROVIDE CLEAN CRUSHED ROCK WRAPPED IN GEO-TEXTILE FABRIC FOR STAND PIPE DRAINAGE WHEN NOT IN USE.
4. ALL MECHANICAL JOINT (MJ) CONNECTIONS SHALL BE RESTRAINED.
5. PUMPER NOZZLES SHALL BE LOCATED EACH NOT MORE THAN 40 FT FROM EACH OTHER AND NO MORE THAN 20 FT FROM VEHICULAR ACCESS. LOCATIONS TO BE DETERMINED BY SITE LAYOUT.

PUMP STATION BYPASS
SCHEMATIC LAYOUT
(ALTERNATIVE)

DATED 03/2014
PROPOSED WATER MAIN

NOTES:

1. ALL DUCTILE IRON FITTINGS AND PIPE SHALL BE CATHODICALLY PROTECTED PER SECTION 2.6.1.
2. ALL FITTINGS SHALL HAVE MJ RESTRAINTS IN ACCORDANCE WITH CHAPTER 5.
3. EXAMPLE CAN VARY DUE TO SITE CONDITIONS AND COLORADO SPRINGS UTILITIES INSPECTOR’S DIRECTION.
4. RESTRAINED JOINTS ARE REQUIRED WITHIN LOWERING.
5. NO TAPS OR TEES ARE ALLOWED WITHIN THE LOWERING.
6. WHERE WATER MAIN CROSSES UNDER STORM SEWER, WASTEWATER OR NON-POTABLE WATER INFRASTRUCTURE, REFERENCE SECTION 2.6-H.2.

ELEVATION

NOTES:

1. ALL DUCTILE IRON FITTINGS AND PIPE SHALL BE CATHODICALLY PROTECTED PER SECTION 2.6.1.
2. ALL FITTINGS SHALL HAVE MJ RESTRAINTS IN ACCORDANCE WITH CHAPTER 5.
3. EXAMPLE CAN VARY DUE TO SITE CONDITIONS AND COLORADO SPRINGS UTILITIES INSPECTOR’S DIRECTION.
4. RESTRAINED JOINTS ARE REQUIRED WITHIN LOWERING.
5. NO TAPS OR TEES ARE ALLOWED WITHIN THE LOWERING.
6. WHERE WATER MAIN CROSSES UNDER STORM SEWER, WASTEWATER OR NON-POTABLE WATER INFRASTRUCTURE, REFERENCE SECTION 2.6-H.2.

LOWERING DETAIL
UTILITY CROSSING 30" & SMALLER

DATED 03/2014
NOTES:
1. ALL DUCTILE IRON FITTINGS AND PIPE SHALL BE CATHODICALLY PROTECTED PER SECTION 2.6.1.
2. ALL FITTINGS SHALL HAVE MJ RESTRAINTS IN ACCORDANCE WITH CHAPTER 5.
3. EXAMPLE CAN VARY DUE TO SITE CONDITIONS AND COLORADO SPRINGS UTILITIES INSPECTOR’S DIRECTION.
4. RESTRAINED JOINTS ARE REQUIRED WITHIN LOWERING.
5. NO TAPS OR TEES ARE ALLOWED WITHIN THE LOWERING.
6. WHERE WATER MAIN CROSSES UNDER STORM SEWER, WASTEWATER OR NON-POTABLE WATER INFRASTRUCTURE, REFERENCE SECTION 2.6-H.2.
NOTES:
1. ALL FITTINGS AND BELLS SHALL BE RESTRAINED IN THE CASING PIPE.
2. LOCATE CASING SPACERS AT "HOMING" LOCATION FOR SLEEVES GREATER THAN 50 FEET IN LENGTH TO PREVENT DAMAGE TO BELL DURING INSTALLATION AND EXTRACTION OF PIPE, IF REMOVED.
3. CASING SHALL BE STEEL PIPE WITH A MINIMUM YIELD STRENGTH OF 35,000 PSI. CASING THICKNESS SHALL BE SPECIFIED BY THE DESIGN ENGINEER ON THE PLANS BASED ON THE ANTICIPATED LOADS. SEE DETAIL DRAWING A7-4.
4. THE DIAMETER OF THE CASING SHALL BE SPECIFIED BY THE DESIGN ENGINEER. THE DIAMETER SHALL TAKE INTO ACCOUNT THE MAXIMUM O.D. WITH THE USE OF RESTRAINED JOINT PIPE.
5. SEE DETAIL DRAWING A7-4 FOR CASING SPACER DETAILS.
6. LOCATE SPACERS ON BOTH SIDES OF JOINTS TO ELIMINATE DEFLECTION OF THE JOINT IN THE SLEEVE.
7. WHERE WATER MAIN CROSSES UNDER STORM SEWER, WASTEWATER OR NON-POTABLE WATER INFRASTRUCTURE, REFERENCE SECTION 2.6-H.2.
8. WHEN CROSSING A ROADWAY IMPROVEMENT, THE WIDTH OF THE IMPROVEMENT SHALL BE ADDED TO THE LENGTH OF THE SLEEVE.
CARRIER PIPE MINIMUM SIZES AND THICKNESSES
(TO BE VERIFIED BY THE DESIGN ENGINEER)
BASED ON ACTUAL LOADING AND SITE CONDITIONS

