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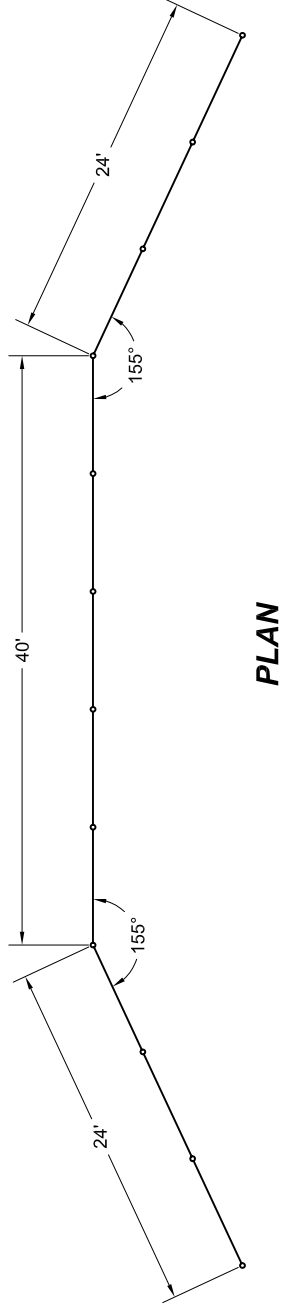
W

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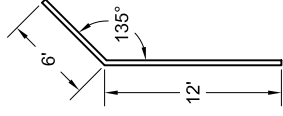
N

G

S



PLAN



BACKSTOP PROFILE

TOP SECTION BENT IN AT 45 DEGREE ANGLE - SEE BACKSTOP PROFILE VIEW

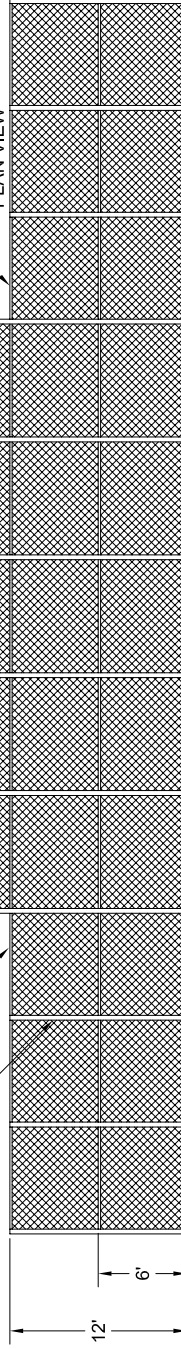
SIDE SECTIONS BENT IN AT 155 DEGREE ANGLE - SEE PLAN VIEW

ALL PIPE MUST BE SCHEDULE 40 OR GREATER

9 GAUGE CHAIN LINK

ALL CROSS MEMBERS ARE 2.5" GALVANIZED STEEL

ALL UPRIGHTS ARE 4" GALVANIZED STEEL



ELEVATION

NOTE:

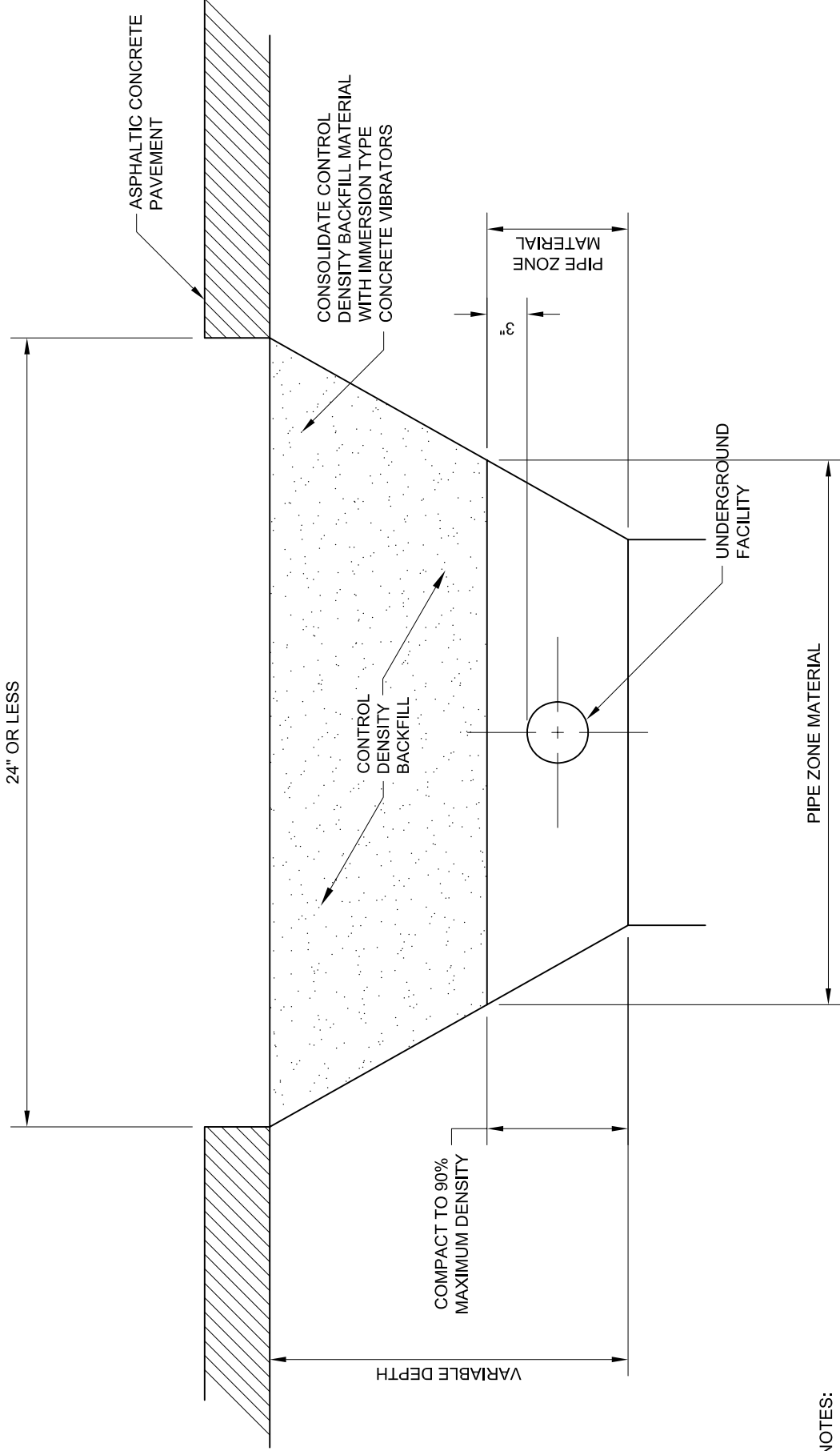
ALL OPEN PIPES MUST BE CAPPED OFF.
ALL INTERSECTING PIPE MUST BE WELDED.

**CITY OF CASPER
ENGINEERING DIVISION**

BACKSTOP DETAIL

204 1

REV.	DESCRIPTION	DATE
1	DRAFTED ONTO COMPUTER- G.D.W.	3/28/03
2	DRAWING STANDARDS REVISIONS	JAN 06



NOTES:

1. THIS TRENCH DETAIL IS ONLY APPLICABLE TO UNDERGROUND FACILITIES AS DEFINED BY ARTICLE 13 STANDARD SPECIFICATION FOR STREET CONSTRUCTION.
2. TRIM EDGES OF ASPHALT PAVEMENT TO A VERTICAL EDGE.
3. BITUMINOUS TAC COAT ALL EXPOSED EDGES OF CURB, GUTTER, MANHOLES, AND EDGES OF ASPHALT PAVEMENT.

**STANDARD TRENCH DETAIL
FOR UTILITY CUTS**

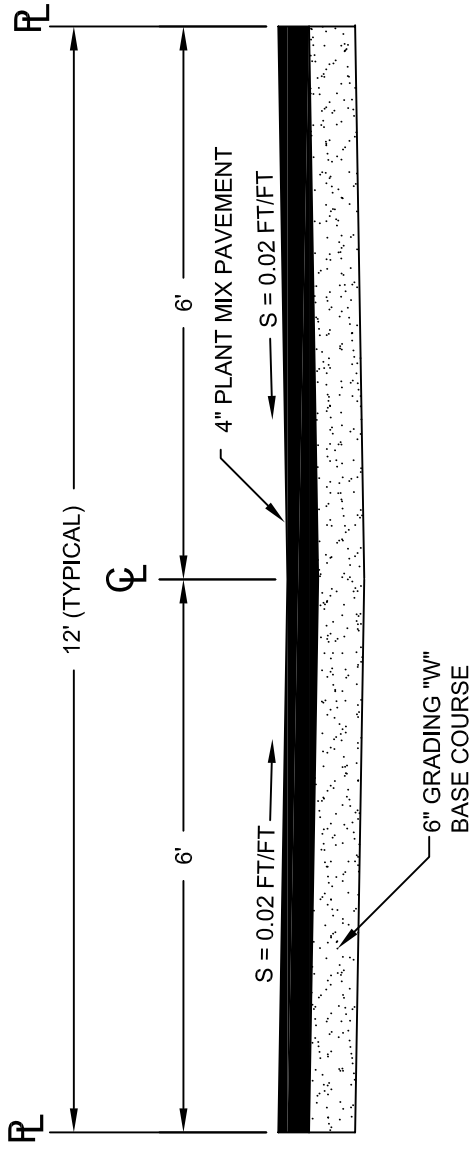
NOT TO SCALE

*CITY OF CASPER
ENGINEERING DIVISION*

**STANDARD TRENCH DETAIL
FOR UTILITY CUTS**

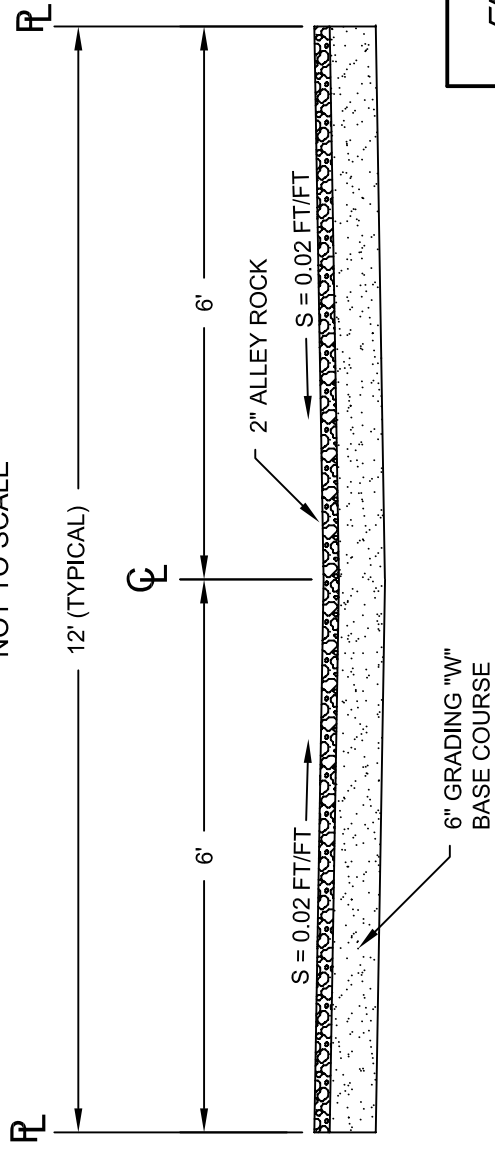
205 **1**

REV.	DESCRIPTION	DATE
1	REDRAFTED ONTO COMPUTER-Z.T.L.	6/14/01
2	DRAWING STANDARDS REVISIONS	JAN 06



TYPICAL PAVED ALLEY SECTION

NOT TO SCALE



TYPICAL UNPAVED ALLEY SECTION

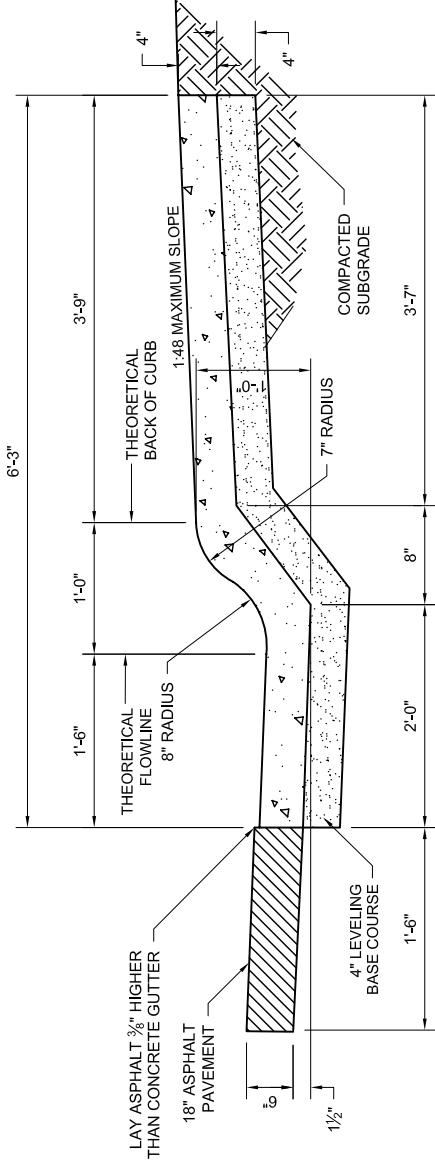
NOT TO SCALE

**CITY OF CASPER
ENGINEERING DIVISION**

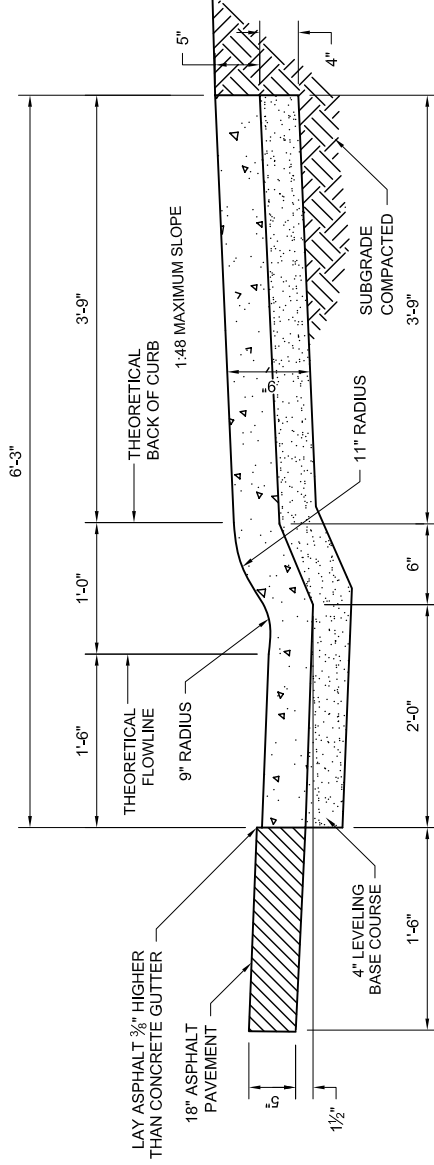
STANDARD ALLEY SECTIONS

208 / **1**

REV.	DESCRIPTION	DATE
1	REDRAFTED ONTO COMPUTER-Z.T.L.	6/10/02
2	UNPAVED ALLEY SECTION ADDED	1/14/03
3	DRAWING STANDARDS REVISIONS	JAN 06



**EXISTING RIGHT-OF-WAY CONSTRUCTION
STANDARD CONCRETE CURBWALK**



**EXISTING RIGHT-OF-WAY CONSTRUCTION
STANDARD CONCRETE CURBWALK
(ALTERNATE PROFILE DETAIL)**

NOTES:

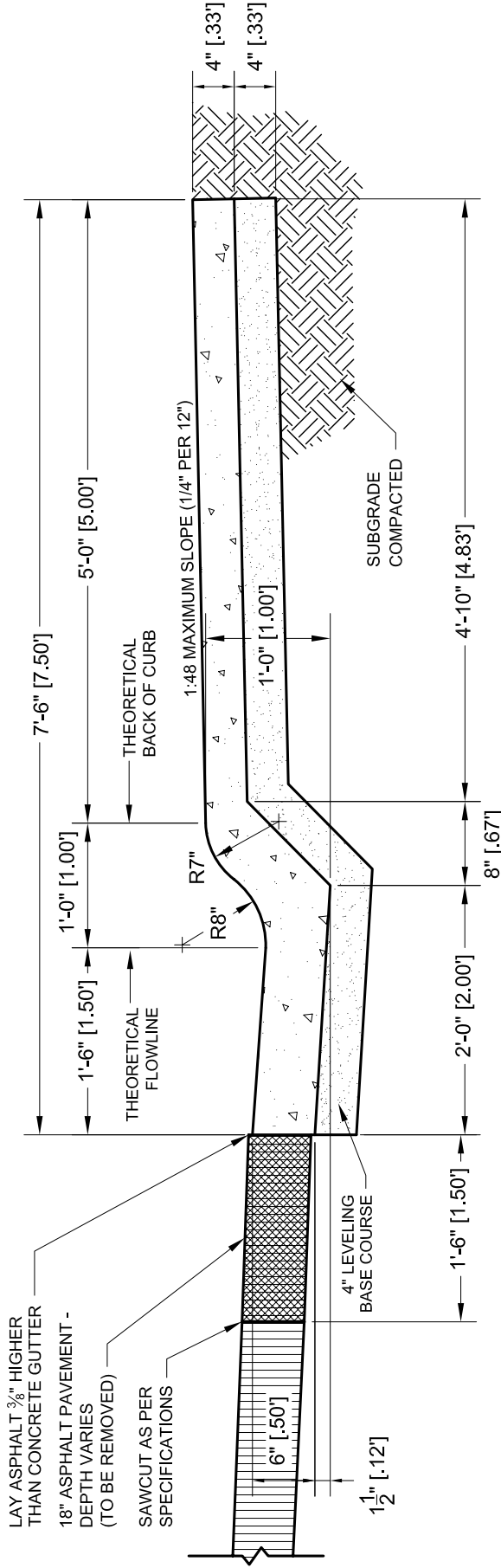
1. CUT AND REMOVE EXISTING ASPHALT 18" BACK FROM LIP OF GUTTER. PLACE GRADING "W" BASE COURSE, BACKFILL AND COMPACT TO TOP ASPHALT ELEVATION. EXCEPTIONS MAY BE GRANTED BY CITY ENGINEERING.
2. THE CITY OF CASPER DOES NOT PAVE BACK THE 18" CUT BACK FOR COMMERCIAL PROPERTIES, SITE PLANS, SUBDIVISION DEVELOPMENT, NEW CONSTRUCTION, ETC.

*CITY OF CASPER
ENGINEERING DIVISION*

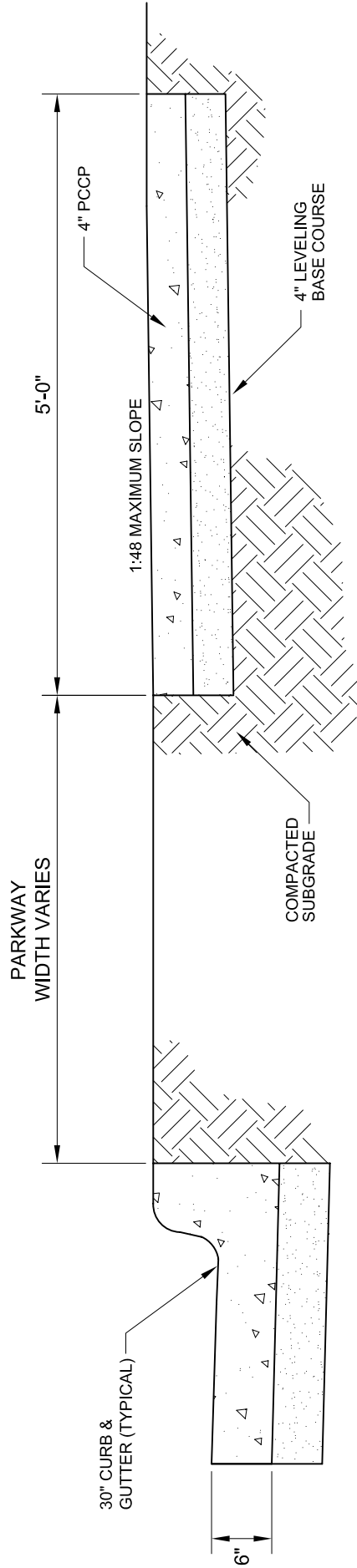
**STANDARD CURBWALK
DETAILS FOR EXISTING
CONSTRUCTION**

302.1

REV.	DESCRIPTION	DATE
1	REDRAFTED ONTO COMPUTER-Z.T.L.	5/5/01
2	DRAWING STANDARDS REVISIONS	JAN 06



**NEW RIGHT-OF-WAY CONSTRUCTION
STANDARD CONCRETE CURB AND
SIDEWALK
(ALTERNATE PROFILE DETAIL)**



**NEW RIGHT-OF-WAY CONSTRUCTION
STANDARD CONCRETE CURB AND SIDEWALK**

**CITY OF CASPER
ENGINEERING DIVISION**

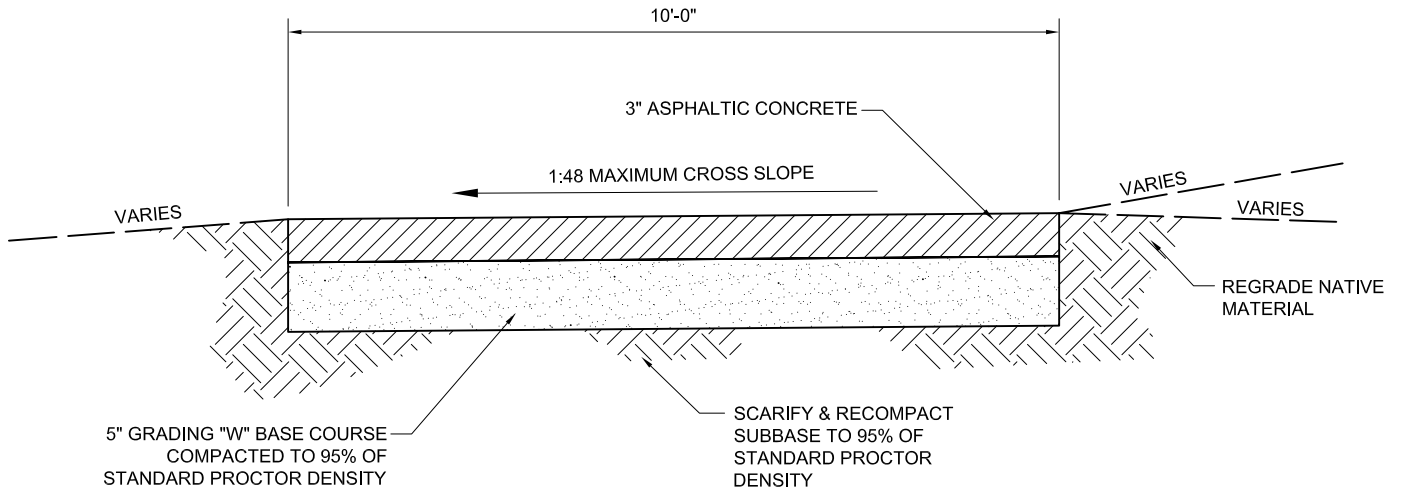
**STANDARD CURB AND
SIDEWALK DETAILS**

REV.	DESCRIPTION	DATE
1	REDRAFTED ONTO COMPUTER - Z.T.L.	5/5/01
2	DRAWING STANDARDS REVISIONS	JAN 06

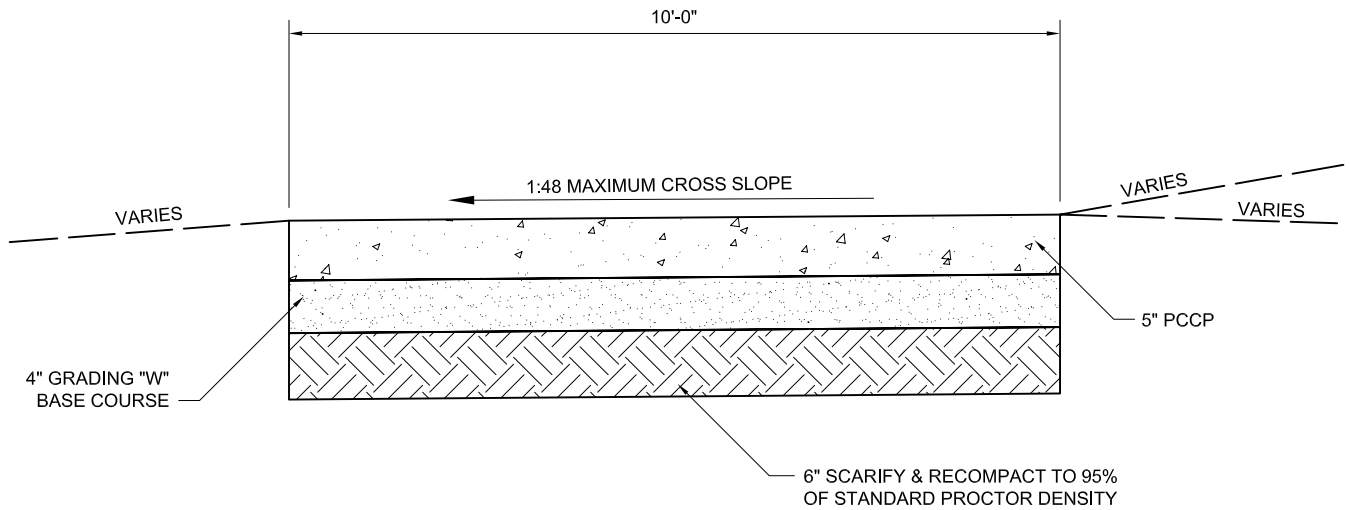
302 / 2

STANDARD CURB AND SIDEWALK DETAILS

NOT TO SCALE



**STANDARD ASPHALT
PATHWAY SECTION**



**STANDARD CONCRETE
PATHWAY SECTION**

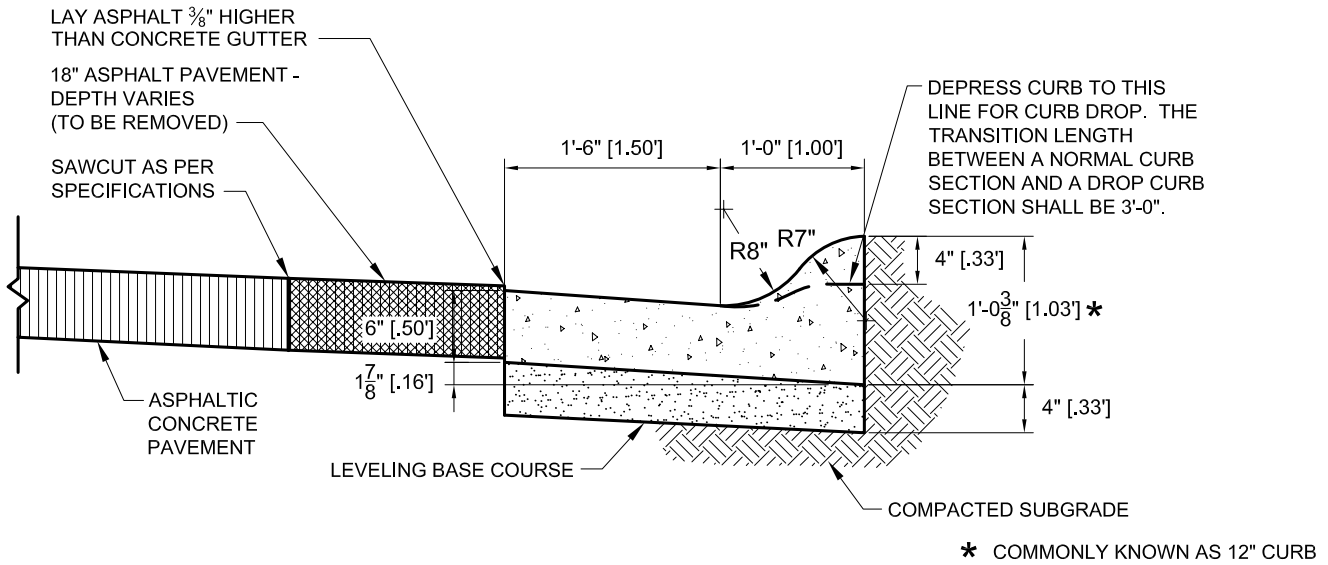
**STANDARD PATHWAY
SECTIONS**

NOT TO SCALE

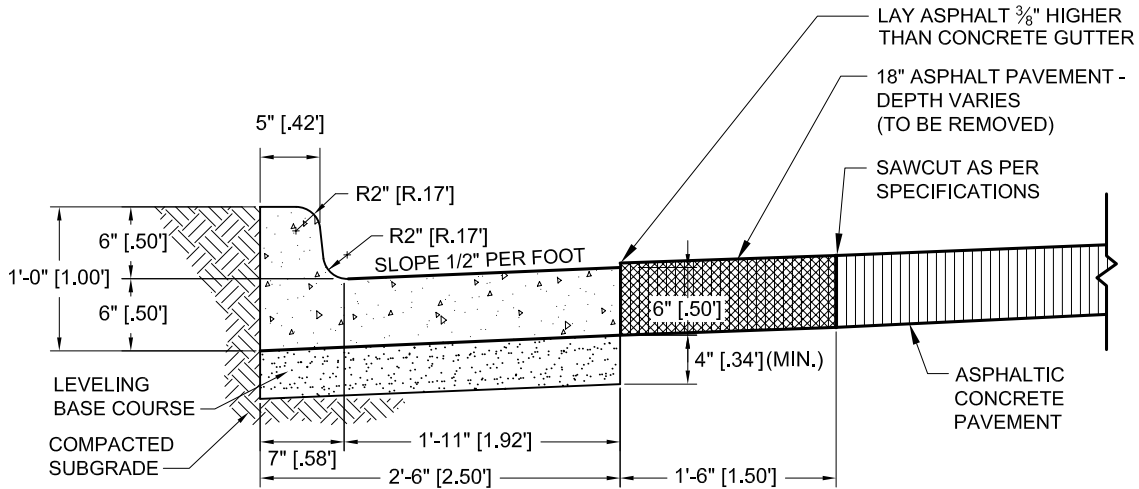
NOTE:

5' CONCRETE PATHWAY
TYPICAL SECTION SHALL
CONSIST OF 4" PCCP
AND 4" BASE COURSE.

<i>CITY OF CASPER ENGINEERING DIVISION</i>		
STANDARD PATHWAY SECTIONS		
		302
		3
REV.	DESCRIPTION	DATE
1	REDRAFTED ONTO COMPUTER- Z.T.L.	5/5/01
2	DRAWING STANDARDS REVISIONS	JAN 06



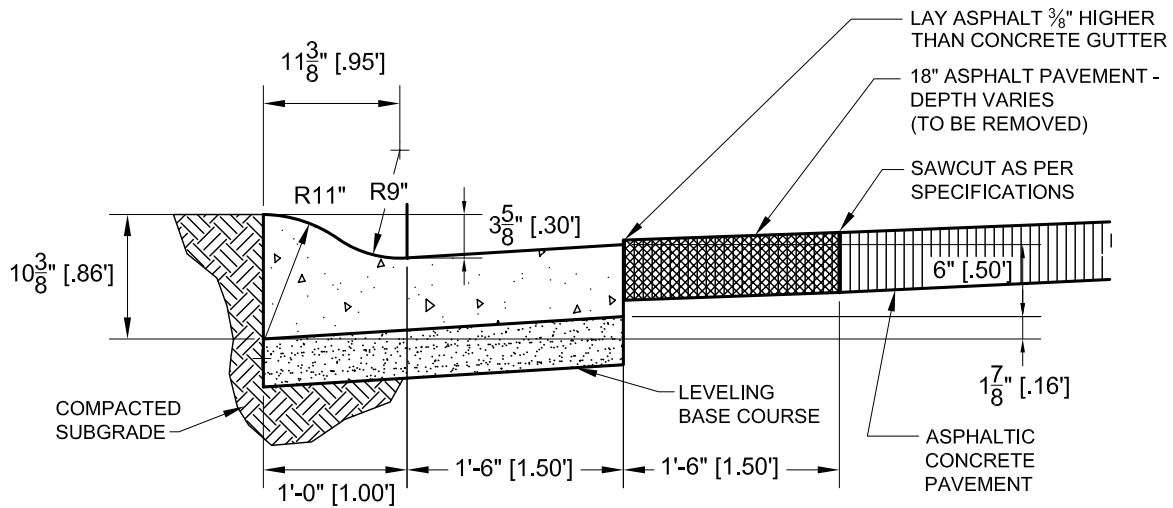
**30" CONCRETE CURB & GUTTER
TYPE A**



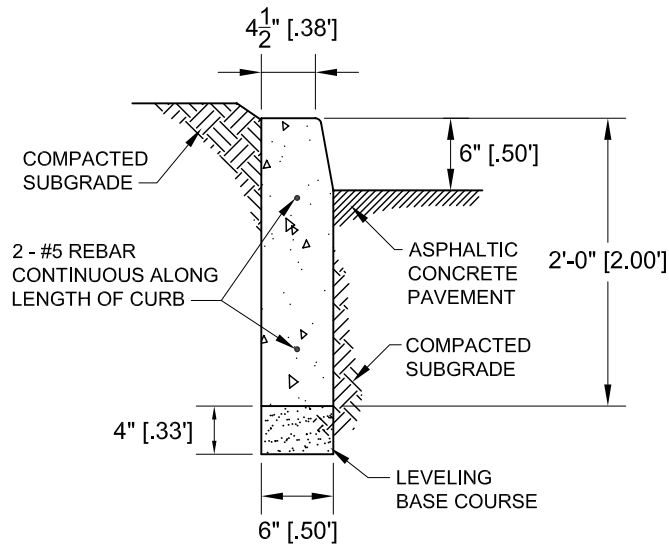
**30" CONCRETE CURB & GUTTER
TYPE B**

**TYPICAL CONCRETE CURB
& GUTTER SECTIONS**
NOT TO SCALE

<i>CITY OF CASPER ENGINEERING DIVISION</i>		
STANDARD CURB WALK DETAILS FOR EXISTING CONSTRUCTION		
		302
		4
REV.	DESCRIPTION	DATE
1	REDRAFTED ONTO COMPUTER - Z.T.L.	5/5/01
2	DRAWING STANDARDS REVISIONS	JAN 06



**TYPE A-1
30" CONCRETE CURB & GUTTER**

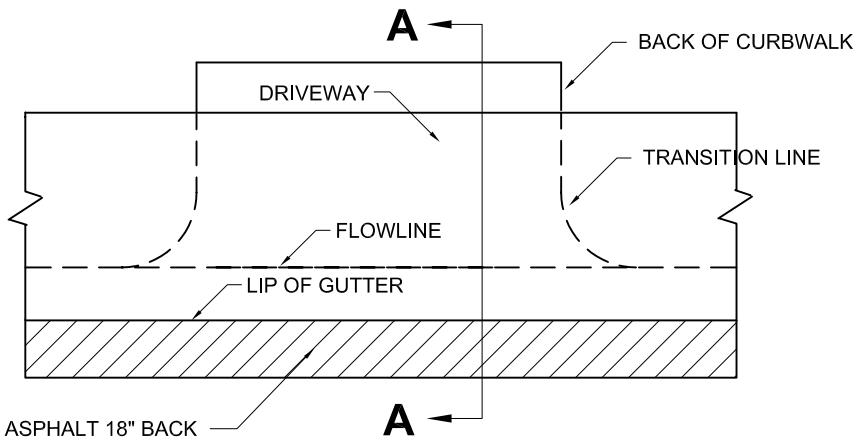


**VERTICAL 24" CONCRETE
CURB & GUTTER**

**TYPICAL CONCRETE CURB
& GUTTER SECTIONS**

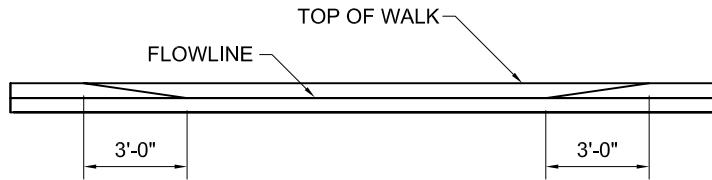
NOT TO SCALE

<i>CITY OF CASPER ENGINEERING DIVISION</i>		
STANDARD CURBWALK DETAILS FOR EXISTING CONSTRUCTION		
		302
		5
REV.	DESCRIPTION	DATE
1	REDRAFTED ONTO COMPUTER- Z.T.L.	5/5/01
2	DRAWING STANDARDS REVISIONS	JAN 06

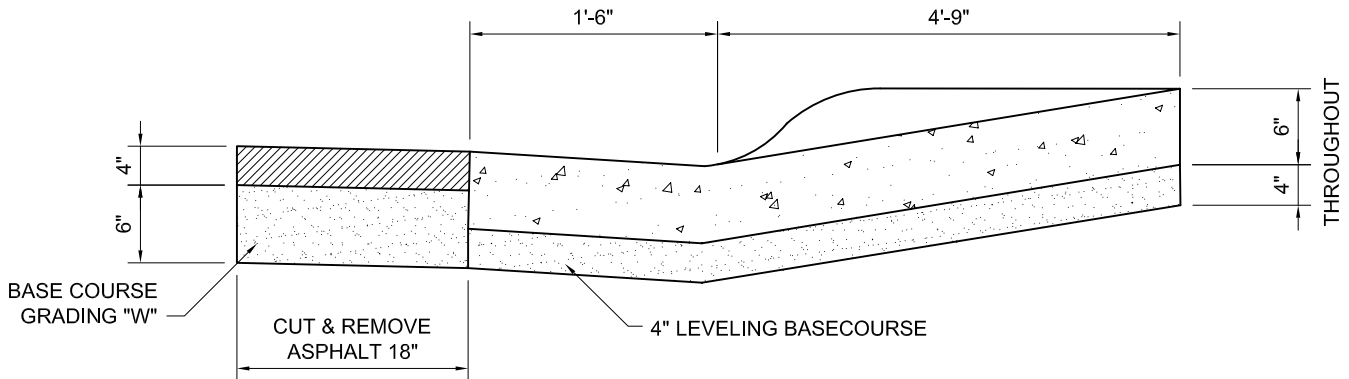


CUT AND REMOVE ASPHALT 18" BACK FROM LIP OF GUTTER. PLACE GRADING "W" BASECOURSE, BACKFILL AND COMPACT TO TOP ASPHALT ELEVATION. EXCEPTIONS MAY BE GRANTED BY CITY ENGINEER.

CURBWALK PLAN AT DRIVEWAY



ELEVATION



SECTION A-A

TYPICAL CURB CUT SECTION FOR EXISTING CONSTRUCTION

NOT TO SCALE

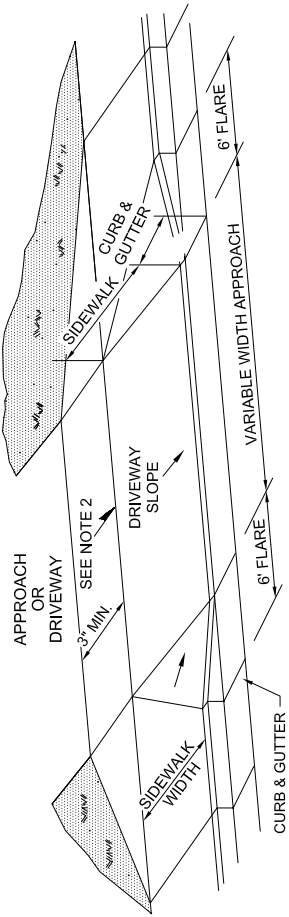
NOTES:

1. REINFORCING FOR DRIVEWAY SECTIONS SHALL CONSIST OF NO. 3 REBAR AT 18" ON CENTER EACH WAY OR FIBER-REINFORCED CONCRETE.
2. THE CITY OF CASPER DOES NOT PAVE BACK FOR COMMERCIAL PROPERTIES, SITE PLANS, SUBDIVISION DEVELOPMENT, NEW CONSTRUCTION, ETC.

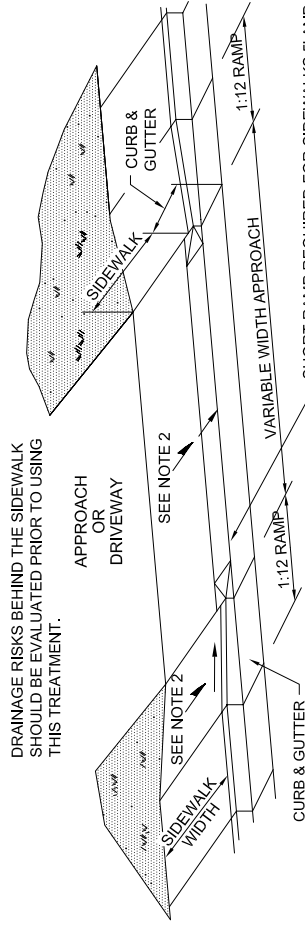
*CITY OF CASPER
ENGINEERING DIVISION*

TYPICAL CURB CUT SECTION FOR EXISTING CONSTRUCTION

		302
		6
REV.	DESCRIPTION	DATE
1	REDRAFTED ONTO COMPUTER- Z.T.L.	9/1/00
2	DRAWING STANDARDS REVISIONS	JAN 06

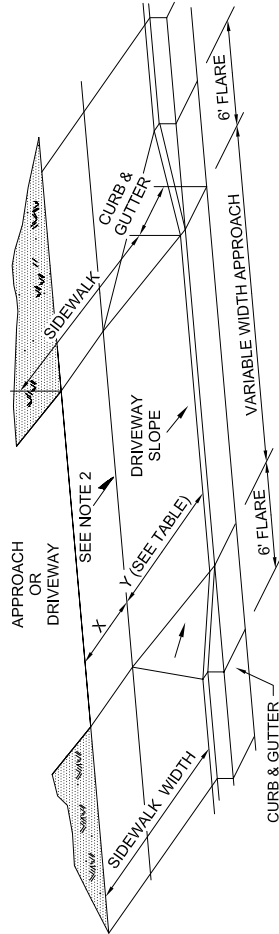


PEDESTRIAN SIDEWALK WITH EXTERNAL BYPASS
(PREFERRED APPROACH FOR SIDEWALK ADJACENT TO CURB AND WHERE RIGHT-OF-WAY PERMITS CONSTRUCTION)



DEPRESSED PEDESTRIAN SIDEWALK
(DESIRABLE APPROACH WHEN DRAINAGE BEHIND SIDEWALK IS NOT A PROBLEM)

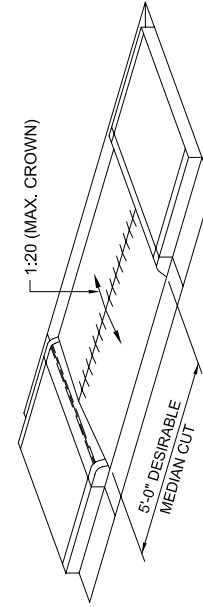
SHORT RAMP REQUIRED FOR SIDEWALKS 5' AND WIDER
SEE CURB RAMP TYPE II FOR SHORT RAMP DETAILS



DETACHED PEDESTRIAN SIDEWALK
(MOST DESIRABLE TREATMENT)

SIDEWALK WIDTH	X	Y
5'	3'	2'
6'	4'	2'
7'	4'	3'
8'	4'	4'
9'	4.5'	4.5'
>9'	VARIES	5'

TYPICAL SIDEWALK AND/OR DOUBLE GUTTER TREATMENT AT APPROACHES



NOTES:

1. RAMP SLOPE SHALL BE 1:12. RAMP SLOPE SHALL NOT EXCEED 1:12.
2. CROSS SLOPE: POSITIVE DRAINAGE SHALL BE PROVIDED BY SLOPING SIDEWALK AND/OR RAMP TOWARDS THE STREET AT 1:48. CROSS SLOPE SHALL NOT EXCEED 1:48.

**CITY OF CASPER
ENGINEERING DIVISION**

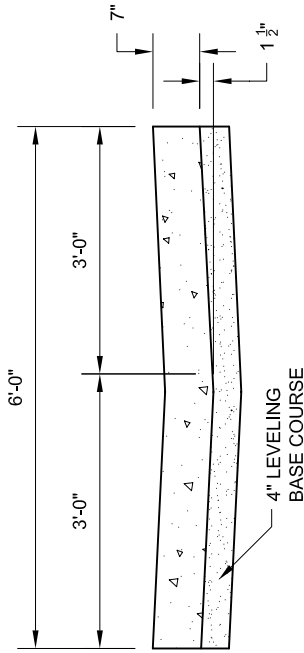
**DRIVEWAYS, APPROACHES & MEDIAN CUTS
FOR ADA ACCESSIBILITY 302.7**

REV.	DESCRIPTION	DATE
1	REDRAFTED ONTO COMPUTER- Z.T.L.	8/14/01
2	DRAWING STANDARDS REVISIONS	JAN 06

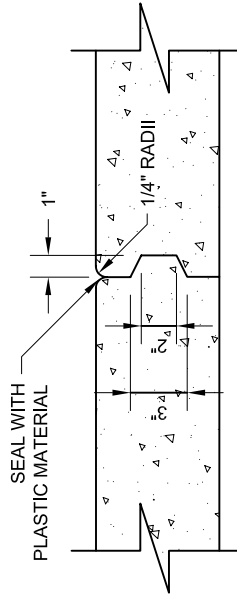
**DRIVEWAYS, APPROACHES AND
MEDIAN CUTS**

NOT TO SCALE

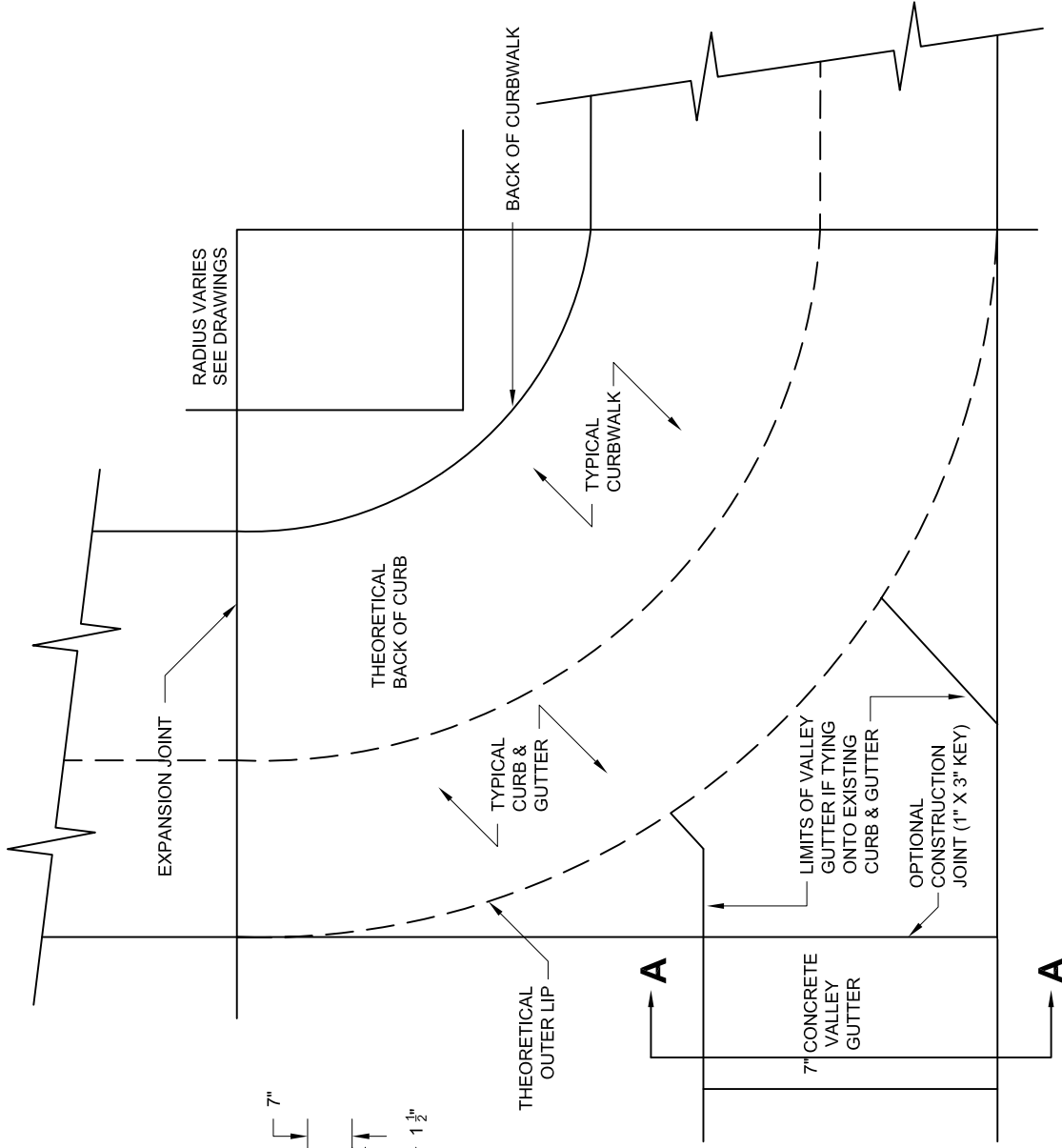
MEDIAN OR ISLAND CUT



SECTION A-A



**TYPICAL KEYED
CONSTRUCTION JOINT**



CITY OF CASPER ENGINEERING DIVISION	
STANDARD VALLEY GUTTER SECTIONS	
302	8
REV.	DESCRIPTION
1	REDRAFTED ONTO COMPUTER- Z.T.L.
2	DIMENSION CHANGE
3	DRAWING STANDARDS REVISIONS
DATE	9/1/00
DATE	6/17/03
DATE	JAN 06

**STANDARD VALLEY
GUTTER SECTIONS
NOT TO SCALE**

- NOTES:
- RADIUS LENGTH SHALL BE AS SPECIFIED IN SUBDIVISION ORDINANCE.
 - VALLEY GUTTERS SHALL BE REINFORCED WITH WWF 4 X 4 X W4 X W4 OR POLYPROPYLENE FIBERS OR #3 REBAR AT 18" ON CENTER EACH WAY.

GENERAL SIDEWALK REQUIREMENTS

SIDEWALKS SHALL BE CONSTRUCTED TO PROVIDE ACCESSIBILITY CONSISTENT WITH THESE SPECIFICATIONS AND ADA STANDARDS UNLESS OTHERWISE SHOWN IN THE PLANS OR DIRECTED BY THE ENGINEER.

MINIMUM SIDEWALK WIDTH SHALL BE 5 FEET WHENEVER POSSIBLE. SIDEWALKS NARROWER THAN 5 FEET SHALL PROVIDE PASSING ZONES SPACED NO GREATER THAN 200 FEET AND MUST BE A MINIMUM OF 5 FEET BY 5 FEET. THE MINIMUM WIDTH FOR AN ACCESSIBILITY ROUTE IS 36".

THE CROSS-SLOPE ON SIDEWALKS AND CURB RAMPS SHALL NOT EXCEED 1:48. ALL SIDEWALKS SHALL BE SLOPED 1:48 TOWARDS THE CURB AND GUTTER UNLESS OTHERWISE INDICATED TO PROVIDE POSITIVE DRAINAGE. SIDEWALKS SHALL PROVIDE A MINIMUM OF 36" CLEAR PASSAGE AROUND DRIVEWAYS AND OTHER FEATURES TO PREVENT EXCEEDING THE MAXIMUM CROSS-SLOPE.

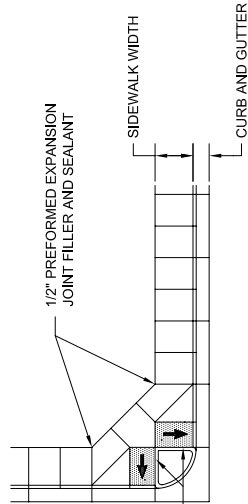
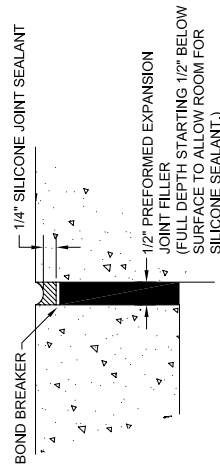
CURB RAMPS SHALL BE PROVIDED AT STREET INTERSECTIONS AND ELSEWHERE AS SHOWN ON THE PLANS. RAMPS SHALL ALSO BE PROVIDED MID BLOCK IN THE VICINITY OF HOSPITALS, MEDICAL CENTERS, ATHLETIC STADIUMS, REST AREAS, DESIGNATED HANDICAP PARKING AREAS AND AT ANY OTHER LOCATION WHERE A CROSSWALK OR WHEELCHAIR ACCESS IS NEEDED AS DETERMINED BY THE ENGINEER.