<table>
<thead>
<tr>
<th>CASING PIPE NOMINAL SIZE (IN)</th>
<th>MIN. THICKNESS (IN)</th>
</tr>
</thead>
<tbody>
<tr>
<td>12</td>
<td>0.250</td>
</tr>
<tr>
<td>14</td>
<td>0.312</td>
</tr>
<tr>
<td>16</td>
<td>0.312</td>
</tr>
<tr>
<td>18</td>
<td>0.312</td>
</tr>
<tr>
<td>20</td>
<td>0.375</td>
</tr>
<tr>
<td>24</td>
<td>0.375</td>
</tr>
<tr>
<td>32</td>
<td>0.500</td>
</tr>
<tr>
<td>36</td>
<td>0.625</td>
</tr>
</tbody>
</table>

CASING PIPE MINIMUM SIZES AND THICKNESSES ARE
BASED ON E80 LOADING. VARIANCES TO THESE
MINIMUMS MAY BE ALLOWED WITH SUPPORTING
CALCULATIONS FROM THE DESIGN ENGINEER

CARRIER PIPE:

1. CARRIER PIPE SHALL BE CENTERED WITHIN CASING BY USE OF
   APPROVED STAINLESS STEEL CASING SPACERS AS MANUFACTURED
   BY APPROVED MANUFACTURER BY COLORADO SPRINGS UTILITIES.
   (REFERENCE CHAPTER 2)

PLACEMENT OF SPACERS ON CARRIER PIPE:

1. GENERAL - ONE SPACER SHALL BE PLACED MAX. 2' FROM EACH END
   OF CASING AND ON EITHER SIDE OF EACH BELL OR MECHANICAL
   JOINT. SUBSEQUENT SPACERS SHALL BE PLACED AT 8' INTERVALS
   WITHIN THE CASING, OR IN ACCORDANCE WITH PIPE
   MANUFACTURERS RECOMMENDATIONS.

END SEALS:

1. END SEALS SHALL BE USED TO ENSURE A WATER TIGHT SEAL ON
   EITHER END OF THE CASING.

CATHODIC PROTECTION:

1. CASING SHALL BE CATHODICALLY PROTECTED PER SECTION 2.6.1.
NOTES:
1. IF UPPER UTILITY IS GREATER THAN 30" IN SIZE LOWER UTILITY MUST BE IN A CASING PIPE. REFERENCE DETAIL DRAWING A7-2 & A7-3.
2. ALL METALLIC STRUCTURE AND PIPE SHALL BE CATHODICALLY PROTECTED PER SECTION 2.6.1.
3. THE BRIDGING SUPPORT SHALL BE DESIGNED BY THE DESIGN ENGINEER.
NOTES:
1. ALL FLOWABLE-FILL SHALL BE IN CONFORMANCE WITH CHAPTER 4.
2. SEE SECTION 2.6.H FOR UTILITY CROSSING STANDARDS.