CURB RAMPS SHALL BE MEASURED AND PAID FOR AS CONCRETE SIDEWALK AND WILL INCLUDE CURB RETURNS AND INTERIOR CURBS. THE AREA OF THE CURB RAMP THAT FALLS ON THE STREET SIDE OF THE BACK OF CURB LINE WILL BE MEASURED AND PAID FOR AS CURB AND GUTTER OR AS DETERMINED BY THE ENGINEER.

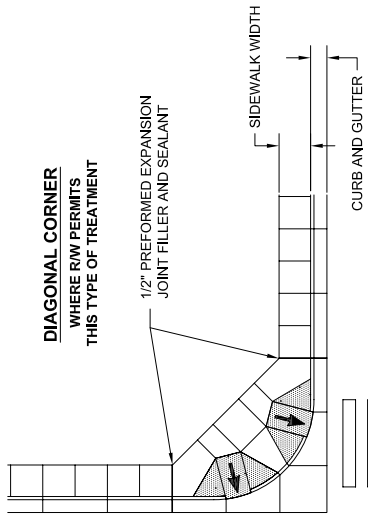
STREET DRAINAGE STRUCTURES SHALL NOT BE PLACED IN LINE WITH CURB RAMPS NOR IN THE PATH OF PEDESTRIANS. GRATINGS AND ACCESS COVERS SHALL NOT BE PLACED IN SIDEWALK CURB RAMPS.

SIDEWALKS AND CURB AND GUTTER SHALL BE CONSTRUCTED WITH 1/2" PREFORMED EXPANSION JOINT FILLER AT RADIUS POINTS, JUNCTIONS WITH EXISTING CONCRETE, INTERSECTIONS OF CONCRETE SIDEWALK RUNS, AT THE JUNCTURE OF CURB AND GUTTER AND SIDEWALK WHEN THE STREET PAVEMENT IS CONCRETE, AROUND INLETS, AROUND MANHOLES, AROUND OTHER STRUCTURES AND AT INTERVALS. PREFORMED EXPANSION JOINTS SHALL BE SEALED WITH AN APPROVED SILICONE JOINT SEALANT.

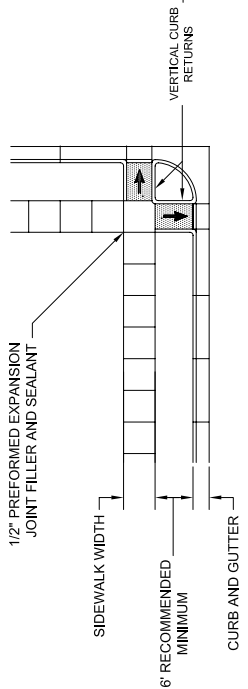
CURB RAMPS SHALL BE TYPE I OR TYPE II MODIFIED UNLESS OTHERWISE SHOWN IN PLANS. IF NO RAMP TYPE IS SPECIFIED AND EXISTING CONDITIONS DO NOT PERMIT ADEQUATE CLEAR RIGHT OF WAY, TYPE II OR TYPE III RAMPS MAY BE INSTALLED DEPENDING ON THE GIVEN SIDEWALK WIDTH.



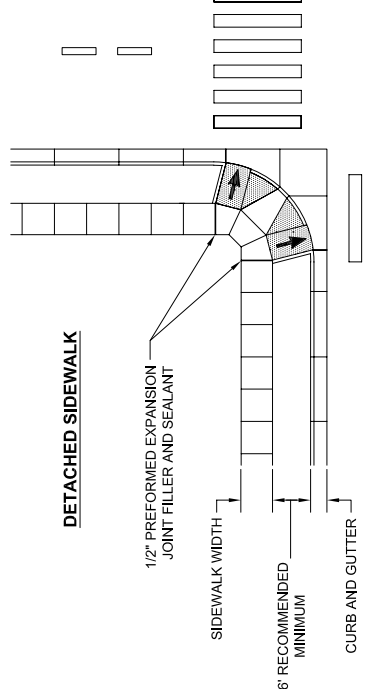
DIAGONAL CORNER - BACK TO BACK RAMP



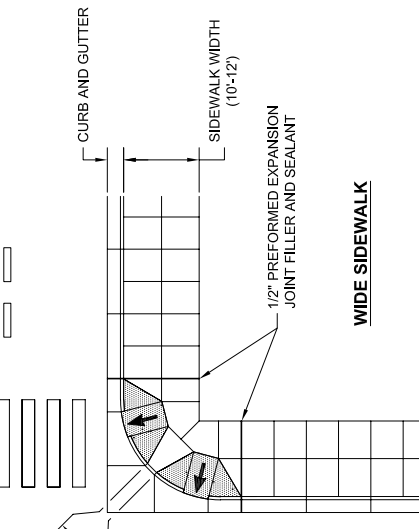
**DIAGONAL CORNER
WHERE RW PERMITS
THIS TYPE OF TREATMENT**



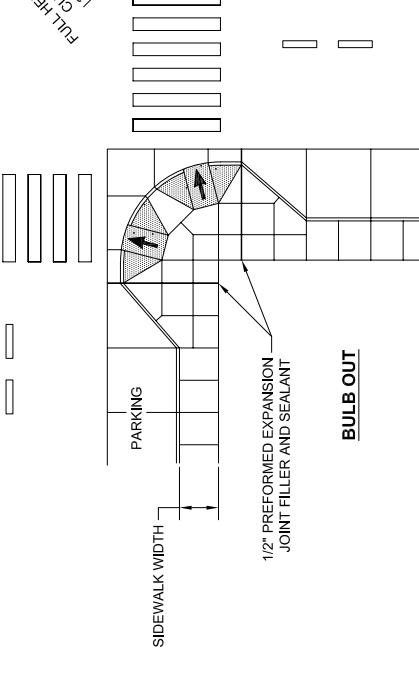
DETACHED SIDEWALK - BACK TO BACK RAMPS



DETACHED SIDEWALK



WIDE SIDEWALK



BULB OUT

TYPICAL CURB RAMP TYPE I TREATMENTS

**CITY OF CASPER
ENGINEERING DIVISION**

**GENERAL SIDEWALK REQUIREMENTS
FOR ADA ACCESSIBILITY 302 9**

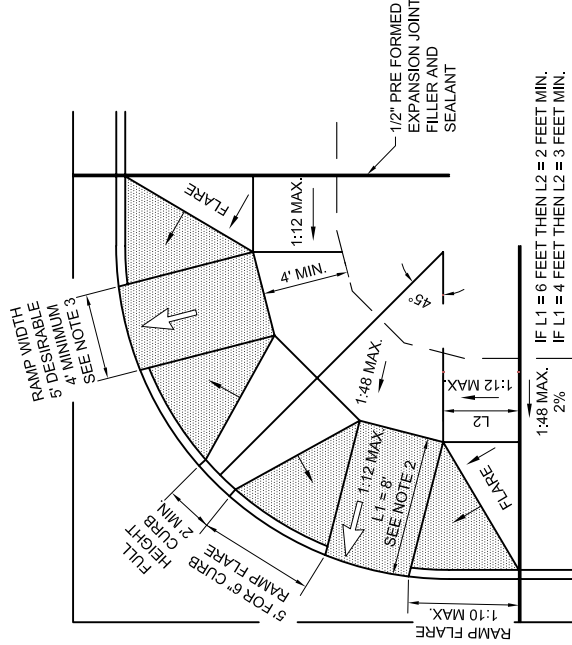
REV.	DESCRIPTION	DATE
1	REDRAFTED ONTO COMPUTER-Z.T.L.	8/7/01
2	DRAWING STANDARDS REVISIONS	JAN 06

**GENERAL SIDEWALK REQUIREMENTS
FOR ADA ACCESSIBILITY**

NOT TO SCALE

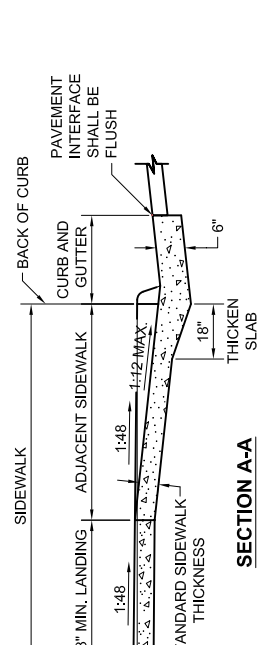
TYPE I (PERPENDICULAR) CURB RAMP REQUIREMENTS
 TYPE I CURB RAMPS SHALL BE CONSTRUCTED WHEN AVAILABLE RIGHT-OF-WAY PERMITS THEIR USE.

- RAMP SLOPE:** THE RAMP SLOPE SHOULD NOT EXCEED 1:12. ADA ALLOWS A MAXIMUM SLOPE OF 1:10 IN EXISTING FACILITIES WHERE A 1:12 IS NOT POSSIBLE AS DEFINED IN ADA AS SITE INFEASIBILITY.
- RAMP LENGTH:** THE RAMP LENGTH BECOMES 8' FOR A 6" CURB WHEN THE RAMP RISES ON A 1:12 TO CATCH THE ADJACENT SIDEWALK WHICH IS ALSO RISING ABOVE THE TOP OF CURB ELEVATION ON A 1:48 CROSS SLOPE. IF A PLANTING OR OTHER NON PEDESTRIAN AREA IS ADJACENT TO THE SIDEWALK AND THE RAMP ONLY HAS TO RISE 6" THE RAMP LENGTH IS 6'.
- RAMP LENGTH:** WARPING THE INTERSECTION USING A COMBINED RAMP SYSTEM REDUCES THE HEIGHT THE RAMP MUST RISE THEREBY REDUCING THE LENGTH OF THE PERPENDICULAR RAMP.
- RAMP WIDTH:** PERPENDICULAR RAMPS SHOULD BE 5' WHERE POSSIBLE, 4' IN OTHER LOCATIONS, AND WHERE SITE INFEASIBILITY EXISTS ABSOLUTELY NO NARROWER THAN 3'.
- LEVEL LANDINGS:** A LEVEL LANDING (I.E. MAX. SLOPE IN ANY DIRECTION DOES NOT EXCEED 1:48) SHALL BE PROVIDED AT THE TOP OF THE RAMP AND BE 48" MINIMUM IN THE LONGITUDINAL DIRECTION OF THE RAMP TO ALLOW FOR WHEELCHAIRS TURNING ONTO THE RAMP.
- FLARED VS VERTICAL CURB RETURNS:** FLARED SIDE RETURNS ARE REQUIRED WHEN SIDEWALK IS LOCATED ADJACENT TO THE RAMP (SEE DETAIL). THE FLARE RATE ALONG THE CURB LINE SHALL NOT EXCEED 1:10. IF THE SIDES OF THE RAMP ARE ADJACENT TO A PLANTING, STRUCTURE OR OTHER NON PEDESTRIAN SURFACE, THE CURB RETURNS CAN BE VERTICAL. CURB RETURNS AND FLARES WILL BE MEASURED AND PAID FOR AS SIDEWALK.
- DIAGONAL VS DUAL CURB RAMPS:** SINGLE DIAGONAL WHEELCHAIR RAMPS FOR INTERSECTIONS WITH TWO DIRECTIONS OF PEDESTRIAN MOVEMENT TEND TO CREATE MORE MOTOR VEHICLE CONFLICTS WITH PEDESTRIANS AND ARE DISCOURAGED. SITE INFEASIBILITY CONDITIONS MAY DICTATE A SINGLE DIAGONAL WHEELCHAIR BUT IS ONLY PERMITTED WHERE SHOWN IN THE PLANS OR DETERMINED BY THE ENGINEER.
- INTERSECTION LOCATION:** CURB RAMPS SHALL BE LOCATED AS CLOSE TO THE INTERSECTION AS POSSIBLE AND SHALL BE FULLY CONTAINED WITHIN PEDESTRIAN CROSSING MARKINGS WHERE PRESENT. CURB RAMPS SHALL BE PERPENDICULAR TO THE CURB AS SHOWN.
- COLOR CURB RAMPS:** SHADED AREAS REPRESENT WHERE COLORED CONCRETE IS REQUIRED TO PROVIDE CONTRAST. FOR TYPICAL "GREY CONCRETE", CURB RAMPS SHALL BE COLORED WITH RED PIGMENT IN THE CONCRETE UNLESS OTHERWISE SHOWN IN PLANS.

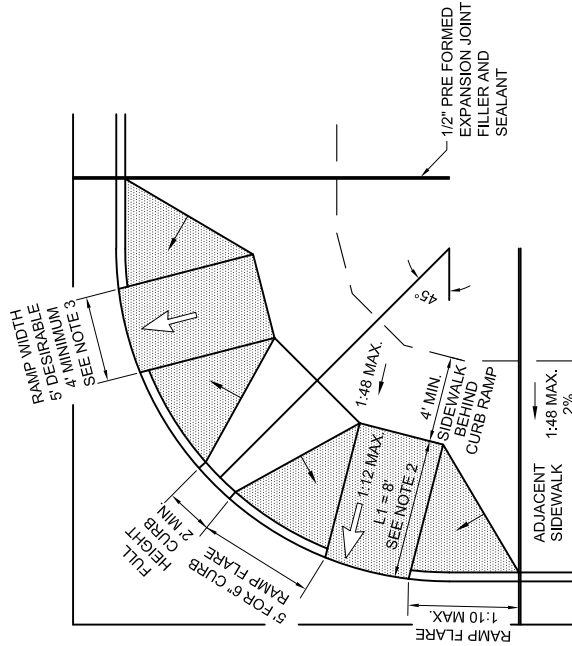


TYPICAL TYPE I (PERPENDICULAR) CORNER RAMPS
 SEE NOTES 2A & 2B

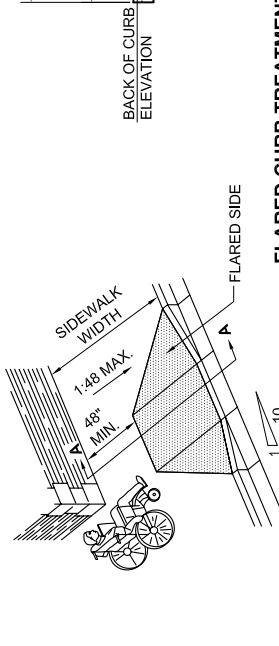
MODIFIED TYPE I (COMBINED) CORNER RAMPS
 SEE NOTES 2A & 2B



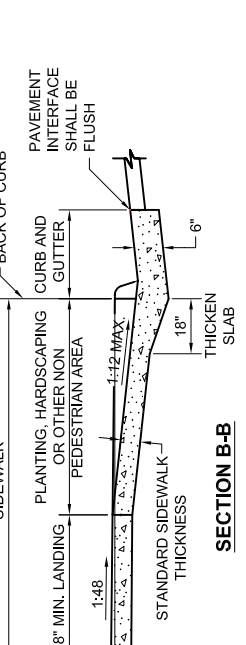
MODIFIED TYPE I (COMBINED) CORNER RAMPS
 SEE NOTES 2A & 2B



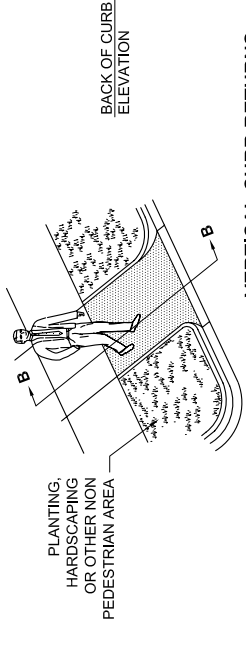
FLARED CURB TREATMENT



VERTICAL CURB RETURNS



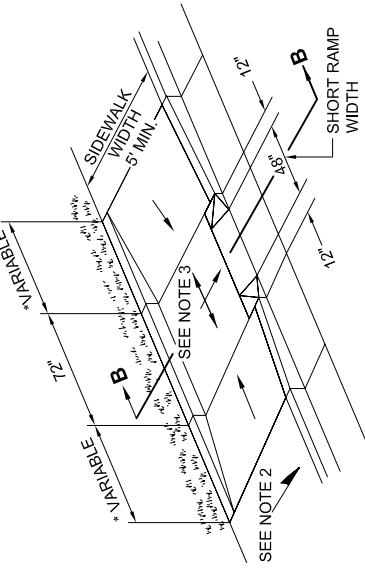
FLARED CURB TREATMENT



VERTICAL CURB RETURNS

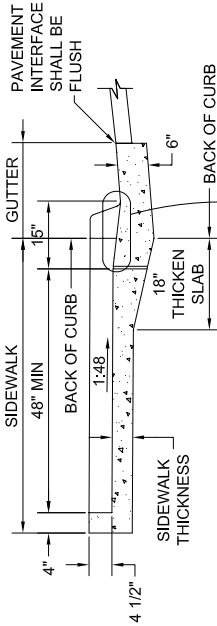
TYPE I (PERPENDICULAR) CURB RAMPS
 NOT TO SCALE

CITY OF CASPER ENGINEERING DIVISION	
TYPE I PERPENDICULAR CURB RAMPS FOR ADA ACCESSIBILITY	
302	10
REV.	DESCRIPTION
1	REDRAFTED ONTO COMPUTER-Z.T.L.
2	DRAWING STANDARDS REVISIONS
	DATE
	8/13/01
	JAN 06



* VARIABLE LENGTH BASED ON RUNNING SLOPE OF SIDEWALK.
 FOR FLAT CONDITIONS AND CURB HEIGHT = 6".
 ELEVATION OF FLOW LINE = 0"
 ELEVATION OF LANDING = 1.5"
 RISE OF PARALLEL RAMP = 4.5"
 VARIABLE DIMENSION = 4.5"

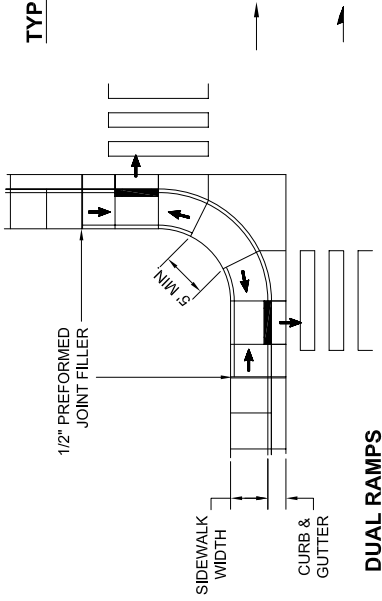
CURB RAMP TYPE II
 (MODIFIED PARALLEL CURB RAMP)



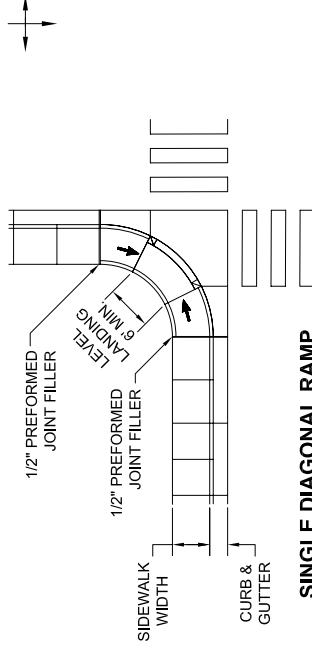
SECTION B-B



SHORT RAMP DETAIL



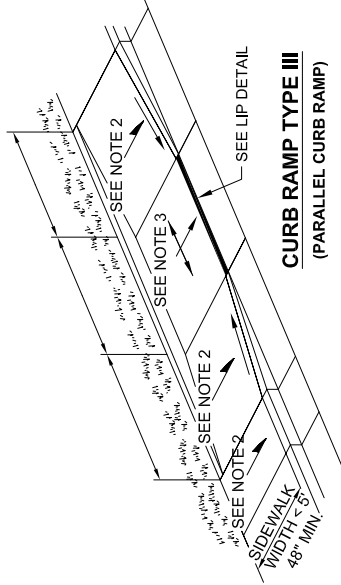
DUAL RAMP



SINGLE DIAGONAL RAMP

TYPICAL CURB RAMP TYPE II & TYPE III TREATMENTS

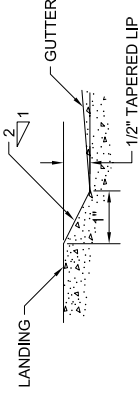
(TYPE II RAMPS SHOWN)
 FOR SIDEWALK WIDTHS 5' AND GREATER - USE TYPE II
 FOR SIDEWALK WIDTHS LESS THAN 5' - USE TYPE III



TYPE II & TYPE III (PARALLEL) CURB RAMP REQUIREMENTS

TYPE II AND TYPE III (PARALLEL) CURB RAMPS SHALL BE CONSTRUCTED ONLY WHEN EXISTING SIRE CONDITIONS DO NOT PERMIT THE USE OF TYPE I OR TYPE I MODIFIED CURB RAMPS. TYPE II AND III RAMPS ARE LESS DESIRABLE DUE TO STRAINED TURNING MOVEMENTS IN WHEELCHAIRS AND DRAINAGE (INCLUDING ICING) PROBLEMS ASSOCIATED WITH THE LANDING AREA.

- RAMP SLOPE:** RAMP SLOPE SHALL BE 1:12. RAMP SLOPE SHALL NOT EXCEED 1:12 EXCEPT FOR SHORT RAMPS AS SHOWN HEREIN.
- CROSS SLOPE:** POSITIVE DRAINAGE SHALL BE PROVIDED BY SLOPING SIDEWALK AND/OR RAMP TOWARDS STREET AT 1:48. CROSS SLOPE SHALL NOT EXCEED 1:48.
- LANDING SLOPE:** LANDING SLOPE SHALL NOT EXCEED 1:48 IN ANY DIRECTION. POSITIVE DRAINAGE SHALL BE PROVIDED TOWARDS THE STREET AS SHOWN BY SINGLE TIP ARROW. LANDING CAN BE SLOPED IN EITHER DIRECTION TO A MAXIMUM OF 1:48 AS SHOWN BY DOUBLE TIP ARROW.
- SINGLE DIAGONAL VS. DUAL CURB RAMPS:** DUAL CURB RAMPS ARE STRONGLY PREFERRED, HOWEVER, WITH TYPE II AND TYPE III RAMPS, IT MAY BE NECESSARY AT SOME LOCATIONS TO PROVIDE ONLY ONE SINGLE DIAGONAL RAMP AS SHOWN IN THE PLANS OR AS DIRECTED BY THE ENGINEER.
- COLORS CURB RAMPS:** SHADED AREAS REPRESENT WHERE COLORED CONCRETE IS REQUIRED TO PROVIDE CONTRAST. FOR TYPICAL "GREY CONCRETE" CURB RAMPS SHALL BE COLORED WITH A RED PIGMENT IN THE CONCRETE UNLESS OTHERWISE SHOWN IN THE PLANS.
- LIP DETAIL:** TYPE III CURB RAMPS WILL REQUIRE THE FOLLOWING LIP DETAIL TO REDUCE THE AMOUNT OF NUISANCE DRAINAGE IN THE LANDING AREA.



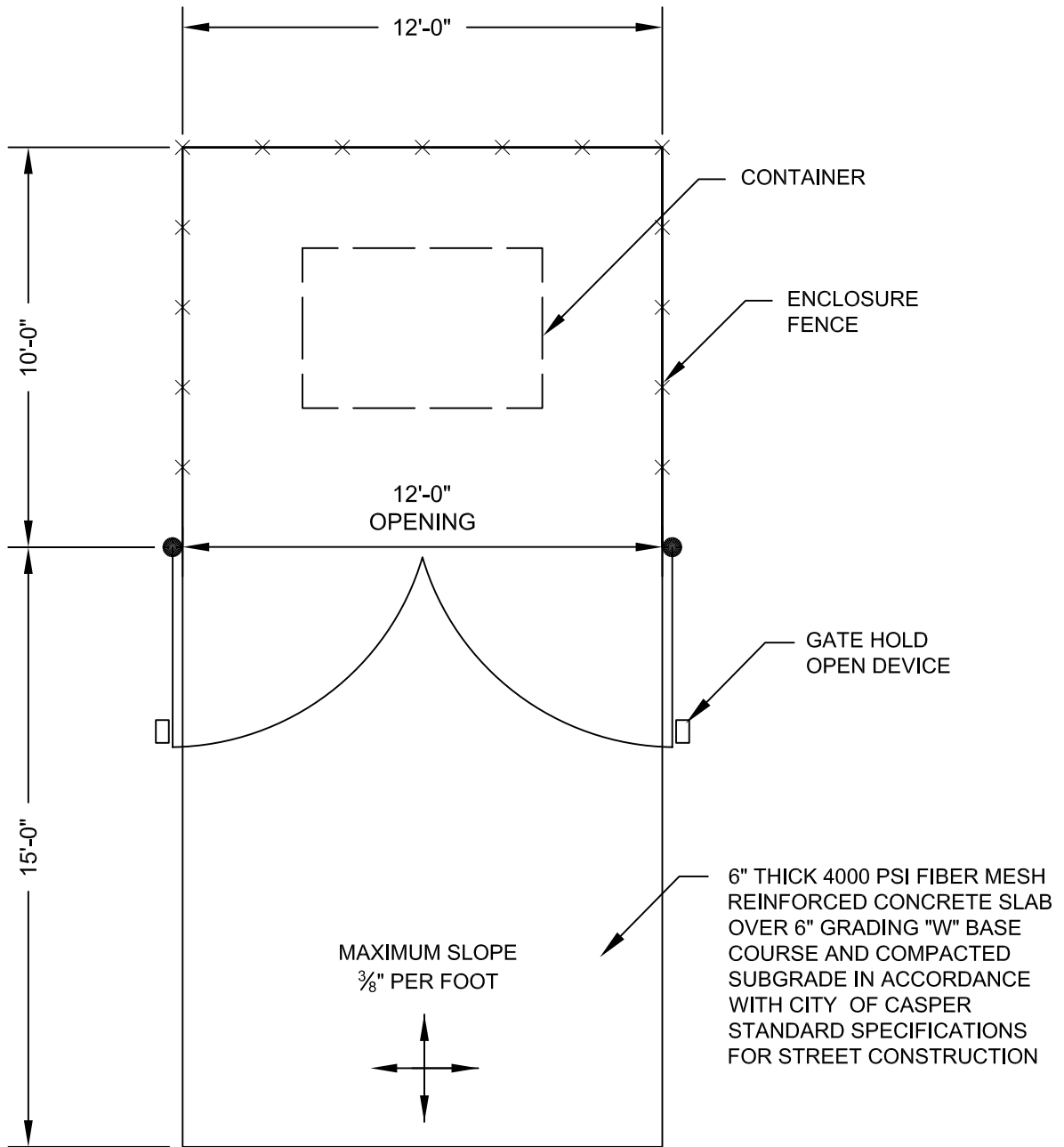
LIP DETAIL

**CITY OF CASPER
 ENGINEERING DIVISION**

TYPE II & TYPE III (PARALLEL) CURB RAMPS	
FOR ADA ACCESSIBILITY 302.11	
REV.	DESCRIPTION
1	REDRAFTED ONTO COMPUTER-Z.T.L.
2	DRAWING STANDARDS REVISIONS
DATE	8/15/01
JAN 06	

**TYPE II & TYPE III (PARALLEL)
 CURB RAMPS**

NOT TO SCALE



**MINIMUM STANDARDS FOR
COMMERCIAL SANITATION
CONTAINER FACILITY**

NOTES:

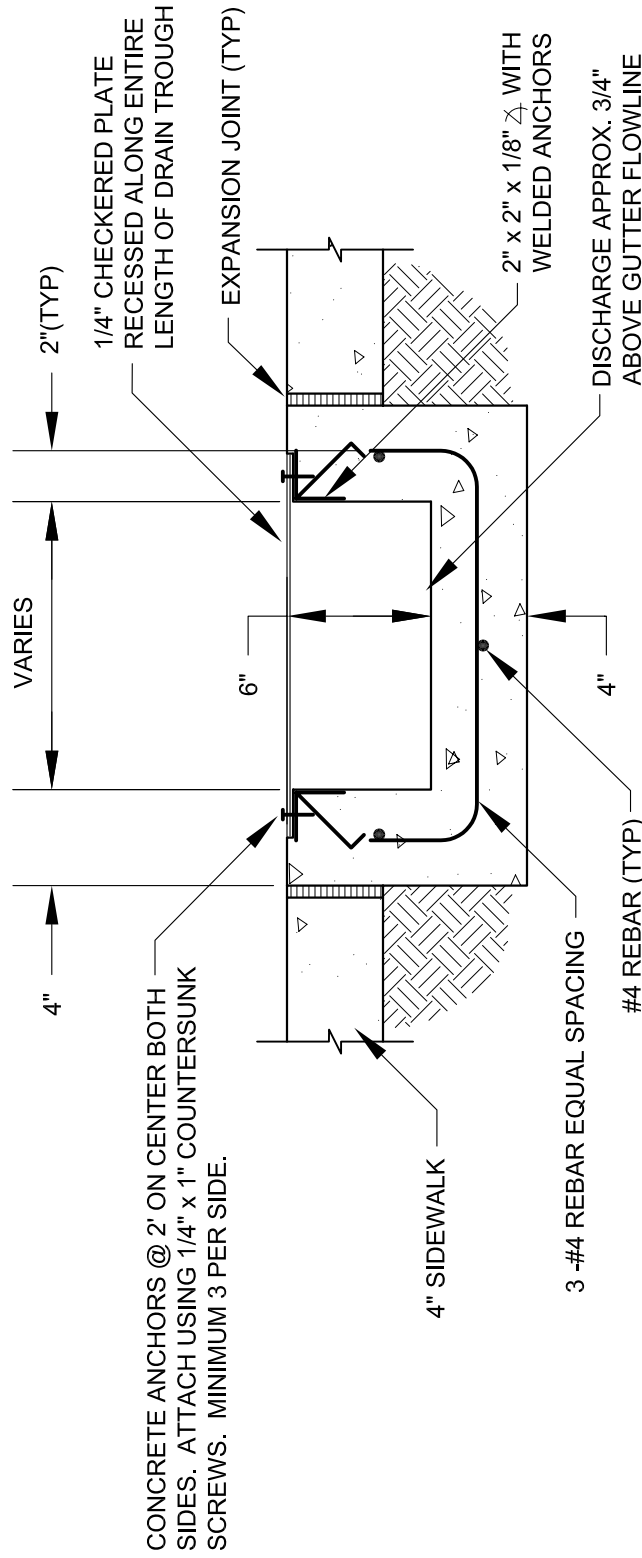
1. PROVIDE FOR STRAIGHT APPROACH TO CONTAINER BY SERVICE VEHICLE.
2. PROVIDE FOR A MINIMUM OVERHEAD CLEARANCE OF 15' ABOVE GRADE.
3. ORIENT TO MINIMIZE BACKING MOVEMENTS REQUIRED BY SERVICE VEHICLE.

NOT TO SCALE

*CITY OF CASPER
ENGINEERING DIVISION*

**MINIMUM STANDARDS FOR
COMMERCIAL SANITATION
CONTAINER FACILITY**

		302
		12
REV.	DESCRIPTION	DATE
1	DRAFTED ONTO COMPUTER- Z.T.L.	4/03/01
2	INCREASE WIDTH OF OPENING TO 12'	3/18/02
3	DRAWING STANDARDS REVISIONS	JAN 06

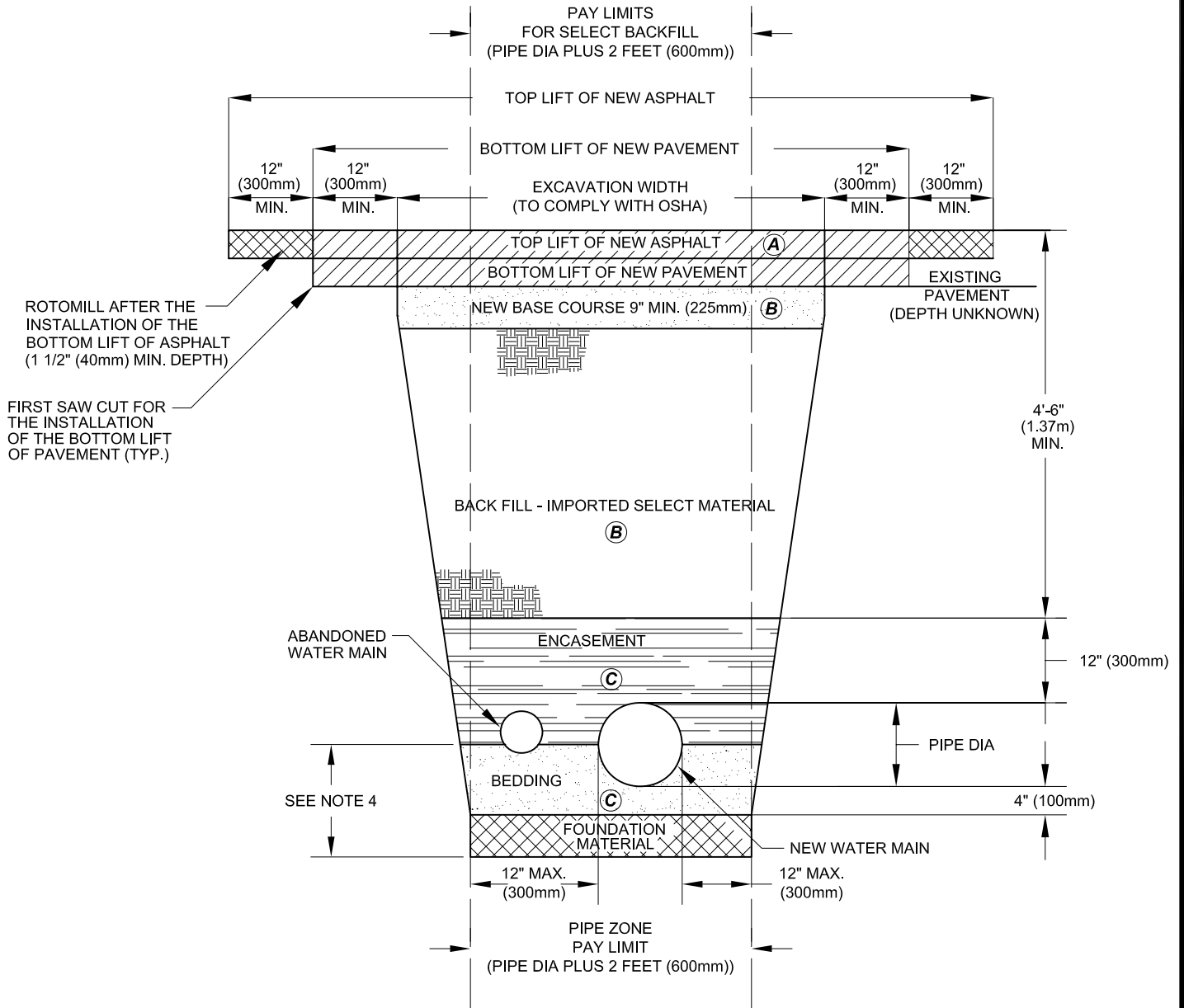


CONCRETE ANCHORS @ 2' ON CENTER BOTH SIDES. ATTACH USING 1/4" x 1" COUNTERSUNK SCREWS. MINIMUM 3 PER SIDE.

- NOTES:
- CHECKERED PLATE TO BE PAINTED WITH 2 COATS OF RUST-PROOF PAINT PRIOR TO INSTALLATION. COLOR TO MATCH CONCRETE.
 - CONTRACTOR MAY PROPOSE AN OR-EQUAL METHOD OF CONSTRUCTING THE CHECKERED PLATE SYSTEM. MUST BE APPROVED.

CITY OF CASPER ENGINEERING DIVISION	
CONCRETE DRAIN TROUGH DETAILS	
302	13
REV.	DESCRIPTION
1	DRAFTED ONTO COMPUTER- G.D.W.
2	DRAWING STANDARDS REVISIONS
	DATE
	3/28/03
	JAN 06

CONCRETE DRAIN TROUGH DETAIL
NOT TO SCALE



TYPICAL STREET CUT SECTION ASPHALT SURFACING

NOT TO SCALE

NOTES:

1. TACK COAT SHALL BE APPLIED ON ALL SAW CUT AND MILLED INTERFACES BETWEEN EXISTING AND NEW ASPHALT.
2. NEW PAVEMENT THICKNESS SHALL MATCH EXISTING.
3. DENSITY REQUIRED:
 - (A) =97% MARSHALL DENSITY
 - (B) =95% STANDARD PROCTOR
 - (C) =90% STANDARD PROCTOR
4. GRANULAR FOUNDATION MATERIAL IF USED SHALL BE PLACED BELOW AND TO THE MIDPOINT OF THE PIPE.

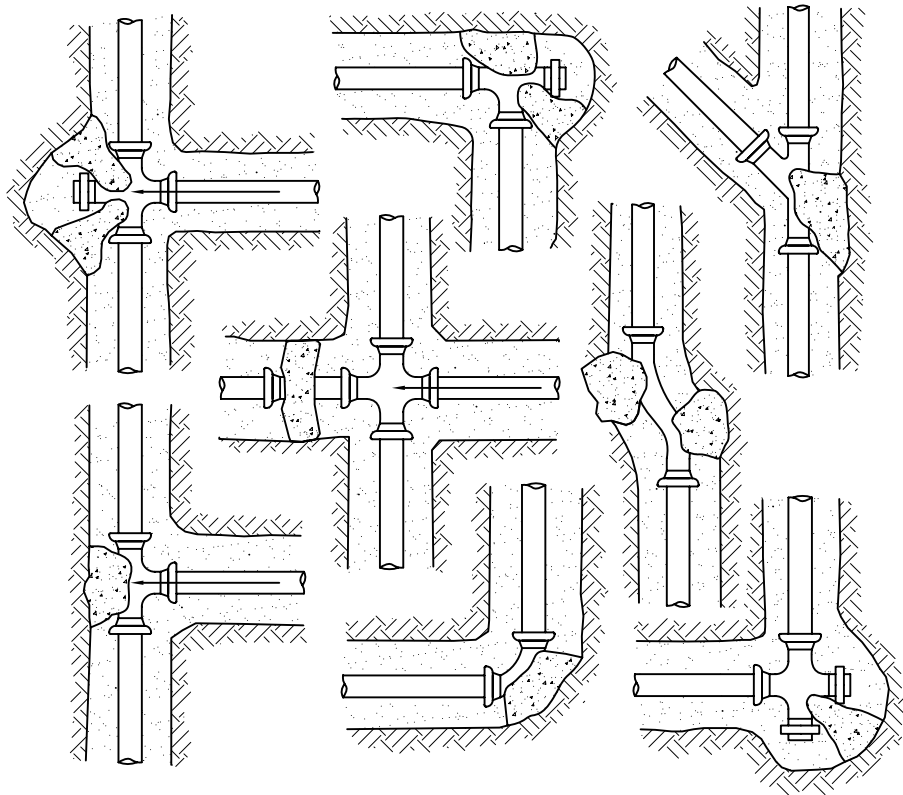
*CITY OF CASPER
ENGINEERING DIVISION*

**TYPICAL STREET CUT SECTION
ASPHALT SURFACING**

501

1

REV.	DESCRIPTION	DATE
1	REDRAFTED ONTO COMPUTER- Z.T.L.	9/1/00
2	DRAWING STANDARDS REVISIONS	JAN 06



**CONCRETE AREA REQUIRED FOR THRUST BLOCKS
(IN CUBIC FEET)**

FITTING SIZE	TEE & PLUG	90° BEND & FIRE HYDRANT	45 ° BEND	22 1/2° BENDS & REDUCERS	11 1/4° BEND
4" (100mm)	1.50	2.00	1.00	1.00	0.50
6" (150mm)	3.00	4.00	2.50	1.50	1.00
8" (200mm)	5.00	7.00	4.00	2.00	1.00
10" (250mm)	7.50	10.50	6.00	3.00	1.50
12" (300mm)	10.50	14.50	8.00	4.00	2.00
14" (350mm)	14.00	19.50	11.00	5.50	3.00
16" (400mm)	18.00	25.50	14.00	7.00	3.50

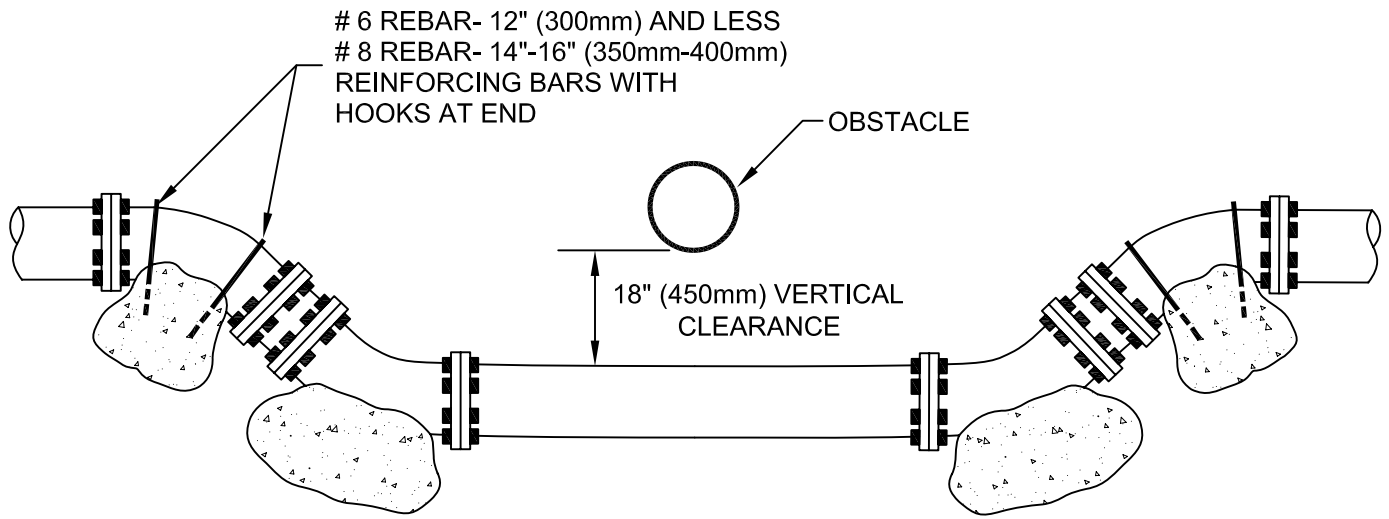
THIS TABLE IS BASED ON 150 PSI TEST PRESSURE AND 2000 PSF SOIL BEARING PRESSURE.
CONTRACTOR SHALL ADJUST SIZE IF NECESSARY TO CONFORM TO EXISTING SOIL CONDITIONS.

NOTES:

1. WRAP ALL METALLIC FITTINGS WITH POLYETHYLENE.
2. KEEP CONCRETE AWAY FROM MJ BOLTS.
3. THRUST BLOCKS SHALL BE PLACED AGAINST UNDISTURBED SOIL.
4. THRUST BLOCKS FOR FITTINGS OVER 16" (400mm) SHALL BE SPECIALLY DESIGNED.
5. THRUST BLOCKS FOR REDUCERS FOR PIPES WITH MORE THAN 2" (50mm) DIA DIFFERENCE SHALL BE SPECIALLY DESIGNED.

**STANDARD THRUST
BLOCK DETAIL
NOT TO SCALE**

<i>CITY OF CASPER ENGINEERING DIVISION</i>		
STANDARD THRUST BLOCK DETAILS		
		501 2
REV.	DESCRIPTION	DATE
1	REDRAFTED ONTO COMPUTER- Z.T.L.	1/11/01
2	ADD NOTE 5	1/18/05
3	DRAWING STANDARDS REVISIONS	JAN 06



VOLUME OF BLOCK IN CUBIC YARDS FOR UPPER VERTICAL BENDS			
SIZE	45° BEND	22 1/2° BEND	11 1/4° BEND
4" (100mm)	1.10	0.40	0.20
6" (150mm)	2.70	1.00	0.40
8" (200mm)	4.00	1.50	0.60
10" (250mm)	6.00	2.30	0.90
12" (300mm)	8.50	3.20	1.30
14" (350mm)	11.50	4.30	1.80
16" (400mm)	14.80	5.60	2.30

TYPICAL WATER MAIN LOWERING DETAIL

NOT TO SCALE

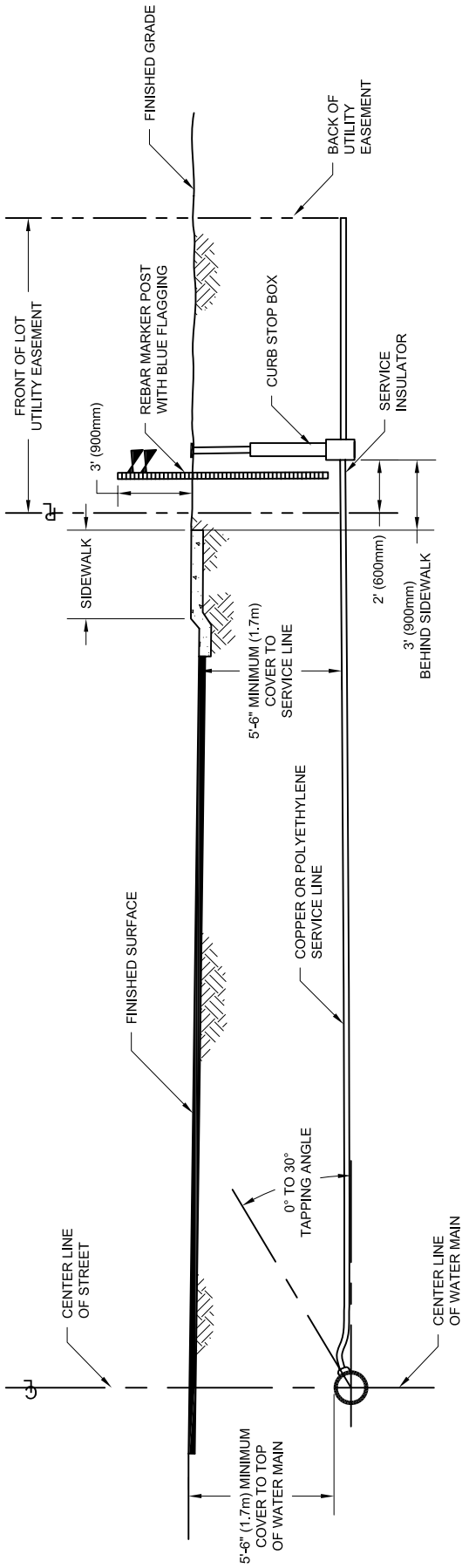
NOTES:

1. KEEP CONCRETE AWAY FORM MJ BOLTS.
2. COAT EXPOSED REINFORCED BARS, STAINLESS STEEL RODS OR STRAPS WITH BITUMASTIC COATING IN ACCORDANCE WITH SPECIFICATIONS.
3. THRUST BLOCKS FOR LOWER VERTICAL BENDS SHALL ADHERE TO STANDARD THRUST BLOCK DETAILS (DRAWING 501-2.
4. THRUST BLOCKS FOR FITTINGS OVER 16" (400 mm) SHALL BE SPECIALLY DESIGNED.

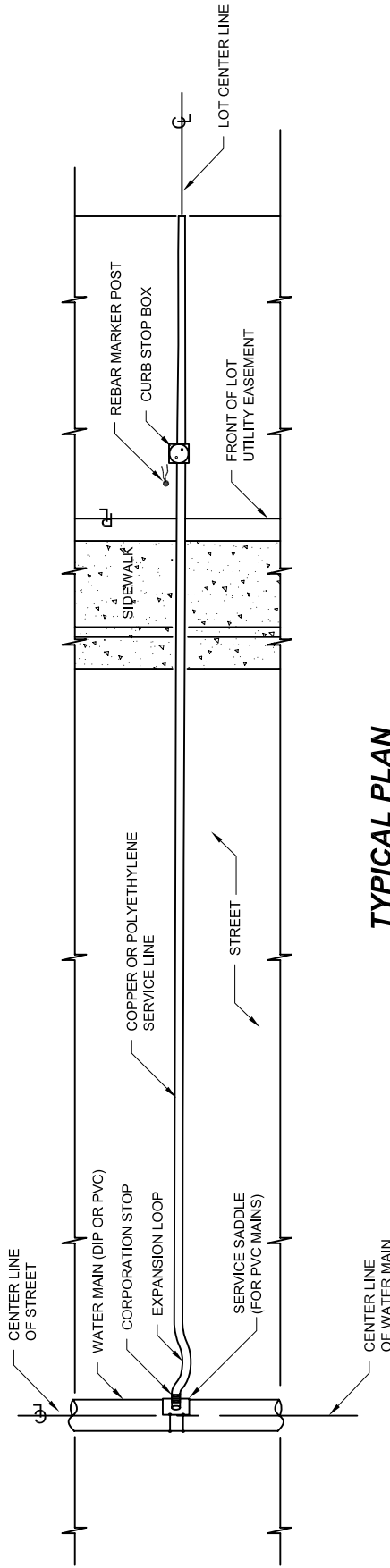
*CITY OF CASPER
ENGINEERING DIVISION*

**TYPICAL WATER MAIN
LOWERING DETAIL**

		501
		3
REV.	DESCRIPTION	DATE
1	REDRAFTED ONTO COMPUTER- Z.T.L.	1/12/01
2	ADD NOTE 4	1/17/05
3	DRAWING STANDARDS REVISIONS	JAN 06



TYPICAL SECTION



TYPICAL PLAN

NOTES:

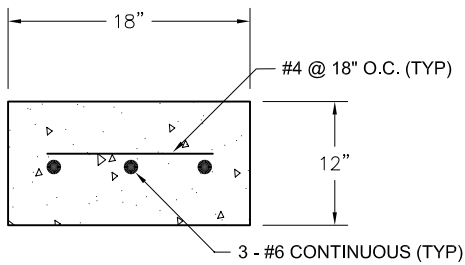
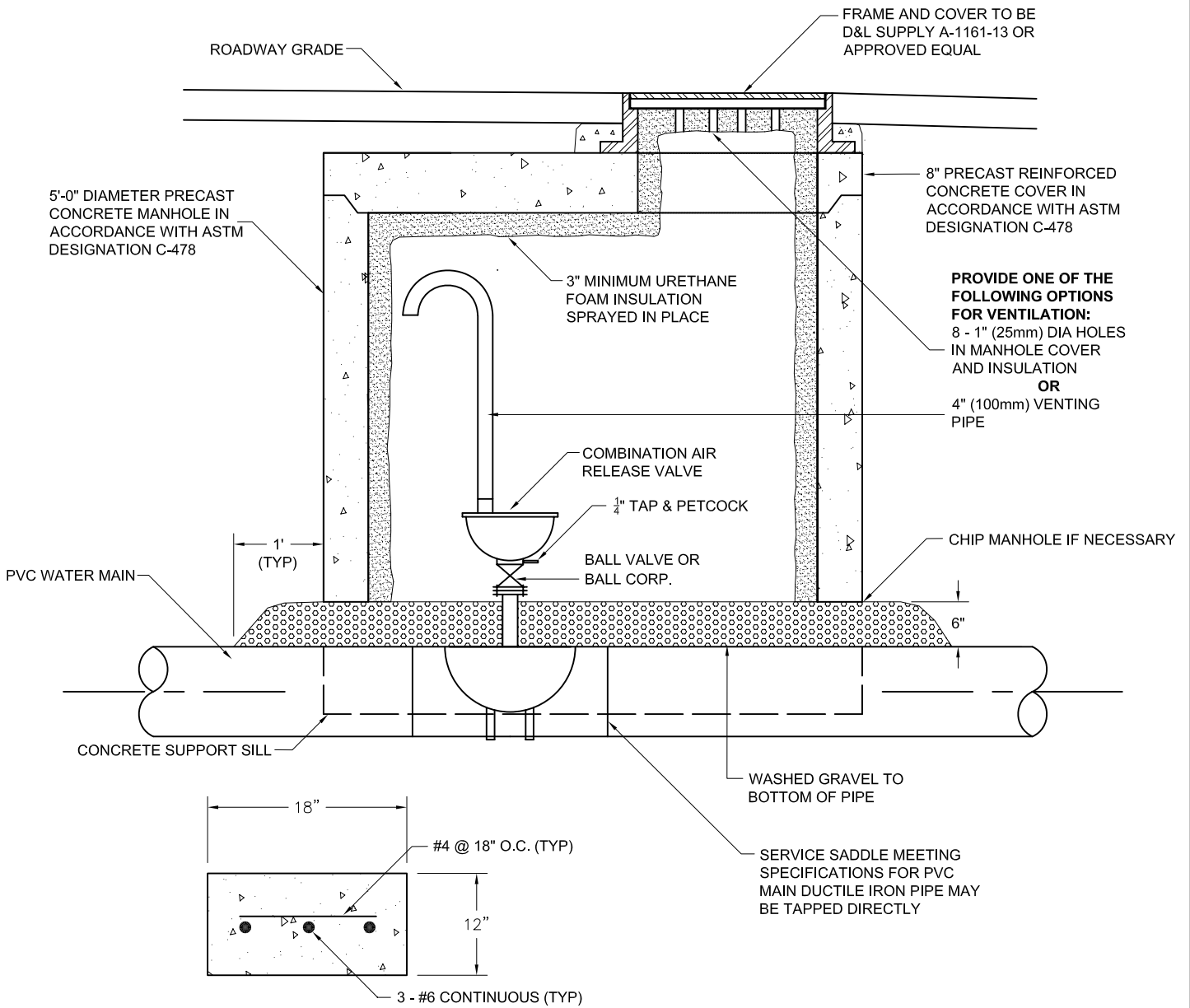
1. WATER SERVICE TO BE LOCATED ON LOT CENTER LINE.
2. SEWER SERVICE TO BE LOCATED AT LEAST 10 FEET (3m) FROM WATER SERVICE LINE ON THE DOWNHILL FLOW SIDE OF SEWER MAIN.
3. A GROUNDWATER BARRIER SHALL BE INSTALLED IN THE SERVICE LINE TRENCH ON THE PROPERTY LINE.