PIPE BRIDGING DETAIL
W/CONCRETE CRADLES

NOTES:
1. CONCRETE SHALL BE REINFORCED WITH NO. 6 REBAR, SET ON 12" CENTERS
2. NO JOINTS OF UTILITY MAIN SHALL BE ALLOWED BETWEEN CONCRETE BRIDGING BLOCKS.
3. CONCRETE AND REINFORCEMENT SHALL BE IN ACCORDANCE WITH CHAPTER 4.

FLOWFILL DETAIL

FINAL GRADE

NOTES:
1. ALL FLOWABLE-FILL SHALL BE IN CONFORMANCE WITH CHAPTER 4.
2. SEE SECTION 2.6.H FOR UTILITY CROSSING STANDARDS.
TYPICAL CHANNEL PROFILE

VALVE

CRA PER DETAIL DRAWING A4-8 (TYP.)

TYPICAL STREAM CROSSING CROSS SECTION

4" x 4" x 1/4" L TIED BACK W/ #6 REBAR @ 12" CC. TO PROTECT ENCASEMENT (TYP.)

#6 BAR WELDED TO L @ 12" O.C. (1/2" ANCHOR BOLT MAY BE USED)

L BRACKET DETAIL

LINED STEEL OR DUCTILE IRON PIPE POLYWRAPPED AND BONDED PRIOR TO PLACEMENT OF CONCRETE.

#6 REBAR SET ON 12" CENTERS

#6 REBAR SET ON 6" CENTERS

DIMENSION EQUAL TO PIPE O.D.

CONCRETE ENCASEMENT DETAIL WITHOUT CAISSON

UTILITY

ENCASEMENT AT CREEK BANKS SET TO IDENTICAL ELEVATION

SLOPE ENCASEMENT TOWARD CHANNEL CL @ 1%

PROPER CORROSION PROTECTION REQUIRED

#6 STIRRUPS PERPENDICULAR TO MAIN REINFORCEMENT ON 12" CENTERS LAP MIN. 12"

#6 MIN. STEEL REINFORCEMENT BARS PARALLEL TO PIPELINE ENTIRE LENGTH OF CONCRETE ENCASEMENT ON 6" CENTERS. NUMBER OF BARS VARIES DEPENDING UPON THE DIA. OF THE PIPE. OVERLAP SHALL BE 36 X’S THE BAR DIA.

CUT AWAY TO REVEAL REBAR DETAIL

STREAM CROSSING NOTES:

1. EXAMPLE CAN VARY DUE TO SITE CONDITIONS AND COLORADO SPRINGS UTILITIES INSPECTOR’S DIRECTIONS.

2. ALL STREAM CROSSINGS SHALL BE REVIEWED AND APPROVED BY THE CITY ENGINEER.
CREEK CROSSING DETAILS
ENCASEMENT W/CAISSONS

TYPICAL STREAM CROSSING CROSS SECTION

FLOW
CREEK BED
MIN. 5'-6' BELOW FINAL CREEK GRADE PER SECTION 2.6-H.3

CAISSON SPACING AND SIZE SHALL BE DETERMINED BY THE DESIGN ENGINEER.

BEDROCK

REBAR, SPACING, SIZE AND MATERIAL SHALL BE SPECIFIED BY THE DESIGN ENGINEER

CONCRETE ENCASEMENT DETAIL WITH CAISSON

DATED 03/2014
EXAMPLE OF A SLIP JOINT OF PVC PIPE WITH HIGH DEFL COUPLINGS

<table>
<thead>
<tr>
<th>PIPE SIZE</th>
<th>MFRS. TOTAL JOINT DEFL/W COUPL.</th>
<th>HORIZ. DEFL.</th>
<th>VERT. DEFL.</th>
<th>MIN. RADIUS FOR CURVES WITH 80% MAX. DEFL. COUPLINGS</th>
</tr>
</thead>
<tbody>
<tr>
<td>4&quot;</td>
<td>5°00'</td>
<td>4°00'</td>
<td>6.99%</td>
<td>286'</td>
</tr>
<tr>
<td>6&quot;</td>
<td>5°00'</td>
<td>4°00'</td>
<td>6.99%</td>
<td>286'</td>
</tr>
<tr>
<td>8&quot;</td>
<td>5°00'</td>
<td>4°00'</td>
<td>6.99%</td>
<td>286'</td>
</tr>
<tr>
<td>12&quot;</td>
<td>5°00'</td>
<td>4°00'</td>
<td>6.99%</td>
<td>286'</td>
</tr>
</tbody>
</table>