**CITY OF CASPER
ENGINEERING DIVISION**

**WATER SERVICE
LINE DETAIL**

501 4

REV.	DESCRIPTION	DATE
1	REDRAFTED ONTO COMPUTER-Z.T.L.	1/16/01
2	DRAWING STANDARDS REVISIONS	JAN 06



SILL DETAIL
NOT TO SCALE

**COMBINATION AIR
RELEASE/VACUUM RELIEF
MANHOLE DETAIL**
NOT TO SCALE

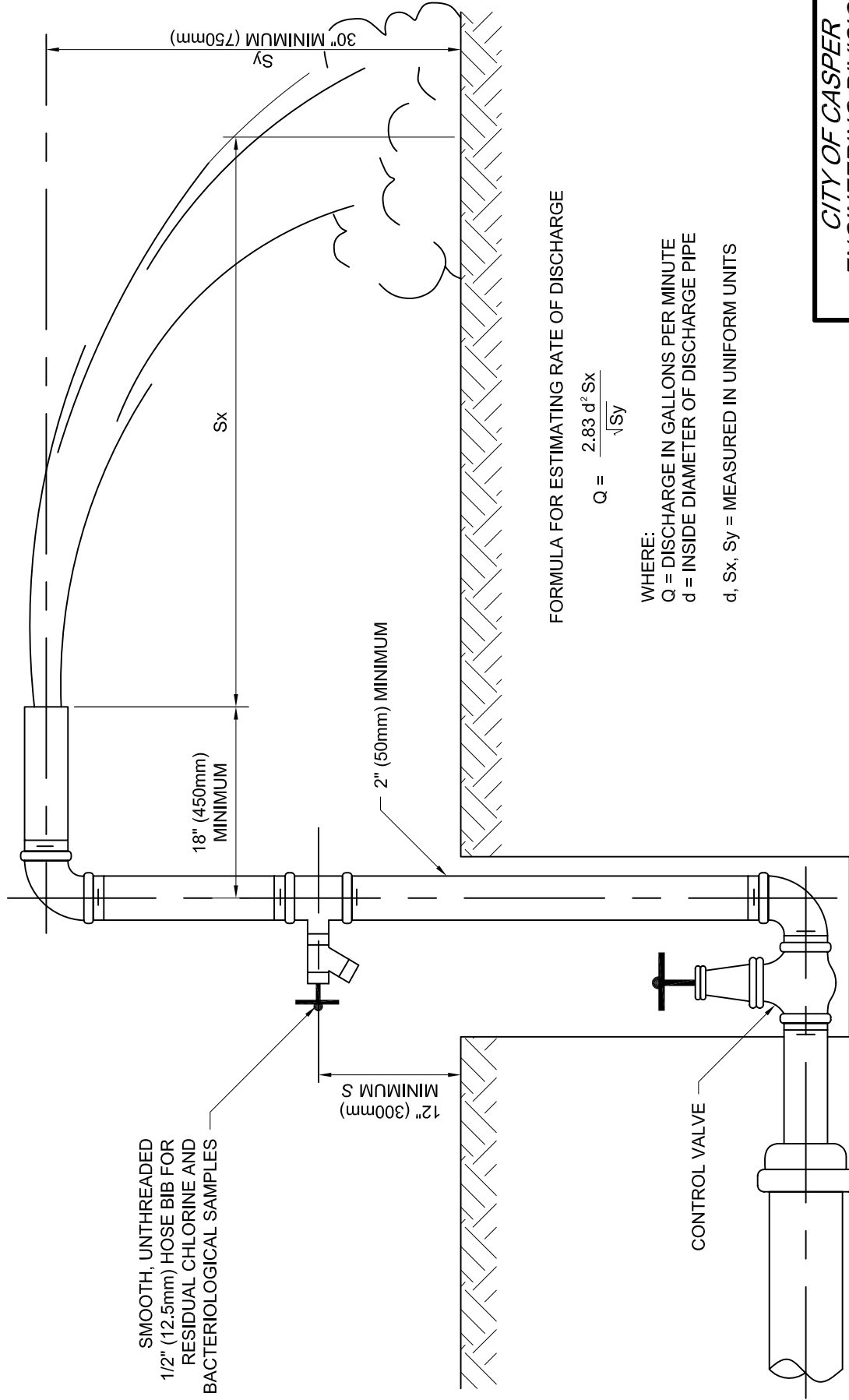
NOTES:

1. MANHOLE CASTING SHALL CONFORM TO THE SPECIFIED CASTINGS THE WORD "WATER" CAST ON TOP OF COVER.
2. ALL PIPE, VALVES, AND FITTINGS UP TO THE COMBINATION AIR RELEASE/VACUUM RELIEF VALVE SHALL BE COPPER, BRASS, OR BRONZE. AIR RELEASE/VACUUM RELIEF VALVE AND VENTING PIPE SHALL BE FUSION BONDED EPOXY COATED.
3. FULL DEPTH MANHOLES WITH FLOORS SHALL BE REQUIRED WHEN GROUND WATER IS PRESENT.
4. MASS CONCRETE SUPPORT SILLS SHALL BE PLACED ON EACH SIDE OF THE WATER MAIN TO SUPPORT THE MANHOLE SECTION. SILL TO BE 12" (300mm) X 18" (450mm) WITH REINFORCEMENT.
5. THREE INCH (3") (75mm) URETHANE FOAM INSULATION SHALL BE SPRAYED ON ALL INSIDE SURFACES OF THE VAULTS.
6. CONCRETE SUPPORT SILLS SHOULD HAVE A MINIMUM LENGTH OF 7 FEET.
7. PROVIDE A MINIMUM 4" (100 mm) VENTING PIPE OR 8 - 1" (25mm) HOLES IN THE MANHOLE COVER AND INSULATION FOR VENTILATION.

**CITY OF CASPER
ENGINEERING DIVISION**

**COMBINATION AIR
RELEASE/VACUUM RELIEF
MANHOLE DETAIL**

		501
		5
REV.	DESCRIPTION	DATE
1	REDRAFTED ONTO COMPUTER-Z.T.L.	1/16/01
2	MODIFIED RELIEF VALVE PIPING	4/22/03
3	MODIFIED VENTILATION OPTIONS	1/17/05
4	DRAWING STANDARDS REVISIONS	JAN 06



FORMULA FOR ESTIMATING RATE OF DISCHARGE

$$Q = \frac{2.83 d^2 Sx}{\sqrt{Sy}}$$

WHERE:

Q = DISCHARGE IN GALLONS PER MINUTE
d = INSIDE DIAMETER OF DISCHARGE PIPE

d, Sx, Sy = MEASURED IN UNIFORM UNITS

TEMPORARY COMBINATION FLUSHING AND SAMPLING TAP DETAIL

NOT TO SCALE

NOTE:

1. THIS FIGURE APPLIES TO MAINS UP TO AND INCLUDING 8" (200mm) DIAMETER.

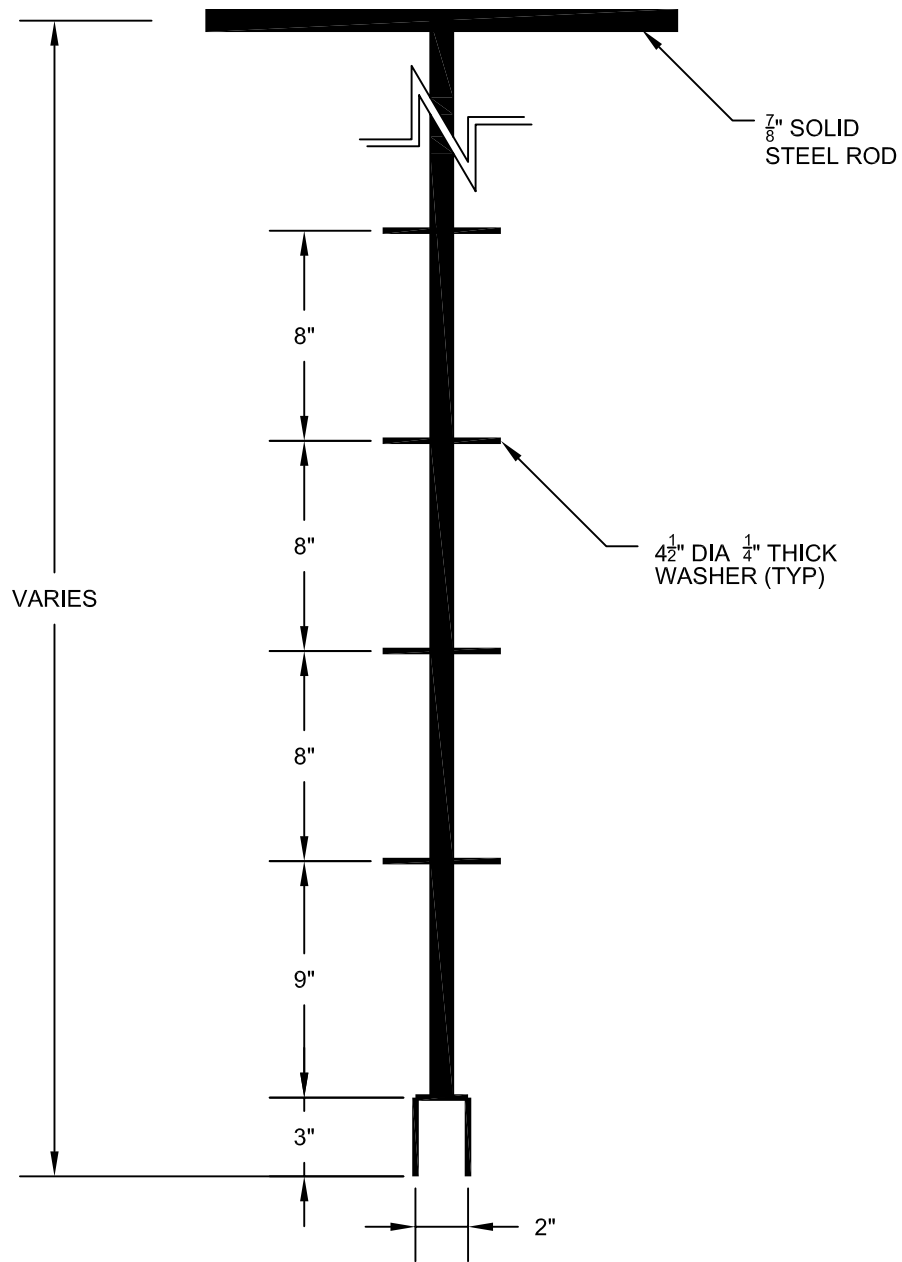
CITY OF CASPER
ENGINEERING DIVISION

TEMPORARY COMBINATION FLUSHING
AND SAMPLING TAP DETAIL

501

6

REV.	DESCRIPTION	DATE
1	REDRAFTED ONTO COMPUTER-Z.T.L.	1/26/01
2	DRAWING STANDARDS REVISIONS	JAN 06



**VALVE BOX ACCEPTANCE
KEY DETAIL**

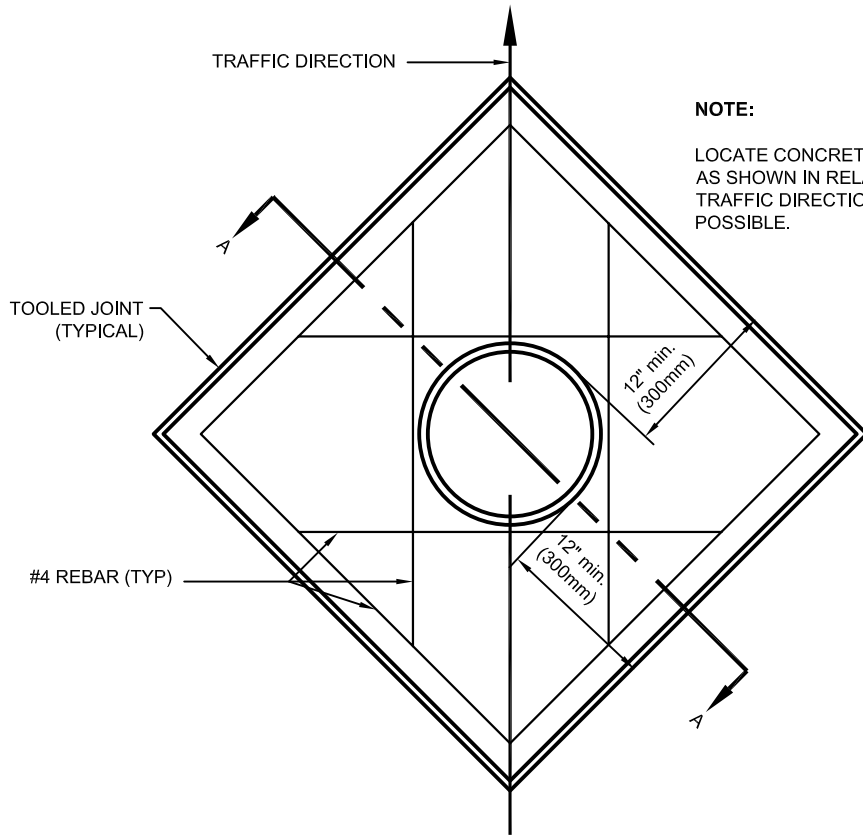
NOT TO SCALE

*CITY OF CASPER
ENGINEERING DIVISION*

**VALVE BOX ACCEPTANCE
KEY DETAIL**

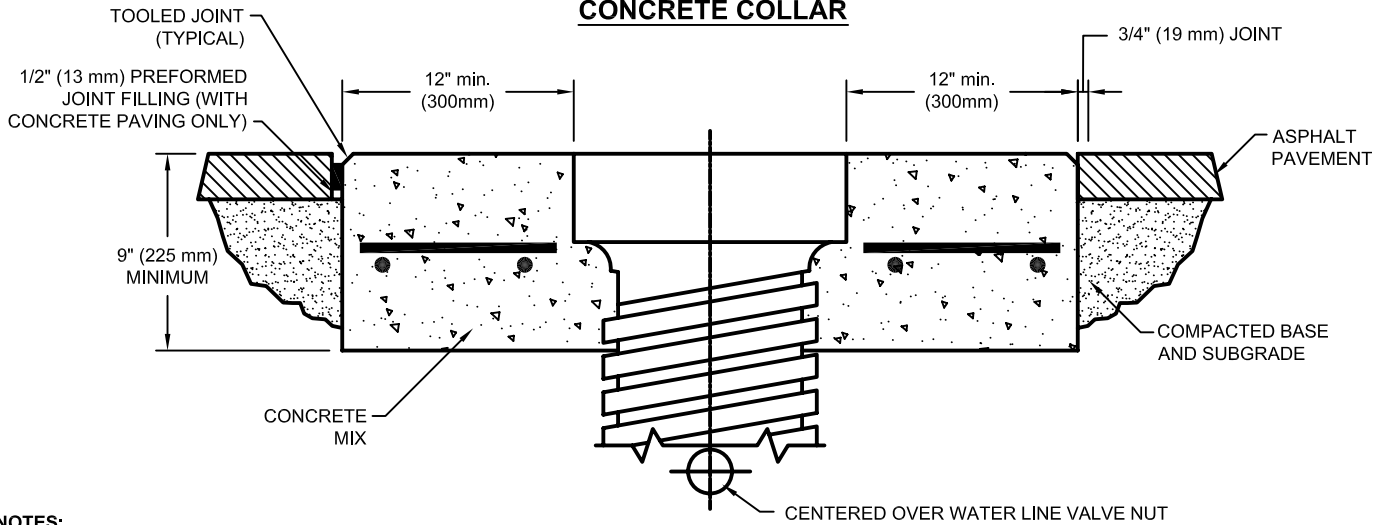
**501
7**

REV.	DESCRIPTION	DATE
1	DRAFTED ONTO COMPUTER-Z.T.L.	2/21/03
2	DRAWING STANDARDS REVISIONS	JAN 06



NOTE:
 LOCATE CONCRETE COLLAR
 AS SHOWN IN RELATION TO
 TRAFFIC DIRECTION WHERE
 POSSIBLE.

CONCRETE COLLAR



NOTES:

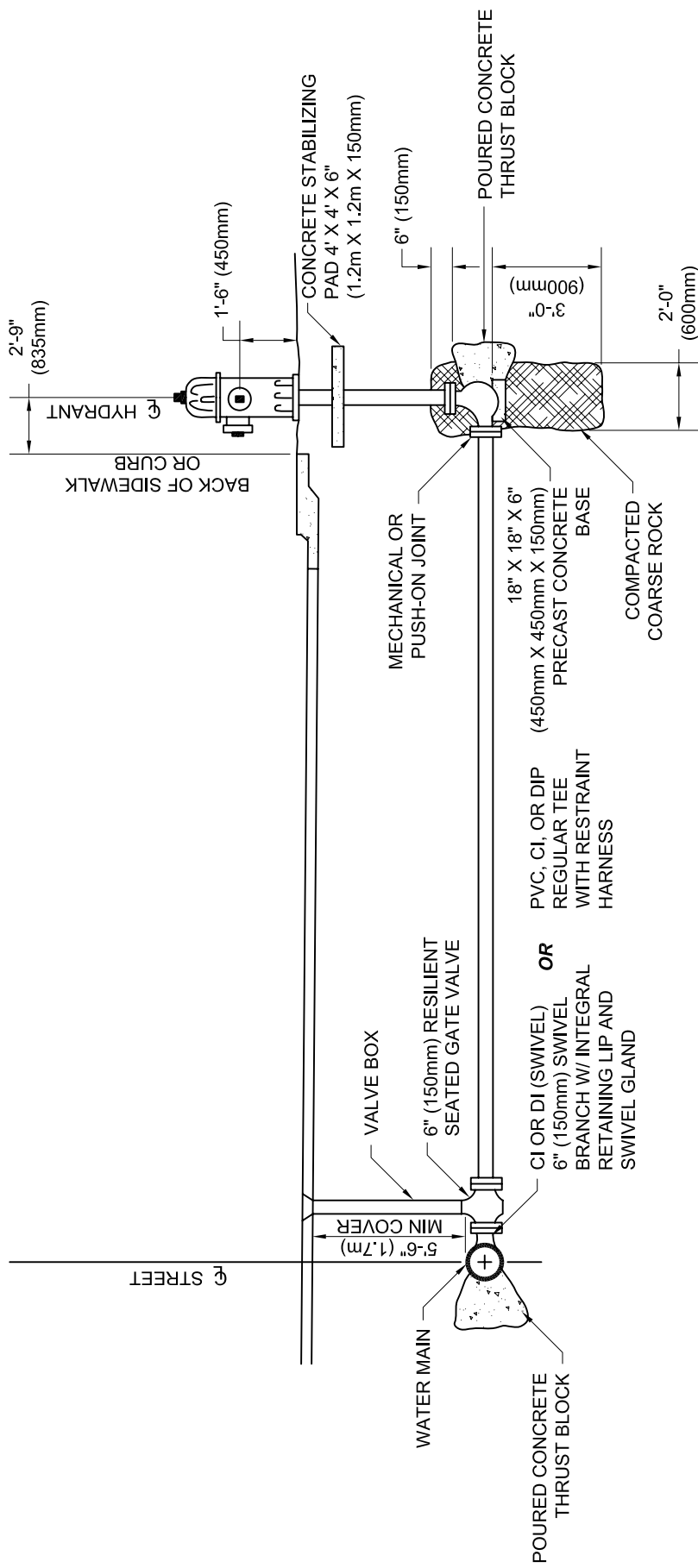
1. SEE DIVISION 500, SECTION 501.07 OF THE CITY OF CASPER STANDARD SPECIFICATIONS FOR ADJUSTMENTS.
2. SLOPE VALVE BOX COLLAR AS REQUIRED TO MATCH LONGITUDINAL AND TRANSVERSE GRADE ON STREET.
3. FINAL VALVE BOX ADJUSTMENT WILL BE MADE AFTER PAVING.
4. NO PAYMENT SHALL BE MADE FOR ADJUSTMENT OF NEW VALVE BOXES TO FINAL GRADE.

SECTION A-A

CONCRETE VALVE BOX COLLAR

NOT TO SCALE

<i>CITY OF CASPER ENGINEERING DIVISION</i>		
CONCRETE VALVE BOX COLLAR		
		501
		8
REV.	DESCRIPTION	DATE
1	DRAWING STANDARDS REVISIONS	JAN 06



STANDARD FIRE HYDRANT INSTALLATION DETAIL

NOT TO SCALE

NOTES:

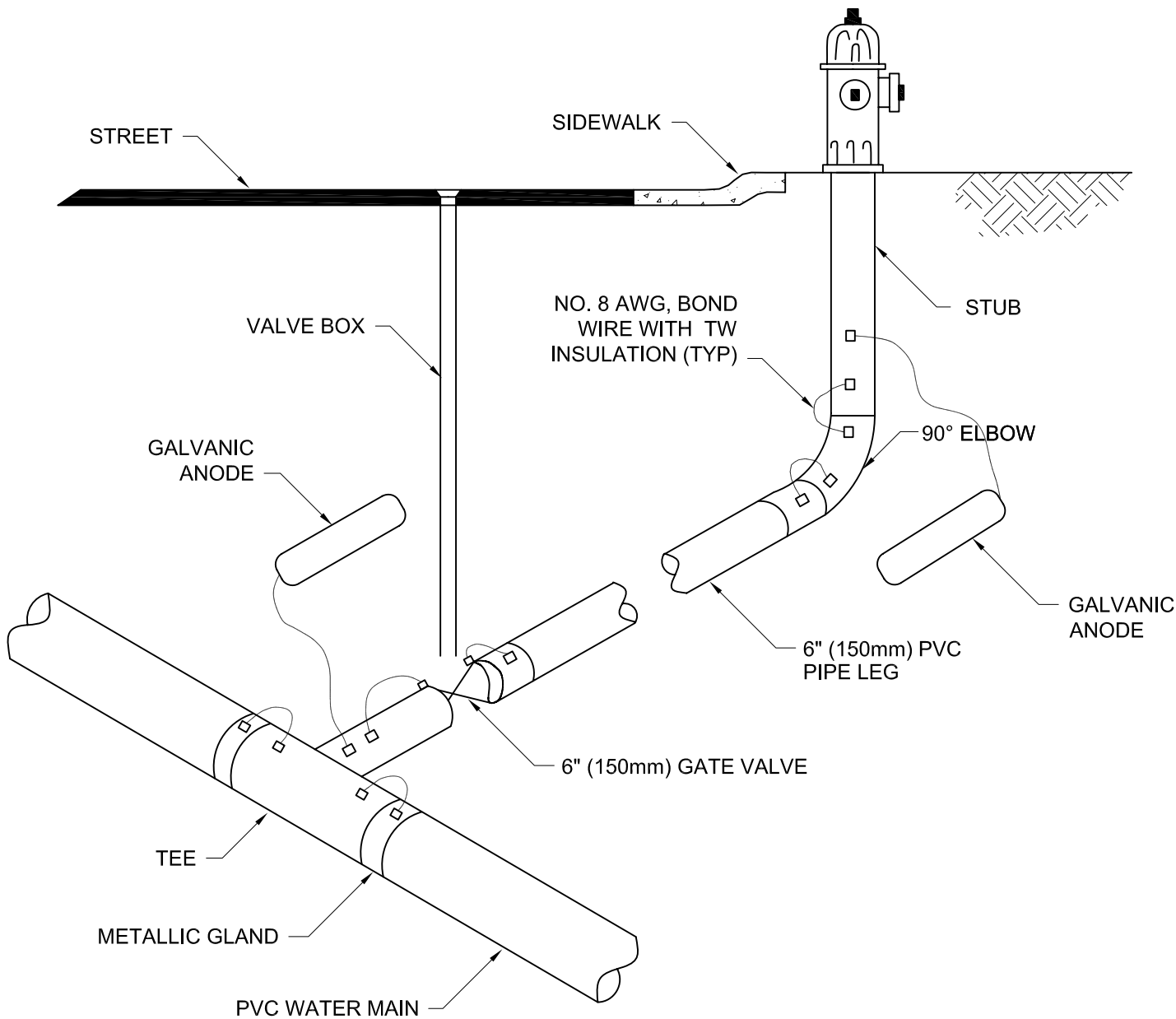
- HYDRANTS SHALL BE MUELLER SUPER CENTURION 250 A423 OR WATEROUS PACER WB67 WITH PENTAGON NUT CAPS.
- HYDRANTS SHALL BE PAINTED OFF WHITE ENAMEL. HYDRANT CAPS SHALL BE PRIMED WITH GRAY PRIMER.
- HYDRANTS SHALL HAVE TWO (2) 2-1/2" (63.5mm) DIA HOSE NOZZLES AND ONE (1) 4-1/2" (112.5mm) DIA PUMPER NOZZLE TO FIT NATIONAL STANDARD THREADS.
- ALL DUCTILE IRON PIPE AND ALL FITTINGS (INCLUDING HYDRANT PARTS BELOW GROUND) TO BE WRAPPED WITH POLYETHYLENE ENCASING MATERIAL WHICH SHALL MEET AWWA C105 SPECIFICATIONS.
- VALVE BOX TO BE TYLER 6850 SERIES 'S' OR APPROVED EQUAL.
- GATE VALVE TO MEET AWWA C509 SPECIFICATIONS.
- CENTER OF NOZZLES MUST BE A MINIMUM OF 18" (450mm) ABOVE BACK OF SIDEWALK, CURB, OR UNFINISHED GRADE- WHICH EVER IS HIGHER.

CITY OF CASPER
ENGINEERING DIVISION

STANDARD FIRE HYDRANT
INSTALLATION DETAIL

502 / 1

REV.	DESCRIPTION	DATE
1	REDRAFTED ONTO COMPUTER-Z.T.L.	1/23/01
2	DRAWING STANDARDS REVISIONS	JAN 06



**TYPICAL GALVANIC ANODE
INSTALLATION AT IRON FITTINGS
ON PVC WATER MAINS DETAIL**

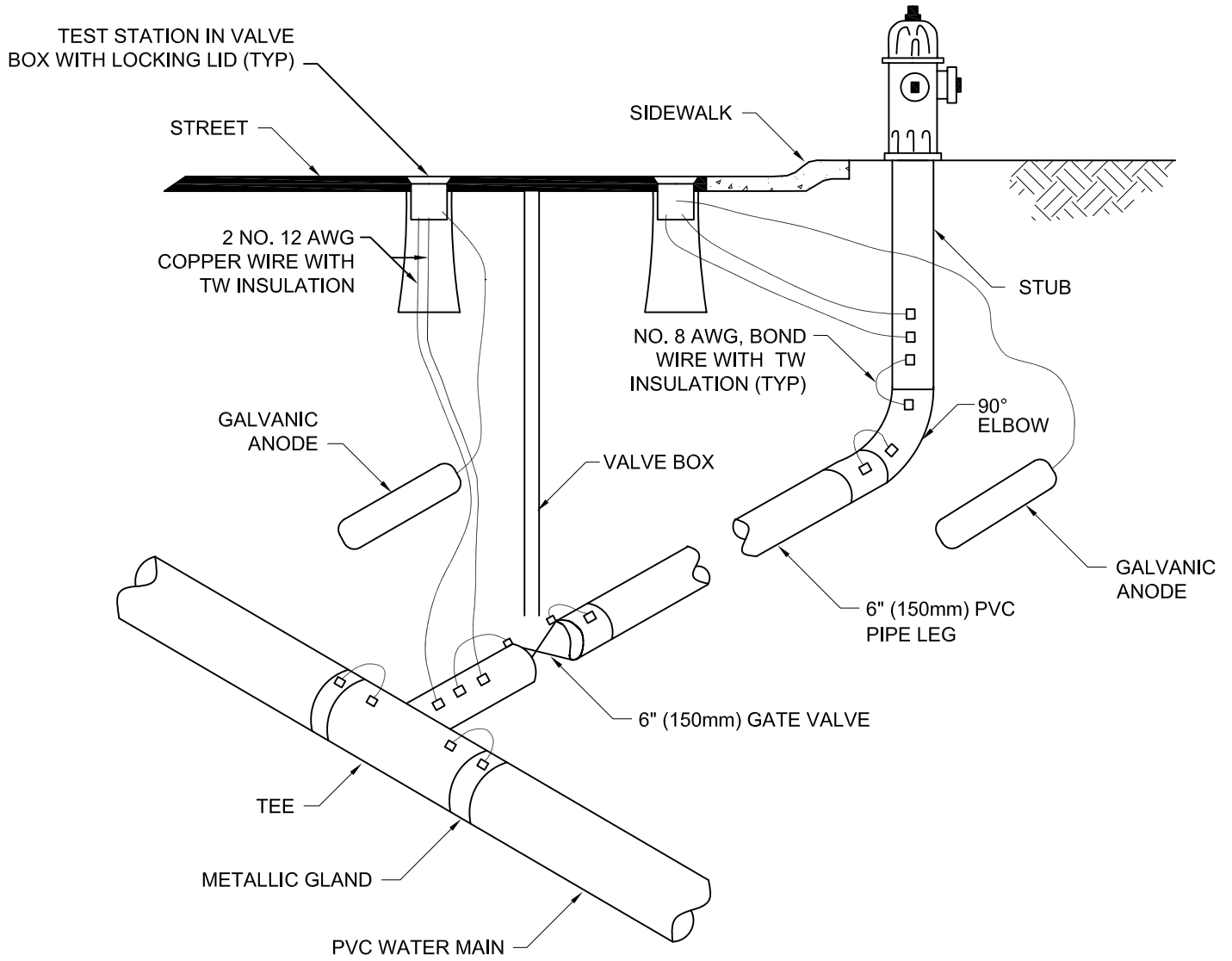
NOT TO SCALE

*CITY OF CASPER
ENGINEERING DIVISION*

**TYPICAL GALVANIC ANODE
INSTALLATION AT IRON FITTINGS
ON PVC WATER MAINS DETAIL**

**503
1**

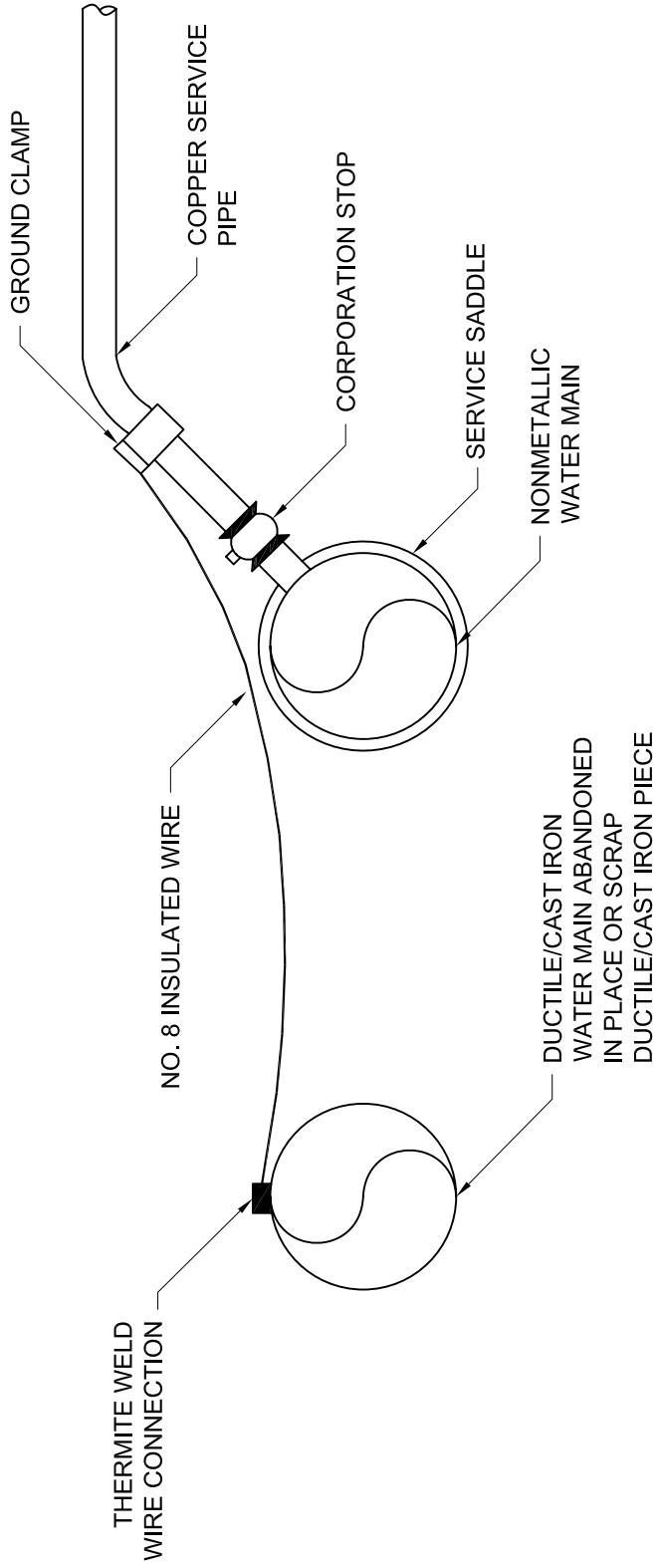
REV.	DESCRIPTION	DATE
1	REDRAFTED ONTO COMPUTER- Z.T.L.	1/28/01
2	DRAWING STANDARDS REVISIONS	JAN 06



**TYPICAL GALVANIC ANODE AND TEST
STATION INSTALLATIONS AT IRON FITTINGS
ON PVC WATER MAINS DETAIL**

NOT TO SCALE

<i>CITY OF CASPER ENGINEERING DIVISION</i>		
TYPICAL GALVANIC ANODE AND TEST STATION INSTALLATIONS AT IRON FITTINGS ON PVC WATER MAINS		
		503
		2
REV.	DESCRIPTION	DATE
1	REDRAFTED ONTO COMPUTER- Z.T.L.	1/28/01
2	DRAWING STANDARDS REVISIONS	JAN 06



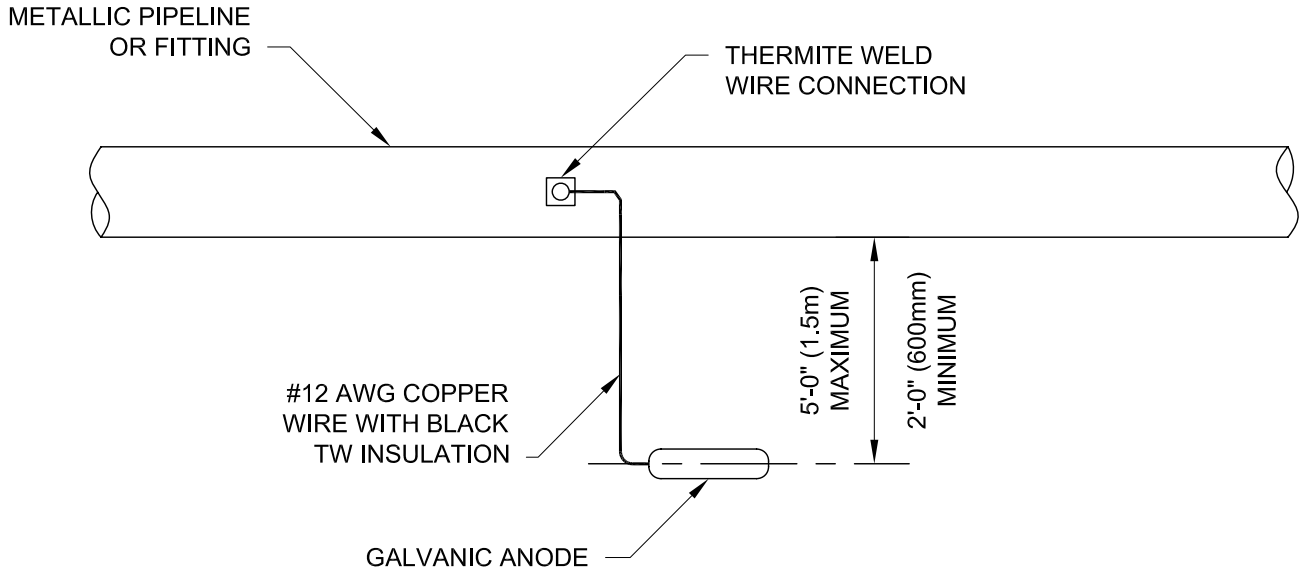
**DUCTILE OR CAST IRON
PIPE ANODE DETAIL**

NOT TO SCALE

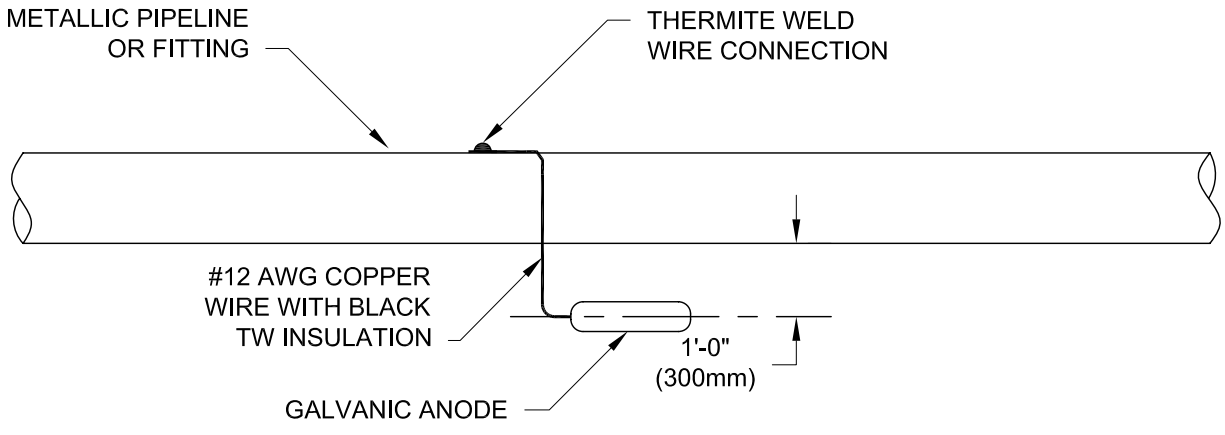
NOTES:

1. PIPE ANODE SHALL BE 6" (150mm) DIAMETER MIN CAST OR DUCTILE IRON PIPE, 10' (3m) MIN LENGTH. AS AN ALTERNATIVE, GALVANIC ANODES MAY BE USED.
2. THE SERVICE SADDLE, CORPORATION STOP, AND GROUND CLAMP SHALL BE COATED WITH POLYGUARD CA-114 MASTIC AND 400 WRAP OR APPROVED EQUAL. THE COATING SHALL BE PROTECTED FROM TRENCH BACKFILLING DAMAGE BY TWO LAYERS OF POLYETHYLENE WRAP MEETING AWWA C105 SPECIFICATIONS.

<i>CITY OF CASPER ENGINEERING DIVISION</i>	
DUCTILE OR CAST IRON PIPE ANODE DETAIL	
503	3
REV.	DESCRIPTION
1	REDRAFTED ONTO COMPUTER-Z.T.L.
2	DRAWING STANDARDS REVISIONS
	DATE
	1/26/00
	JAN 06



PLAN



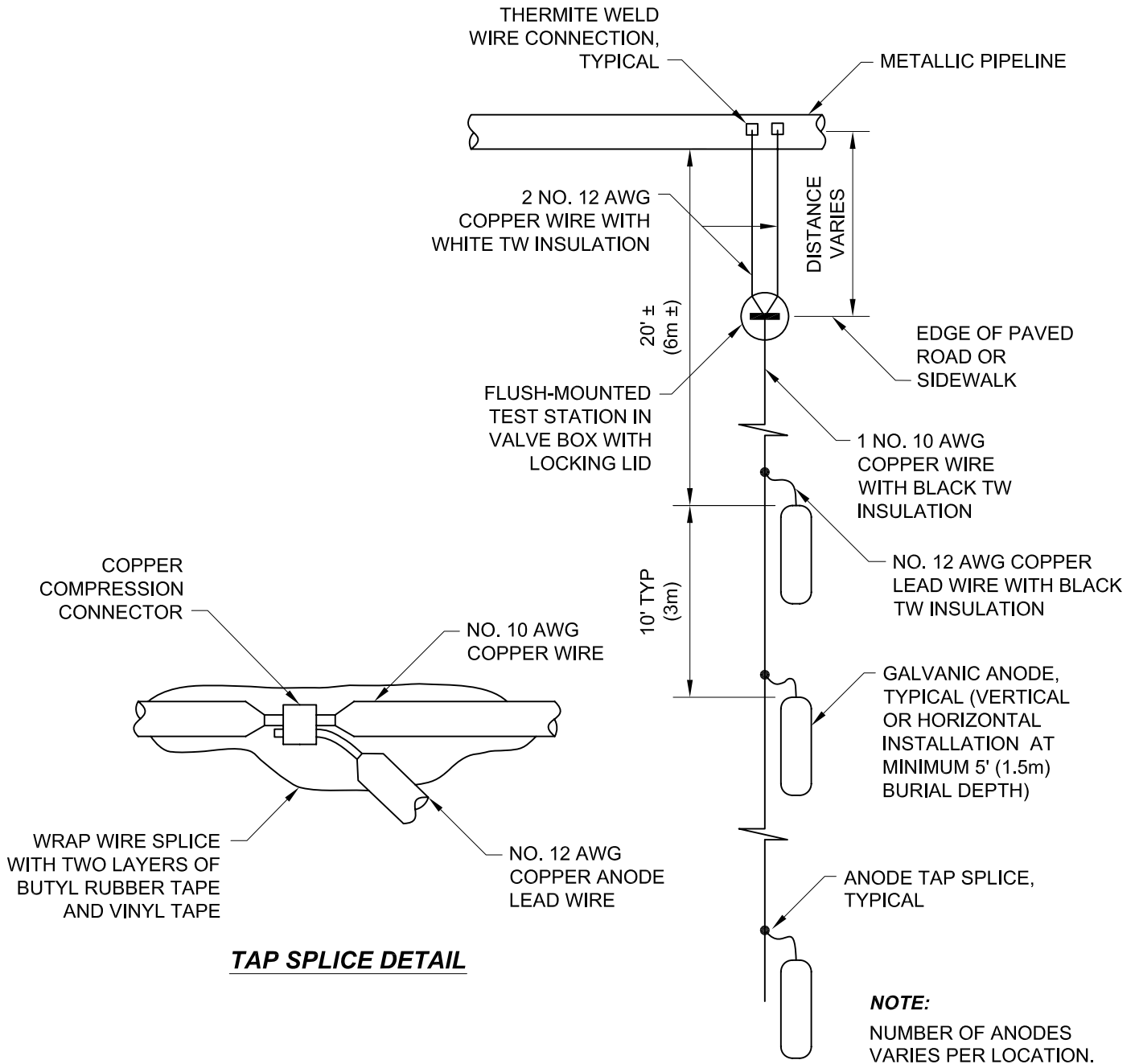
ELEVATION

**GALVANIC ANODE
INSTALLATION DETAIL**
NOT TO SCALE

NOTE:

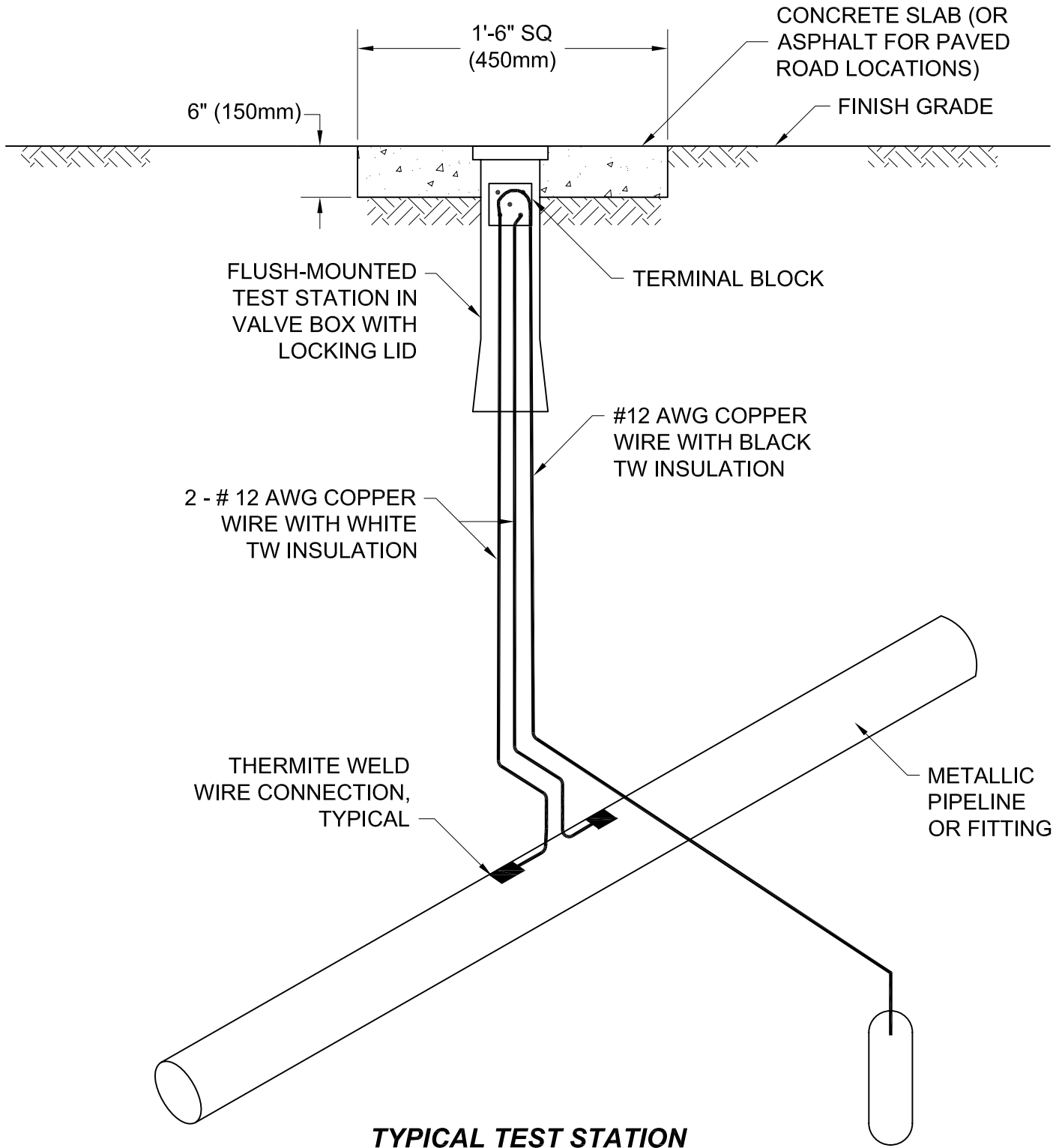
GALVANIC ANODE CAN ALSO
BE INSTALLED VERTICALLY.

<i>CITY OF CASPER ENGINEERING DIVISION</i>		
GALVANIC ANODE INSTALLATION DETAIL		503
		4
REV.	DESCRIPTION	DATE
1	REDRAFTED ONTO COMPUTER- Z.T.L.	1/28/01
2	DRAWING STANDARDS REVISIONS	JAN 06



**GALVANIC ANODE STRING
INSTALLATION DETAIL**
NOT TO SCALE

<i>CITY OF CASPER ENGINEERING DIVISION</i>		
GALVANIC ANODE STRING INSTALLATION DETAIL		503 5
REV.	DESCRIPTION	DATE
1	REDRAFTED ONTO COMPUTER-Z.T.L.	1/29/01
2	DRAWING STANDARDS REVISIONS	JAN 06