NOTES:
1. SEE DETAIL DRAWING A4-1 DETAIL FOR HORIZONTAL RADIUS.
NOTES:
1. REFERENCE SECTION 2.6.H. FOR DESIGN REQUIREMENTS.
2. ROUNDABOUTS SHALL BE DESIGNED PER THE CITY OF COLORADO SPRINGS TRAFFIC CRITERIA MANUAL.
3. MAINTAIN A MINIMUM OF 6' FROM THE EDGE OF PAVEMENT TO CENTERLINE OF WATER MAIN.
4. SEE DETAIL DRAWINGS A3-1 THRU A3-10 FOR LOCATION OF UTILITIES IN THE RIGHT OF WAY.
5. SERVICE TAPS SHALL BE LOCATED A MINIMUM OF 15 FT OUTSIDE THE ROUNDABOUT.
NOTES:

1. REFERENCE SECTION 2.6.H. FOR DESIGN REQUIREMENTS.
2. ROUNDABOUTS SHALL BE DESIGNED PER THE CITY OF COLORADO SPRINGS TRAFFIC CRITERIA MANUAL.
3. MAINTAIN A MINIMUM OF 6' FROM THE EDGE OF PAVEMENT TO CENTERLINE OF WATER MAIN.
4. SEE DETAIL DRAWINGS A3-1 THRU A3-10 FOR LOCATION OF UTILITIES IN THE RIGHT OF WAY.
5. SERVICE TAPS SHALL BE LOCATED A MINIMUM OF 15 FT OUTSIDE THE ROUNDABOUT.
FIELD INSTALLATION OF POLYETHYLENE WRAP FOR DIP PIPE AND FITTINGS

STEP 1:
PLACE TUBE OF POLYETHYLENE MATERIAL ON PIPE PRIOR TO LOWERING IT INTO TRENCH.

<table>
<thead>
<tr>
<th>TABLE 1</th>
<th>SUITABLE CONDUCTOR SIZES FOR JOINT BONDING OF DUCTILE IRON PIPE</th>
</tr>
</thead>
<tbody>
<tr>
<td>PIPE SIZE (IN)</td>
<td>QUANTITY - SIZE OF BOND</td>
</tr>
<tr>
<td>3 TO 14</td>
<td>2 - #8 STRANDED OR SOLID</td>
</tr>
<tr>
<td>16 TO 36</td>
<td>2 - #4 STRANDED OR SOLID</td>
</tr>
<tr>
<td></td>
<td>4 - #8 STRANDED OR SOLID</td>
</tr>
<tr>
<td></td>
<td>1 - BONDING STRAP</td>
</tr>
<tr>
<td>42 TO 64</td>
<td>2 - #2 STRANDED OR SOLID</td>
</tr>
<tr>
<td></td>
<td>4 - #4 STRANDED OR SOLID</td>
</tr>
</tbody>
</table>

STEP 2:
PULL TUBE OVER THE LENGTH OF THE PIPE. TAPE TUBE TO END AT JOINT. FOLD MATERIAL AROUND THE ADJACENT SPIGOT END AND WRAP WITH TAPE TO HOLD THE PLASTIC TUBE IN PLACE. INSTALL BONDING STRAP OR WIRE AT EVERY JOINT OF PIPE PRIOR TO WRAPPING.

STEP 3:
OVERLAP FIRST TUBE WITH ADJACENT TUBE AND SECURE WITH PLASTIC ADHESIVE TAPE. THE POLYETHYLENE TUBE MATERIAL SHALL BE NEATLY DRAWN UP AROUND THE PIPE BARREL FOLDED ON TOP OF PIPE AND TAPED IN PLACE.