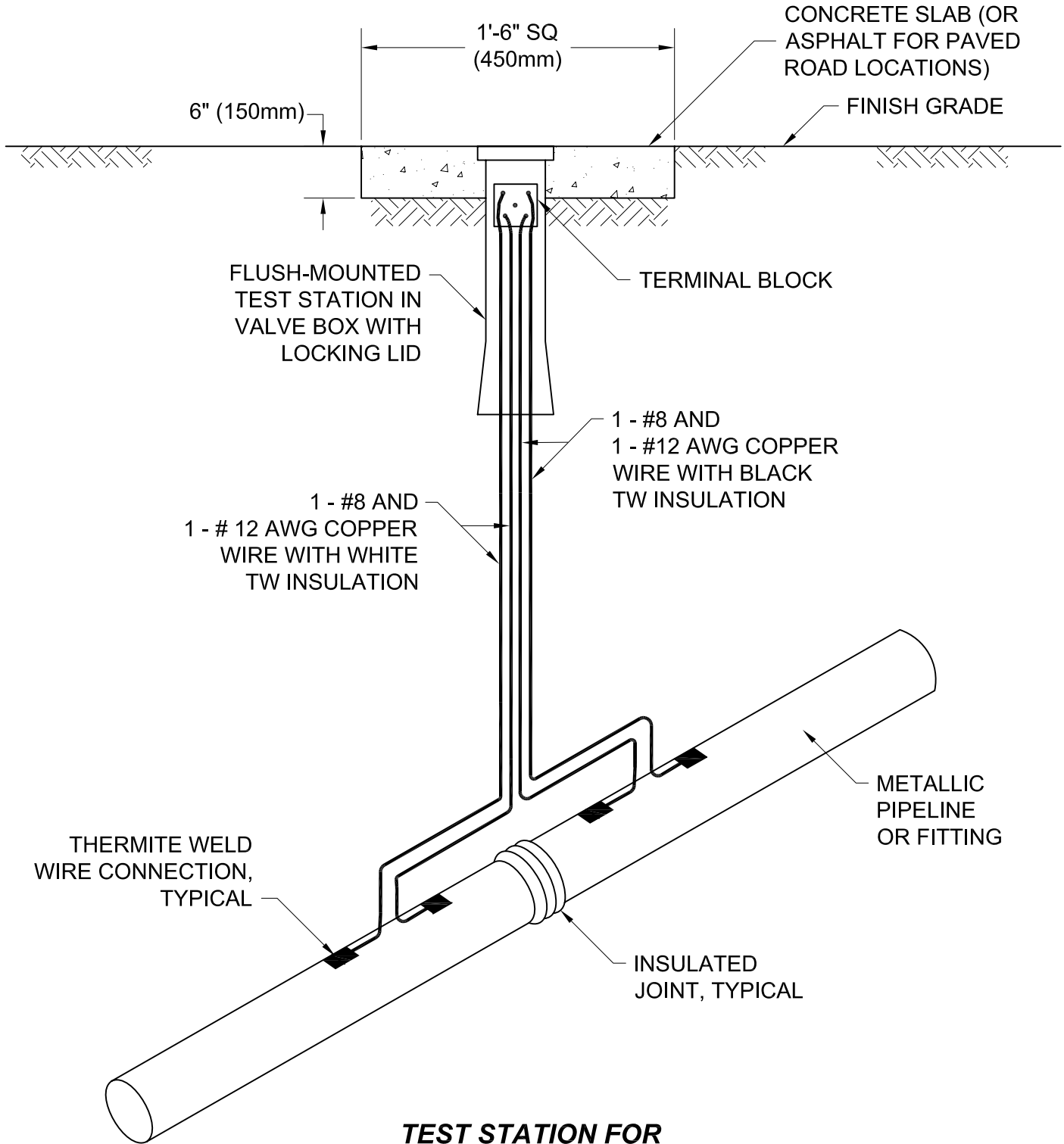


**TYPICAL TEST STATION
INSTALLATION DETAIL**
NOT TO SCALE

*CITY OF CASPER
ENGINEERING DIVISION*

**TYPICAL TEST STATION
INSTALLATION DETAIL**

		503
		6
REV.	DESCRIPTION	DATE
1	REDRAFTED ONTO COMPUTER- Z.T.L.	2/12/01
2	DRAWING STANDARDS REVISIONS	JAN 06



TEST STATION FOR INSULATED JOINT DETAIL
NOT TO SCALE

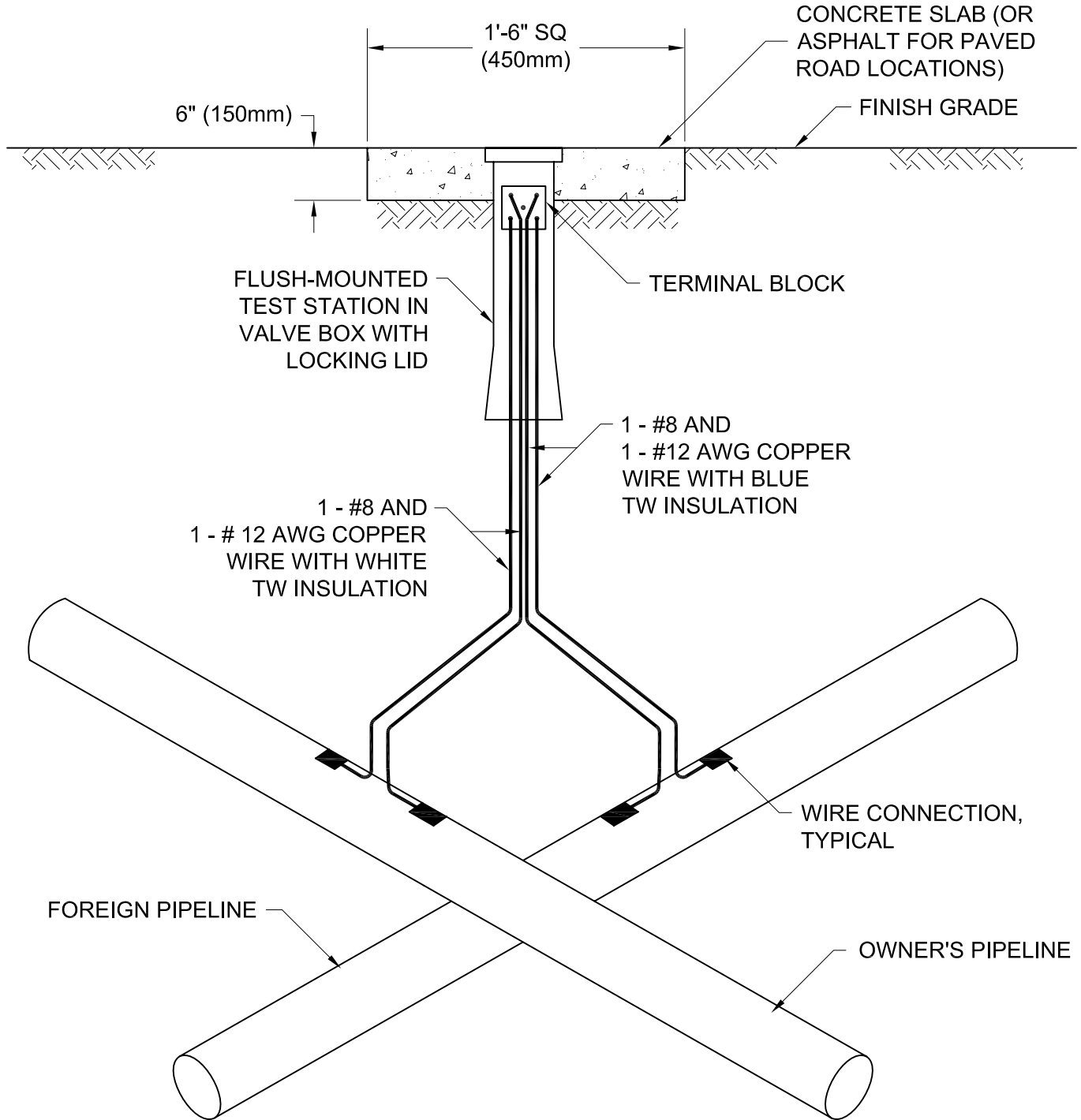
*CITY OF CASPER
ENGINEERING DIVISION*

**TEST STATION FOR
INSULATED JOINT DETAIL**

		503
		7
REV.	DESCRIPTION	DATE
1	REDRAFTED ONTO COMPUTER-Z.T.L.	2/12/01
2	DRAWING STANDARDS REVISIONS	JAN 06

NOTE:

PRIOR TO MAKING WIRE CONNECTIONS CONTACT FOREIGN PIPELINE OWNER FOR APPROVAL.

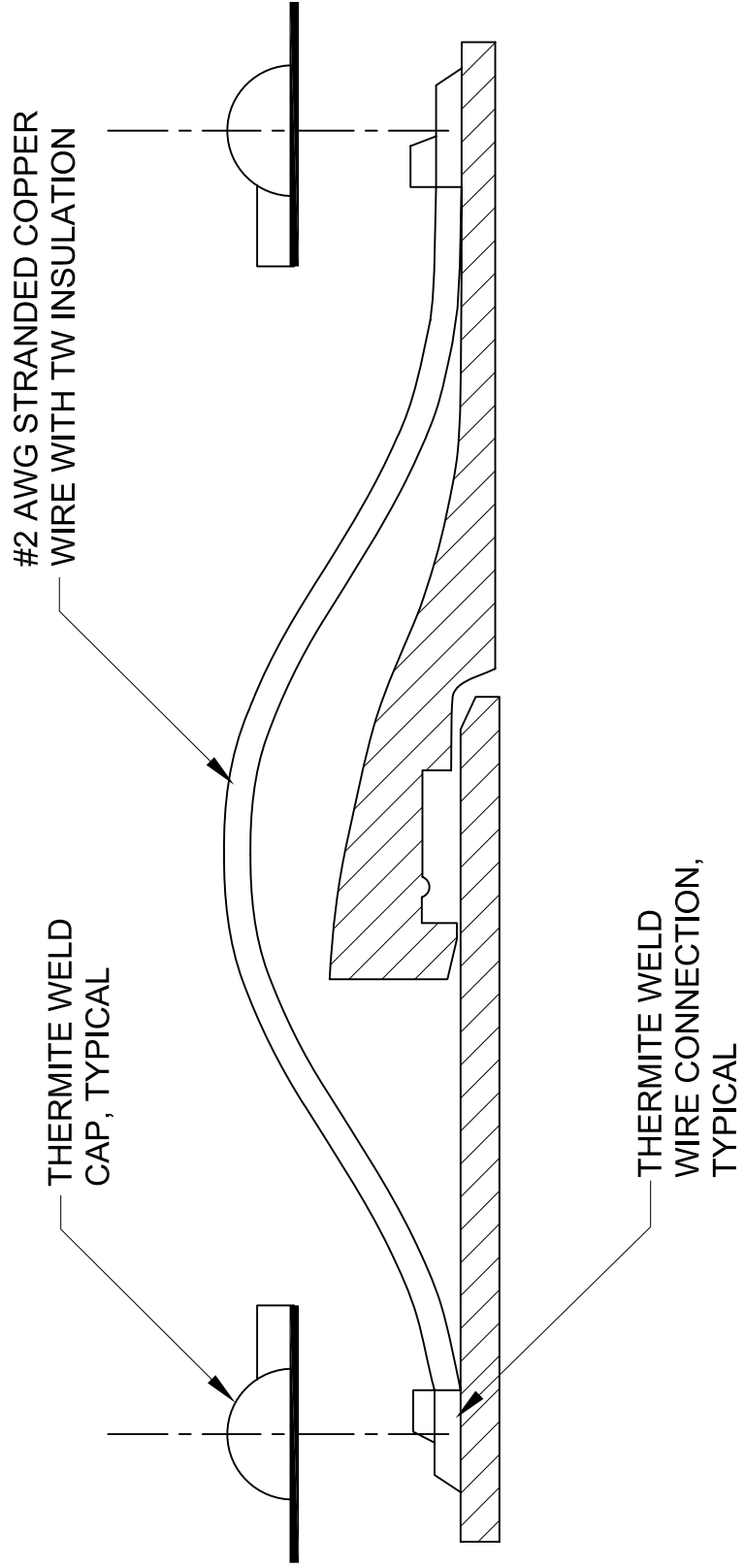


TEST STATION FOR FOREIGN PIPELINE DETAIL
NOT TO SCALE

*CITY OF CASPER
ENGINEERING DIVISION*

**TEST STATION FOR
FOREIGN PIPELINE DETAIL**

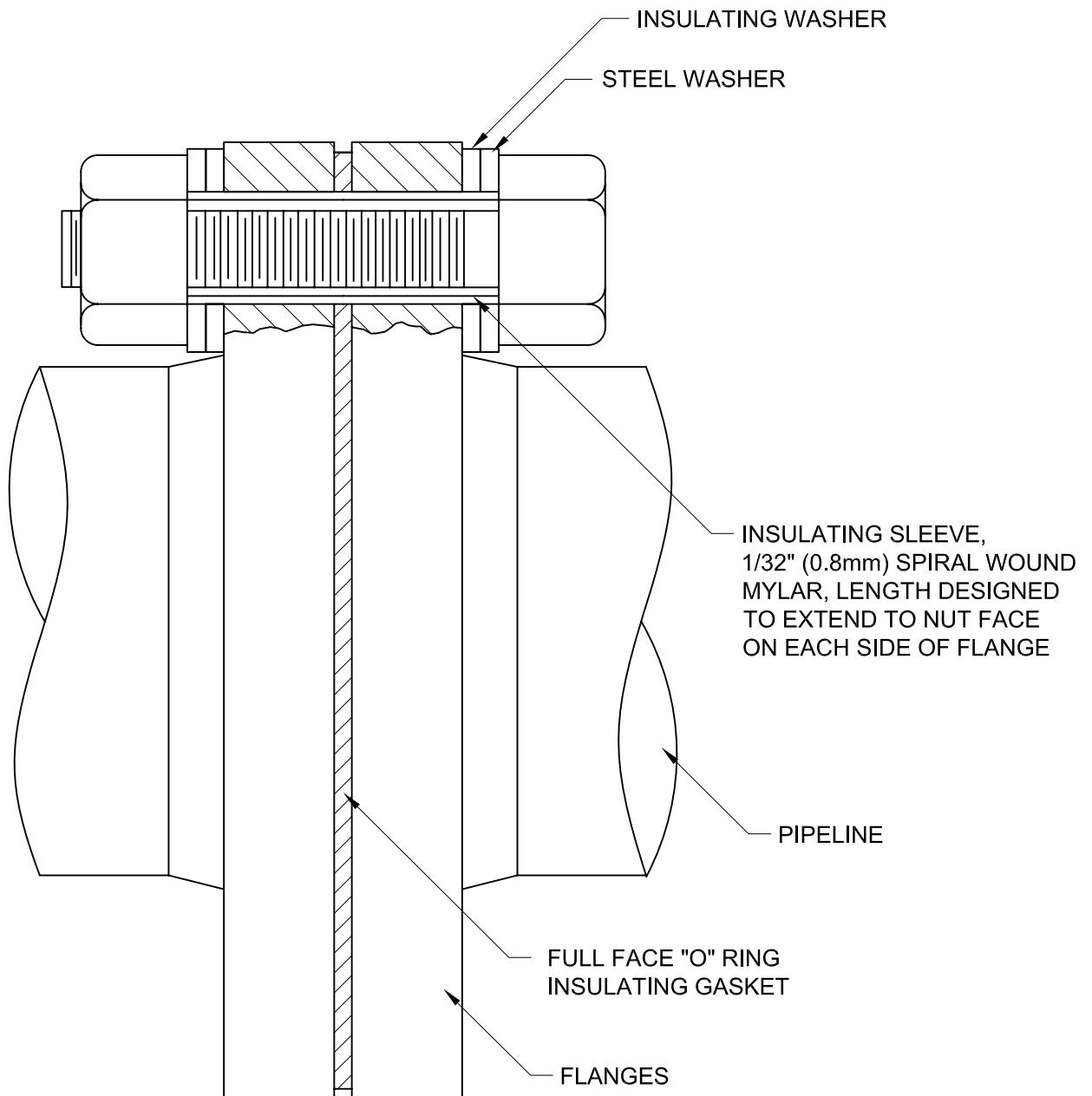
		503
		8
REV.	DESCRIPTION	DATE
1	REDRAFTED ONTO COMPUTER- Z.T.L.	2/12/01
2	DRAWING STANDARDS REVISIONS	JAN 06



TYPICAL JOINT BOND DETAIL

NOT TO SCALE

<i>CITY OF CASPER ENGINEERING DIVISION</i>	
TYPICAL JOINT BOND DETAIL	
503	9
REV.	DESCRIPTION
1	REDRAFTED ONTO COMPUTER- Z.T.L.
2	DRAWING STANDARDS REVISIONS
	DATE
	2/12/01
	JAN 06



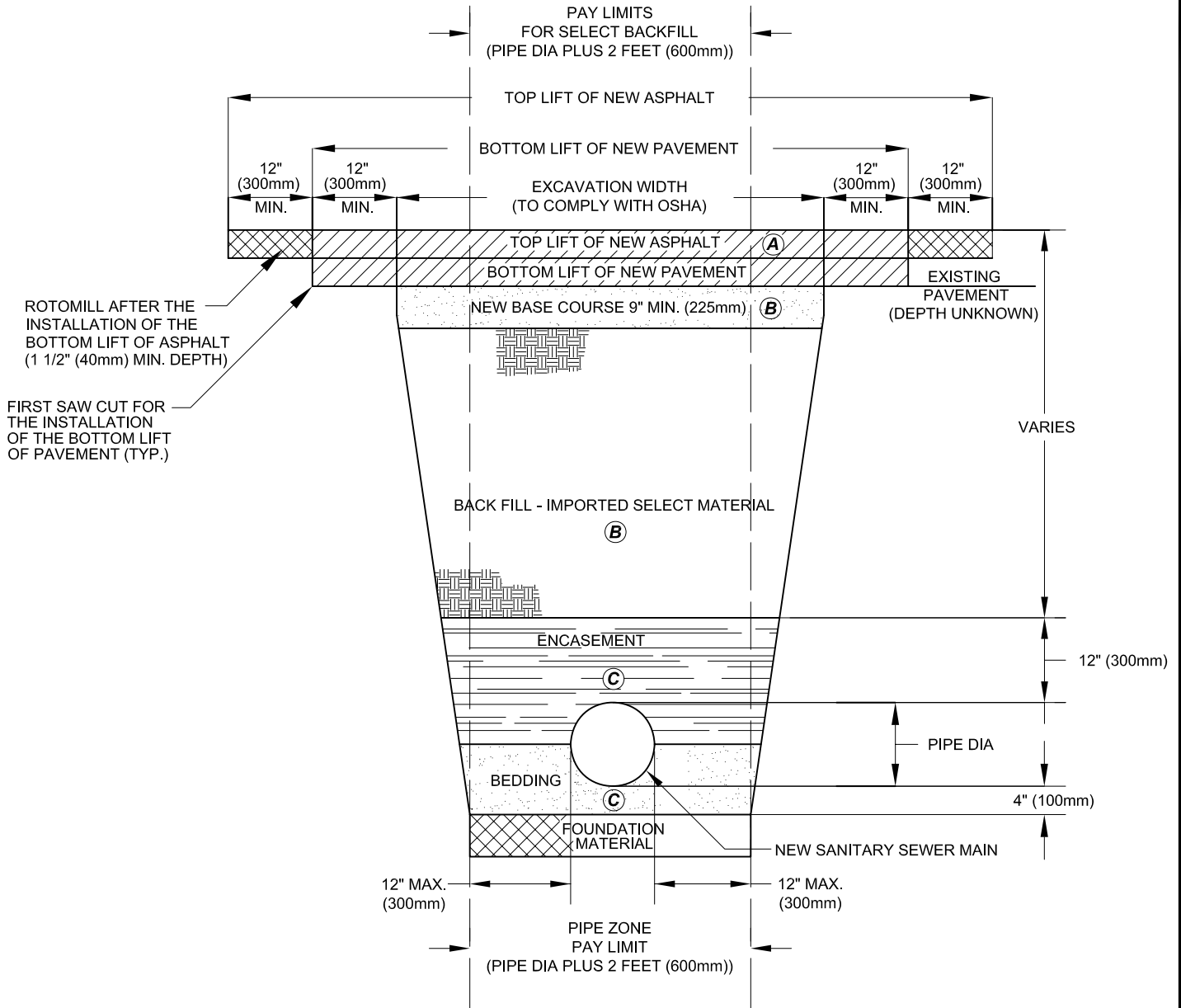
**INSULATING FLANGE DETAIL
(BURIED)**

NOT TO SCALE

NOTES:

1. COAT WITH 100 PERCENT SOLIDS EPOXY AFTER ASSEMBLING JOINT AND WRAP WITH A BUTYL RUBBER ADHESIVE, POLYETHYLENE BACKED TAPE.
2. INSTALL INSULATING WASHER ON UNPROTECTED SIDE OF FLANGE.

<i>CITY OF CASPER ENGINEERING DIVISION</i>		
INSULATING FLANGE DETAIL		
		503
		10
REV.	DESCRIPTION	DATE
1	REDRAFTED ONTO COMPUTER- Z.T.L.	2/12/01
2	DRAWING STANDARDS REVISIONS	JAN 06



TYPICAL STREET CUT SECTION ASPHALT SURFACING

NOT TO SCALE

NOTES:

1. TACK COAT SHALL BE APPLIED ON ALL SAW CUT AND MILLED INTERFACES BETWEEN EXISTING AND NEW ASPHALT.
2. NEW PAVEMENT THICKNESS SHALL MATCH EXISTING.
3. DENSITY REQUIRED:
 - (A) =97% MARSHALL DENSITY
 - (B) =95% STANDARD PROCTOR
 - (C) =90% STANDARD PROCTOR
4. GRANULAR FOUNDATION MATERIAL IF USED SHALL BE PLACED BELOW AND TO THE MIDPOINT OF THE PIPE.

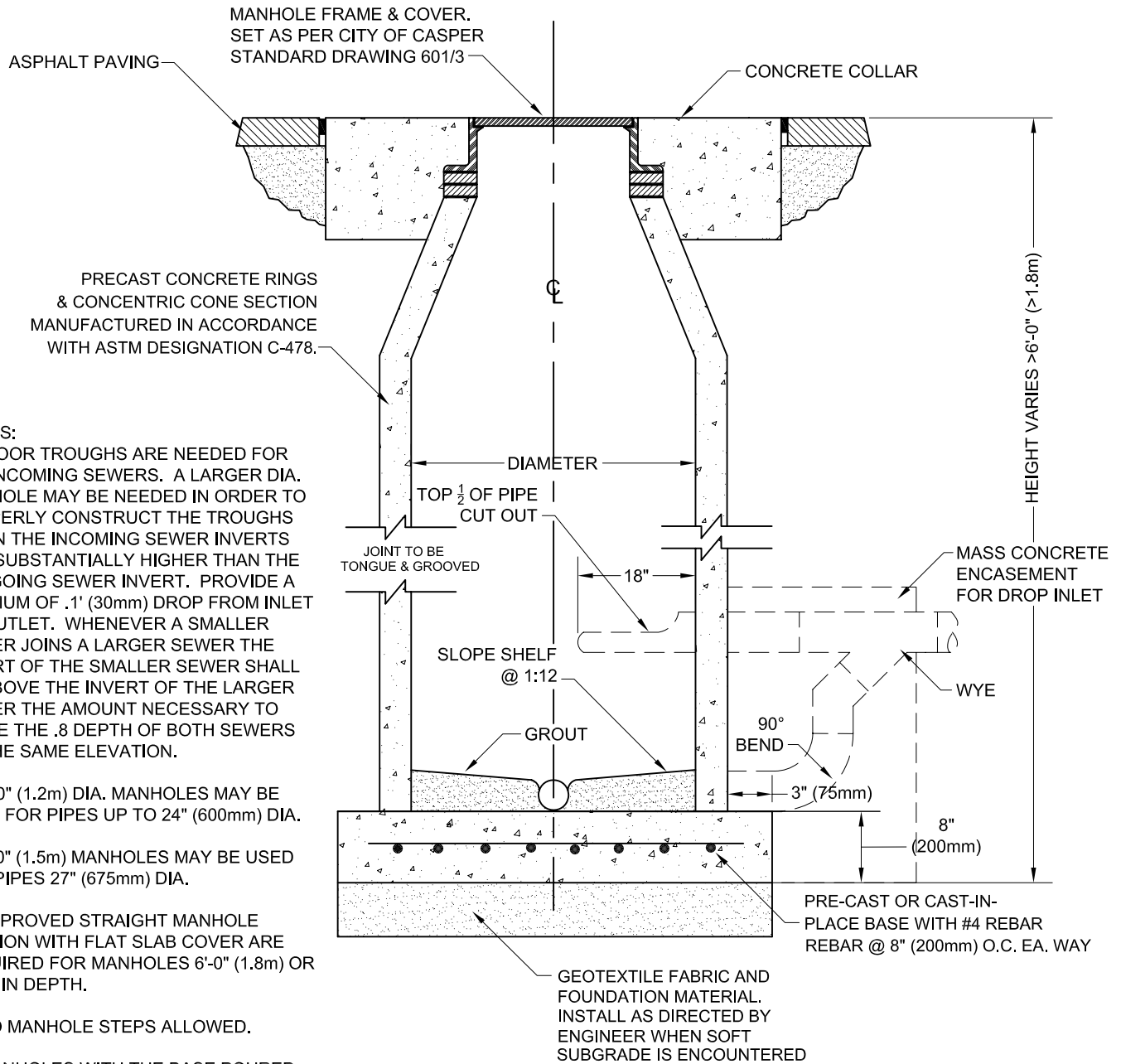
**CITY OF CASPER
ENGINEERING DIVISION**

**TYPICAL STREET CUT SECTION
ASPHALT SURFACING
FOR SANITARY SEWER**

601

1

REV.	DESCRIPTION	DATE
1	REDRAFTED ONTO COMPUTER- Z.T.L.	6/1/01
2	DRAWING STANDARDS REVISIONS	JAN 06



NOTES:

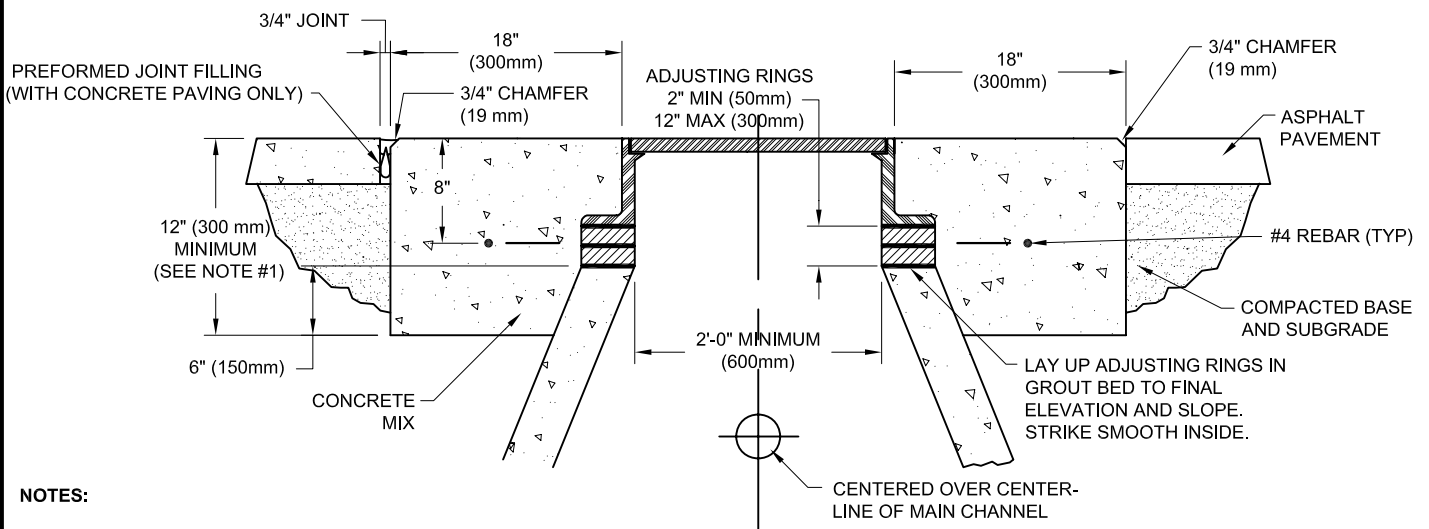
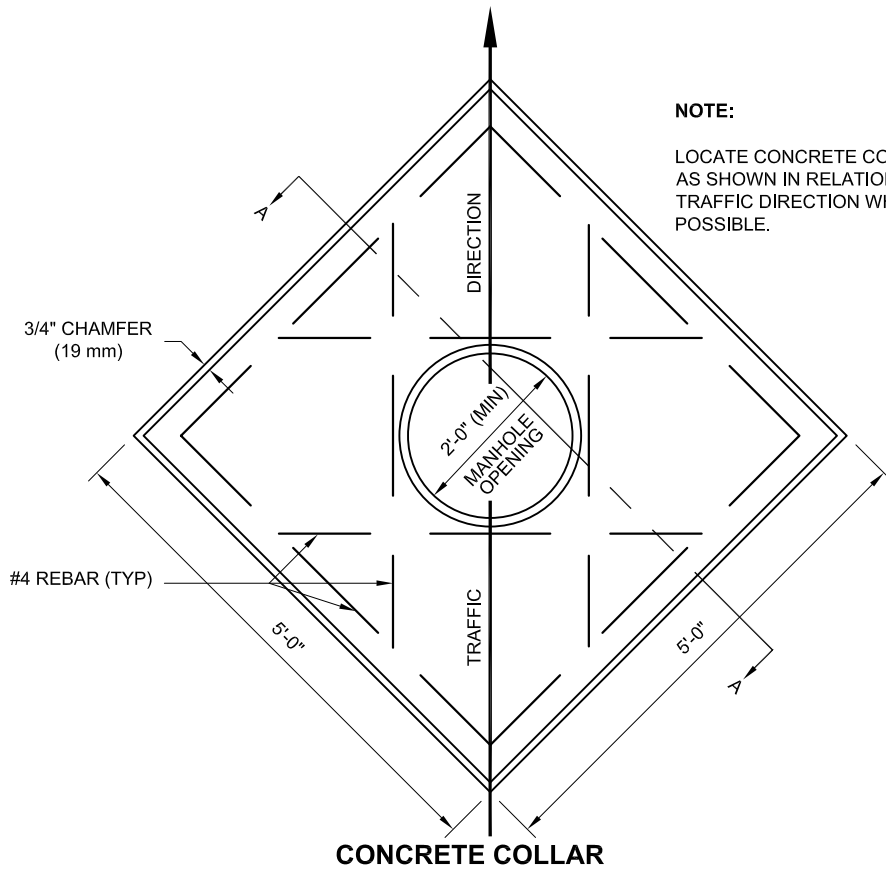
1. FLOOR TROUGHS ARE NEEDED FOR ALL INCOMING SEWERS. A LARGER DIA. MANHOLE MAY BE NEEDED IN ORDER TO PROPERLY CONSTRUCT THE TROUGHS WHEN THE INCOMING SEWER INVERTS ARE SUBSTANTIALLY HIGHER THAN THE OUTGOING SEWER INVERT. PROVIDE A MINIMUM OF .1' (30mm) DROP FROM INLET TO OUTLET. WHENEVER A SMALLER SEWER JOINS A LARGER SEWER THE INVERT OF THE SMALLER SEWER SHALL BE ABOVE THE INVERT OF THE LARGER SEWER THE AMOUNT NECESSARY TO PLACE THE .8 DEPTH OF BOTH SEWERS AT THE SAME ELEVATION.
2. 4'-0" (1.2m) DIA. MANHOLES MAY BE USED FOR PIPES UP TO 24" (600mm) DIA.
3. 5'-0" (1.5m) MANHOLES MAY BE USED FOR PIPES 27" (675mm) DIA.
4. APPROVED STRAIGHT MANHOLE SECTION WITH FLAT SLAB COVER ARE REQUIRED FOR MANHOLES 6'-0" (1.8m) OR LESS IN DEPTH.
5. NO MANHOLE STEPS ALLOWED.
6. MANHOLES WITH THE BASE POURED MONOLITHICALLY WITH THE BOTTOM BARREL ARE ALSO ACCEPTABLE.
7. SEAL JOINTS WATER TIGHT WITH APPROVED MATERIAL. GROUT HOISTING HOLES WATER TIGHT WITH NONMETALLIC, NON-SHRINK GROUT.
8. INVERTS SHALL BE U-SHAPED TO THE I.D. PIPE DIA. POINT (PIPE CROWN).
9. THE ENGINEER SHALL DETERMINE THE MANHOLE SIZE BASED ON THE ANGLE, NUMBER AND SIZE OF PIPE PENETRATIONS. THE MINIMUM DISTANCE BETWEEN KNOCKOUTS IS 12" (300mm).
10. THE UPPER PIPE AT DROP INLETS SHALL EXTEND INTO THE MANHOLE 12" (300mm) WITH THE TOP HALF CUT OUT.