** WET TRENCH INSTALLATION ONLY **

POLYETHYLENE TUBING

NOTES:
1. ANY TEARS OR HOLES SHALL BE REPAIRED WITH POLYETHYLENE TUBING AND TAPE.
2. WHEN WORKING AROUND EXISTING POLY WRAPPED PIPE, ANY TEARS AS A RESULT OF CONSTRUCTION SHALL BE REPAIRED.
3. WHEN WORKING AROUND EXISTING BONDED PIPE, ANY BROKEN BONDS AS A RESULT OF CONSTRUCTION, SHALL BE REPAIRED.
NOTES:

1. THERMITE WELD ANODE TO PIPE WITH A 15 GRAM CHARGE. INSTALL A COPPER SLEEVE WHEN WIRE IS #10 AWG OR SMALLER.
2. THERMITE WELD CONNECTIONS AND ANY BARE METAL SHALL BE COVERED WITH PRIMERLESS HANDICAP OR CORROSION TAPE.
3. PACKED ANODE SHOULD BE COVERED WITH FINE SOIL CONTAINING NO ROCKS OR DIRT CLUMPS AND SHALL BE HAND TAMPERED FOR COMPACTION.
4. ANODE WITH BROKEN BAGS SHALL NOT BE USED.
5. ANODES SHALL BE REMOVED FROM PLASTIC PACKAGING.
6. IT IS NOT NECESSARY TO WET THE ANODES.
7. DIP PIPE SHALL BE ENCASED IN POLYETHYLENE TUBING PER DETAIL DRAWING A8-1.
NOTES:

1. PROVIDE INSULATING KIT FOR APPLICABLE FLANGE TYPE AND PRESSURE RATING.
2. INSTALL DOUBLE INSULATING WASHER SET FOR VAULT OR EXPOSED FLANGES.
3. INSTALL SINGLE INSULATING WASHER SET FOR BURIED OR SUBMERGED FLANGES WITH INSULATORS OR WRAP ON UNPROTECTED SIDE OF FLANGE.
4. COAT BURIED OR IMMERSED INSULATING FLANGES FOR 12-INCHES MINIMUM ON EACH SIDE OF FLANGE.
5. FOR PIPE LESS THAN 36-INCHES DIAMETER, DO NOT INSTALL INNER STEEL WASHERS.
6. TEST COMPLETED JOINT FOR ELECTRICAL ISOLATION AND REPAIR AS REQUIRED.
7. CARE SHOULD BE TAKEN TO INSURE THAT THE TIE-BACK BOLTS DO NOT, ALONG THEIR LENGTH, CONTACT ANY PART OF THE PIPE APPURTENANCES.
8. INSULATION KITS SHALL BE INSTALLED PER MANUFACTURER RECOMMENDATIONS.
9. CONTINUITY TESTING SHALL BE ACCOMPLISHED PRIOR TO FINAL ACCEPTANCE.
10. TEST STATIONS SHALL BE INSTALLED AT INSULATING COUPLINGS PER DETAIL DRAWING A8-4.
11. FILL INTERIOR GAP BETWEEN FLANGES WITH DIELECTRIC FILLER OF SEALANT COMPATIBLE WITH SPECIFIED PIPE LINING.
12. EXTEND SPECIFIED PIPE LINING TO FACE OF FLANGE AND COAT INTERIOR OF MORTAR LINED PIPE FOR TWO PIPE DIAMETERS WITH NSF APPROVED EPOXY AT 20 MILS DFT.
NOTES:

1. THE CONTRACTOR SHALL COORDINATE WITH COLORADO SPRINGS UTILITIES TO WIRE THE TERMINAL BOARD.
2. THERMITE WELD WIRES TO PIPE WITH A 15 GRAM CHARGE. INSTALL A COPPER SLEEVE WHEN WIRE IS #10 AWG OR SMALLER.
3. THERMITE WELD CONNECTIONS AND ANY BARE METAL SHALL BE COVERED WITH PRIMERLESS HANDICAP OR CORROSION TAPE.
4. THE CONTRACTOR SHALL VERIFY CONTINUITY OF ALL WIRES TO TERMINAL BOARD PRIOR TO FINAL ACCEPTANCE.
NOTES:

1. ALL LEAD WIRES SHALL BE INSTALLED WITH A MINIMUM OF 1' - 6" OF SLACK IN EACH PLACE INDICATED TO PREVENT BREAKAGE OF WIRE BECAUSE OF BACKFILL SETTLEMENT.
2. LEAD WIRES SHALL BE ATTACHED TO THE PIPE ON THE CENTERLINE, APPROXIMATELY 12" APART.
3. LEAD WIRES SHALL BE EXOTHERMAL (CADWELD) WELDED TO PIPES IN ACCORDANCE WITH THE INSTRUCTIONS OF THE WELDING EQUIPMENT MANUFACTURER.

TYPICAL DETAIL FOR TEST STATION WITH STEEL SLEEVE INSTALLATION

NOTES:

1. THE CASING SHALL BE CATHODICALLY PROTECTED UNDER THE DIRECTION OF THE COLORADO SPRINGS UTILITIES INSPECTOR. SEE SECTION 2.6.I.
2. EXAMPLE CAN VARY DUE TO SITE CONDITIONS AND COLORADO SPRINGS UTILITIES INSPECTORS’ DIRECTION.
3. REFERENCE STANDARD DETAIL DRAWING A7-3 - STEEL CASING INSTALLATION.
4. CONTRACTOR TO COORDINATE W/ COLORADO SPRINGS UTILITIES TO WIRE TERMINAL BOARD.
5. THERMITE WELD WIRES TO PIPE W/ 15 GRAM CHARGE. INSTALL COPPER SLEEVE WHEN WIRE IS #10 AWG OR SMALLER.
6. THERMITE WELD CONNECTIONS AND ANY BARE METAL SHALL BE COVERED WITH PRIMERLESS HANDICAP OR CORROSION TAPE.
7. CONTRACTOR TO VERIFY CONTINUITY OF ALL WIRES TO TERMINAL BOARD PRIOR TO FINAL ACCEPTANCE.
NOTES:
1. THE CONTRACTOR SHALL COORDINATE WITH COLORADO SPRINGS UTILITIES TO WIRE TERMINAL BOARD.
2. THERMITE WELD WIRES TO PIPE WITH A 15 GRAM CHARGE. INSTALL A COPPER SLEEVE WHEN WIRE IS #10 AWG OR SMALLER.
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NOTES:
1. THE CONTRACTOR SHALL COORDINATE WITH COLORADO SPRINGS UTILITIES TO WIRE TERMINAL BOARD.
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DATED 03/2014
NOTES:

1. THE CONTRACTOR SHALL COORDINATE WITH COLORADO SPRINGS UTILITIES TO WIRE TERMINAL BOARD.
2. THERMITE WELD WIRES TO PIPE WITH A 15 GRAM CHARGE. INSTALL A COPPER SLEEVE WHEN WIRE IS #10 AWG OR SMALLER.
3. THERMITE WELD CONNECTIONS AND ANY BARE METAL SHALL BE COVERED WITH PRIMERLESS HANDICAP OR CORROSION TAPE.
4. THE CONTRACTOR SHALL VERIFY CONTINUITY OF ALL WIRES TO TERMINAL BOARD PRIOR TO FINAL ACCEPTANCE.
5. REMOVE MAGNETIC SWITCH FOR A REMOTE TERMINAL UNIT (RTU).
NOTES:

1. THE CONTRACTOR SHALL COORDINATE WITH COLORADO SPRINGS UTILITIES TO WIRE TERMINAL BOARD.
2. THERMITE WELD WIRES TO PIPE WITH A 15 GRAM CHARGE. INSTALL A COPPER SLEEVE WHEN WIRE IS #10 AWG OR SMALLER.
3. THERMITE WELD CONNECTIONS AND ANY BARE METAL SHALL BE COVERED WITH PRIMERLESS HANDICAP OR CORROSION TAPE.
4. THE CONTRACTOR SHALL VERIFY CONTINUITY OF ALL WIRES TO TERMINAL BOARD PRIOR TO FINAL ACCEPTANCE.
5. COLOR CODE WIRE INSULATION AS SHOWN IN APPLICABLE TEST STATION DETAILS. CONNECT EACH TEST WIRE TO SEPARATE TERMINAL.
6. WIRE CONFIGURATION FOR FLUSH MOUNT STYLE TEST STATIONS SIMILAR TO POST MOUNT STYLE TEST STATIONS.
7. PROVIDE 18 INCHES SLACK IN TEST WIRES, MINIMUM.

NOTES:

1. TERMINALS SHALL BE 1/4" STAINLESS STEEL W/LOCKING WASHER, TWO FLAT WASHERS, AND DOUBLE NUTS.
2. ALL WIRE CONNECTIONS TO BE W/RING TONGUE COMPRESSION TERMINALS.
3. WIRES ON TEST STATIONS TO BE PERMANENTLY LABELED WITH PIPE IDENTIFICATION (i.e. 12" DIP) USING NYLON WIRE MARKER TAGS.
NOTES:
1. DO NOT WRAP OR WAX TAPE DIRECT TAP OR FITTINGS ON COPPER WATER SERVICE LINES.
2. PVC AND HDPE WATER SERVICE METAL FITTINGS SHALL BE WRAPPED OR WAX TAPE PER SECTION 2.6.1.
**METAL IN CONCRETE**

**NOTES:**
1. COAT METAL PARTS WHERE IN CONTACT WITH CONCRETE, EXTENDING COATING SEVERAL INCHES BEYOND THE CONCRETE, SEE SECTION 2.6.I.
2. APPLY POLYETHYLENE WRAP TO THE ROD, OVERLAPPING THE POLYETHYLENE WRAP AND COATING A MINIMUM OF 2 INCHES.
3. SECURE POLYETHYLENE WRAP TO THE ROD USING 2 INCH WIDE POLYETHYLENE PRESSURE-SENSITIVE TAPE.

**ROD THROUGH I-BEAM**

**NOTES:**
1. COAT ENTIRE I-BEAM, SEE SECTION 2.6.I.
2. COAT NUT AND ROD, EXTENDING COATING SEVERAL INCHES BEYOND THE BEAM.
3. APPLY POLYETHYLENE WRAP TO THE ROD, OVERLAPPING THE COATING A MINIMUM OF 2 INCHES AND SECURE WITH TAPE.

**BELL RESTRAINT**

**NOTES:**
1. APPLY POLYETHYLENE WRAP TO THE ROD AND SECURE WITH TAPE, SEE SECTION 2.6.I.
2. APPLY POLYETHYLENE WRAP ON THE FITTING, OVERLAPPING THE COATING A MINIMUM OF 2 INCHES AND SECURE WITH TAPE.
NOTES:

1. MAIN AND FIRE HYDRANT VALVES AND VALVE BOXES SHALL NOT BE IN THE CURB PAN, CURB OR SIDEWALK.
2. VALVE BOXES SHALL BE SLIP TYPE. PER CHAPTER 4.
3. DEBRIS CAPS SHALL BE INSTALLED AS CLOSE UNDER THE CAST IRON COVER WITHOUT INTERFERING WITH COVER OPERATIONS.
4. DEBRIS CAPS WITH FLEXIBLE SKIRTS SHALL BE TRIMMED TO PROVIDE A SMOOTH CONTACT WITH THE INTERIOR OF THE VALVE BOX.
5. FOR SERVICE LINES 4" AND GREATER, TRACER WIRE WILL BE BROUGHT UP IN THE SECONDARY VALVE BOX.
NOTES:

1. THIS DRAWING DEPICTS DEEP VALVE BOX INSTALLATIONS WITH EXTENSION RODS.
2. FOR BUTTERFLY VALVES, SUPPORT GEAR CASING WITH 4"x18"x18" (MIN) CONCRETE BLOCKS.
3. REFER TO DETAIL DRAWING A9-1 FOR TYPICAL VALVE BOX INSTALLATION REQUIREMENTS.
TIE-IN HDPE FITTINGS

TIE-IN DUCTILE FITTINGS

NOTES:
1. OPTION #2 IS USING PVC/DIP SPACER PIPE INSTEAD OF ANCHOR PIPE. INSTALL BOTH SIDES OF TEE IF PRESSURE ALLOWS.
2. PVC/DIP SPACER PIPE SHALL BE A MINIMUM OF 30".

NOTES:
1. OPTION #2 IS USING PVC/DIP SPACER PIPE INSTEAD OF ANCHOR PIPE. INSTALL BOTH SIDES OF TEE IF PRESSURE ALLOWS.
2. PVC/DIP SPACER PIPE SHALL BE A MINIMUM OF 30".