**STANDARD SANITARY
SEWER MANHOLE DETAIL**
(FOR MANHOLE DEPTH >6' BASE TO LID)
NOT TO SCALE

*CITY OF CASPER
ENGINEERING DIVISION*

**STANDARD SANITARY
SEWER MANHOLE DETAIL**
FOR MANHOLE DEPTH ≥6'
BASE TO LID

601		2
REV.	DESCRIPTION	DATE
1	REDRAFTED ONTO COMPUTER- Z.T.L.	6/8/01
2	MODIFY NOTE 1 & ADD NOTE 10	1/17/05
3	DRAWING STANDARDS REVISIONS	JAN 06



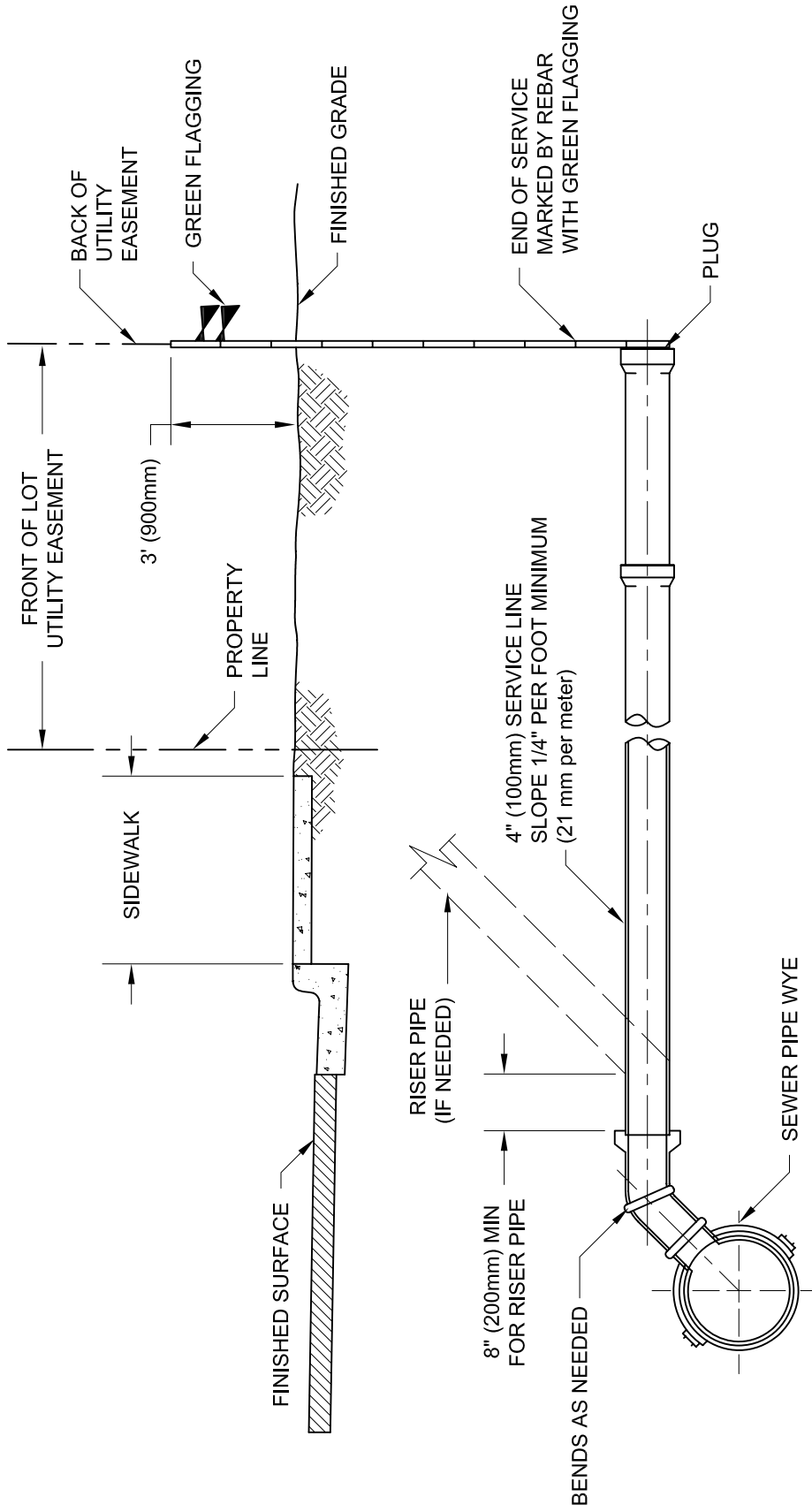
NOTES:

1. MINIMUM OF 12" (300mm) DEPTH CONCRETE ENCASEMENT AROUND MANHOLE CASTINGS OR 6" (150mm) BELOW BOTTOM OF ADJUSTING RING, WHICHEVER IS GREATER.
2. ADJUST MANHOLE UPWARD WITH ADJUSTING RINGS UNDER FRAME. ADJUST MANHOLE DOWNWARD BY REMOVING A PORTION OF THE MANHOLE RISER AND REBUILDING TO PROPER DIAMETER.
3. SLOPE MANHOLE RING AS REQUIRED TO MATCH LONGITUDINAL AND TRANSVERSE GRADE ON STREET.
4. FINAL MANHOLE ADJUSTMENT WILL BE MADE AFTER PAVING AND BEFORE SEAL COATING.
5. NO PAYMENT SHALL BE MADE FOR ADJUSTMENT OF NEW MANHOLES TO FINAL GRADE.
6. FRAME AND COVER TO BE D & L SUPPLY A-1040, DETTER FOUNDRY 1257, NEENAH 1726-A OR APPROVED EQUAL.

**MANHOLE FRAME & COVER
AND GRADE
ADJUSTMENT DETAIL**

NOT TO SCALE

<i>CITY OF CASPER ENGINEERING DIVISION</i>		
STANDARD MANHOLE FRAME & COVER GRADE ADJUSTMENT DETAIL		601
		3
REV.	DESCRIPTION	DATE
1	REDRAFTED ONTO COMPUTER-Z.T.L.	6/10/01
2	DRAWING STANDARDS REVISIONS	JAN 06



NOTES:

1. THE ENDS OF SERVICE LINES SHALL END ABOVE THE GROUNDWATER TABLE.
2. SEWER SERVICE TO BE LOCATED AT 10 FEET (3m) FROM WATER SERVICE ON THE DOWNHILL FLOW SIDE OF SEWER MAIN.
3. A GROUNDWATER BARRIER SHALL BE INSTALLED IN THE SERVICE LINE TRENCH ON THE PROPERTY LINE.
4. SEWER SERVICE LINES WITH RISER PIPES SHALL MEET THE REQUIREMENTS OF SECTION 601.07.C.

**SEWER SERVICE
LINE DETAIL**

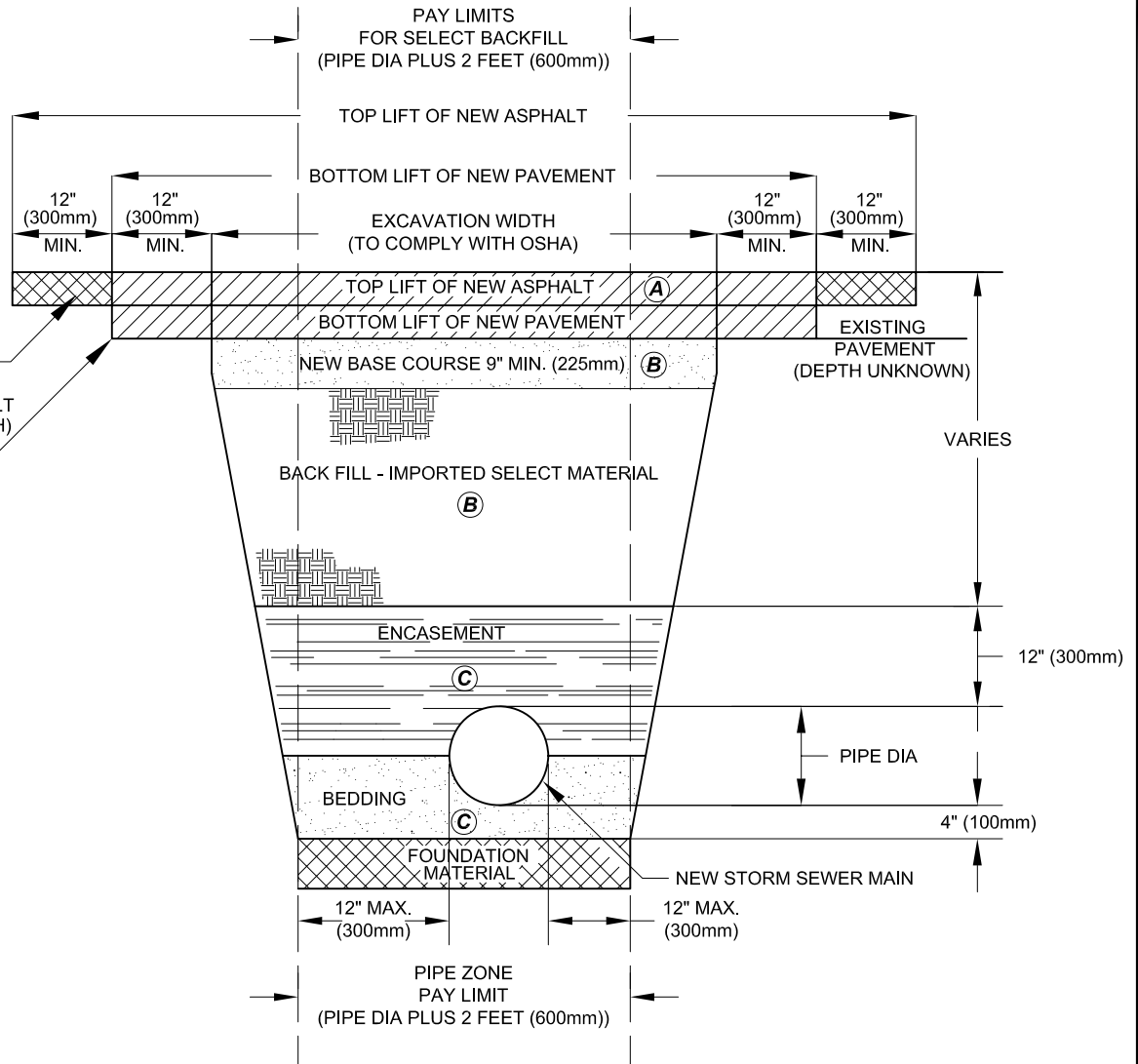
NOT TO SCALE

*CITY OF CASPER
ENGINEERING DIVISION*

**SEWER SERVICE
LINE DETAIL**

601 4

REV.	DESCRIPTION	DATE
1	REDRAFTED ONTO COMPUTER-Z.T.L.	6/14/01
2	ADD RISER PIPE & 2ND 45° BEND	1/24/05
3	DRAWING STANDARDS REVISIONS	JAN 06



TYPICAL STREET CUT SECTION ASPHALT SURFACING

NOT TO SCALE

NOTES:

1. TACK COAT SHALL BE APPLIED ON ALL SAW CUT AND MILLED INTERFACES BETWEEN EXISTING AND NEW ASPHALT.
2. NEW PAVEMENT THICKNESS SHALL MATCH EXISTING.
3. DENSITY REQUIRED:
 - (A) =97% MARSHALL DENSITY
 - (B) =95% STANDARD PROCTOR
 - (C) =90% STANDARD PROCTOR

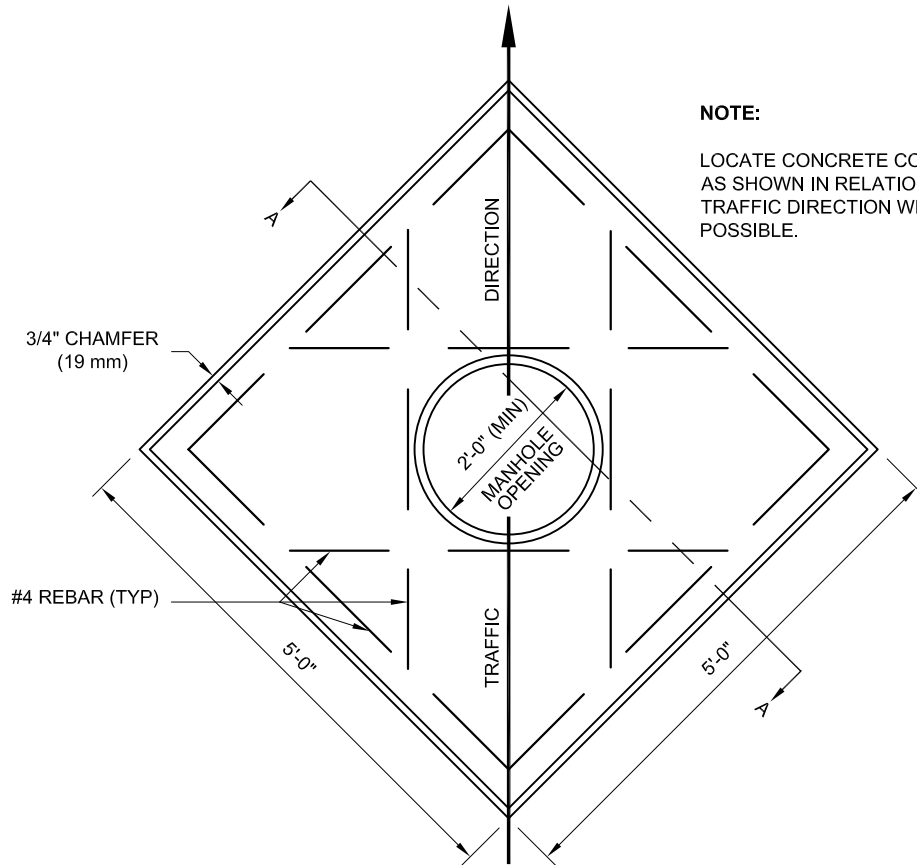
*CITY OF CASPER
ENGINEERING DIVISION*

**TYPICAL STREET CUT SECTION
ASPHALT SURFACING
FOR STORM SEWER**

602

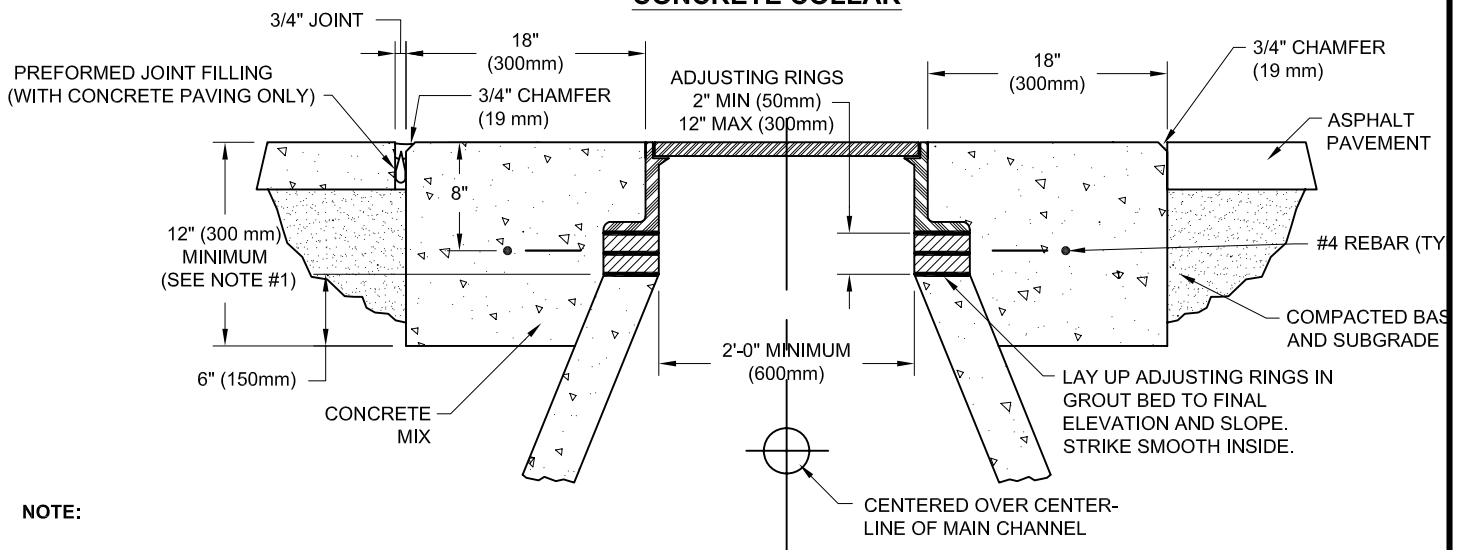
1

REV.	DESCRIPTION	DATE
1	REDRAFTED ONTO COMPUTER- Z.T.L.	9/1/00
2	DRAWING STANDARDS REVISIONS	JAN 06



NOTE:
LOCATE CONCRETE COLLAR AS SHOWN IN RELATION TO TRAFFIC DIRECTION WHERE POSSIBLE.

CONCRETE COLLAR



SECTION A-A

NOTE:

1. MINIMUM OF 12" (300mm) DEPTH CONCRETE ENCASEMENT AROUND MANHOLE CASTINGS OR 6" (150mm) BELOW BOTTOM OF ADJUSTING RING, WHICHEVER IS GREATER.
2. ADJUST MANHOLE UPWARD WITH ADJUSTING RINGS UNDER FRAME. ADJUST MANHOLE DOWNWARD BY REMOVING A PORTION OF THE MANHOLE RISER AND REBUILDING TO PROPER DIAMETER.
3. SLOPE MANHOLE RING AS REQUIRED TO MATCH LONGITUDINAL AND TRANSVERSE GRADE ON STREET.
4. FINAL MANHOLE ADJUSTMENT WILL BE MADE AFTER PAVING AND BEFORE SEAL COATING.
5. NO PAYMENT SHALL BE MADE FOR ADJUSTMENT OF NEW MANHOLES TO FINAL GRADE.
6. FRAME AND COVER TO BE D & L SUPPLY A-1040, DETTER FOUNDRY 1257, NEENAH 1726-A OR APPROVED EQUAL.

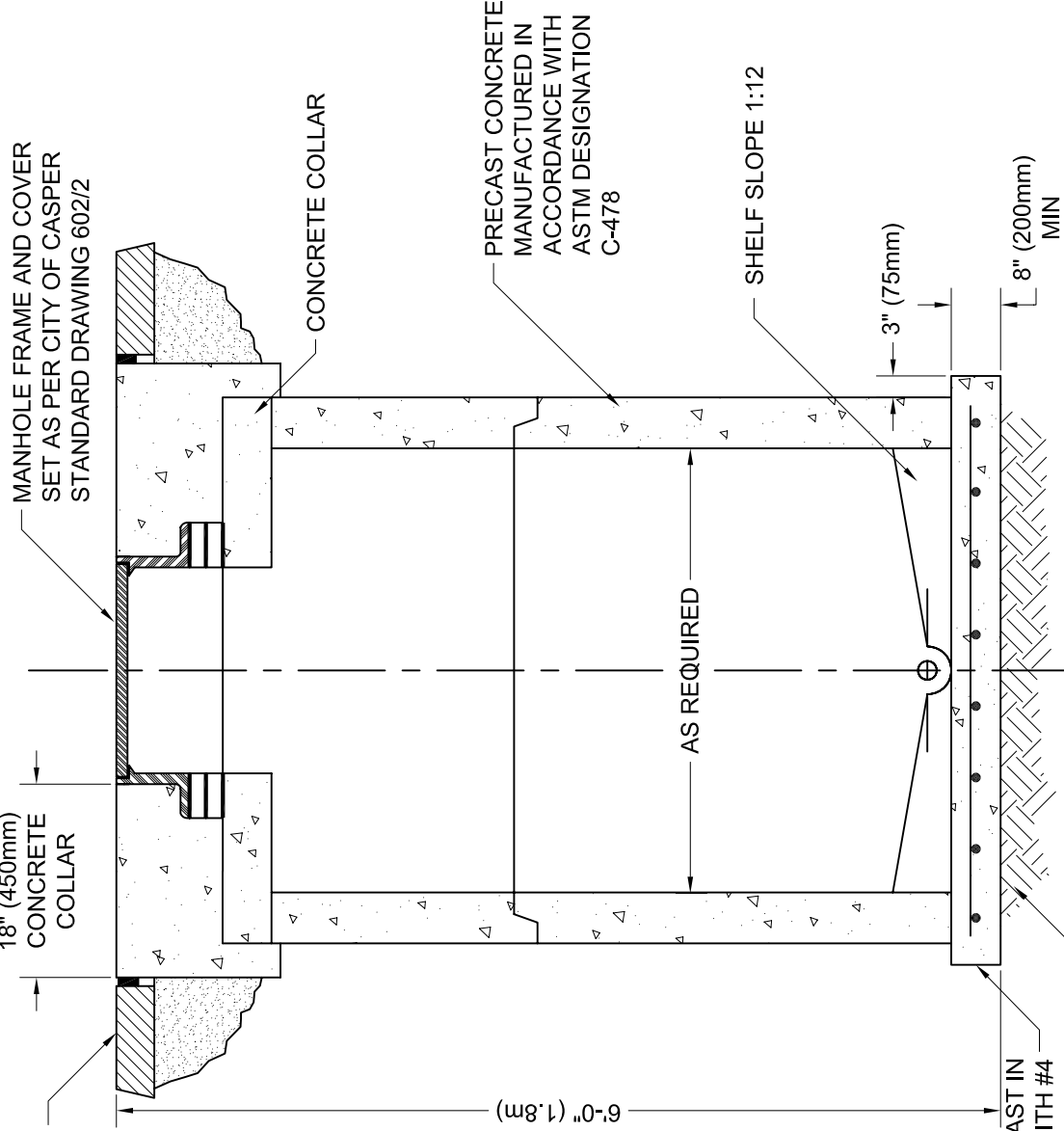
MANHOLE FRAME & COVER AND GRADE ADJUSTMENT DETAIL

NOT TO SCALE

*CITY OF CASPER
ENGINEERING DIVISION*

MANHOLE FRAME & COVER AND GRADE ADJUSTMENT DETAIL

		602
		2
REV.	DESCRIPTION	DATE
1	REDRAFTED ONTO COMPUTER-Z.T.L.	3/19/01
2	DRAWING STANDARDS REVISIONS	JAN 06



NOTES:

1. MANHOLES SHALL BE PLUMB.
2. SEAL ALL JOINTS AND UNDERNEATH RING AND ALL RISERS.
3. FLOOR TROUGHS ARE NEEDED FOR ALL INCOMING SEWERS; A LARGER DIAMETER MANHOLE MAY BE NEEDED IN ORDER TO PROPERLY CONSTRUCT THE TROUGHS WHEN THE INCOMING SEWER INVERTS ARE SUBSTANTIALLY HIGHER THAN THE OUTGOING SEWER INVERT. PROVIDE A MINIMUM OF .1 FT DROP FROM INLET TO OUTLET.
4. NO MANHOLE STEPS ALLOWED.
5. MANHOLES WITH THE BASE POURED MONOLITHICALLY WITH THE BOTTOM BARREL ARE ALSO ACCEPTABLE.
6. SEAL JOINTS WATER TIGHT WITH APPROVED MATERIAL. GROUT HOISTING HOLES WATER TIGHT WITH NON-METALLIC NON-SHRINK GROUT. INVERTS SHALL BE U-SHAPED TO THE I.D. PIPE DIAMETER POINT (PIPE CROWN).
7. THE ENGINEER SHALL DETERMINE THE MANHOLE SIZE BASED ON THE ANGLE, NUMBER AND SIZE OF PIPE PENETRATIONS. THE MINIMUM DISTANCE BETWEEN KNOCKOUTS IS 12" (300mm).

CITY OF CASPER ENGINEERING DIVISION	
STANDARD STRAIGHT MANHOLE FOR DEPTHS OF 6'-0" OR LESS	
602	3
REV.	DESCRIPTION
1	REDRAFTED ONTO COMPUTER - Z.T.L.
2	FRAME & COVER CHANGES - Z.T.L.
3	DRAWING STANDARDS REVISIONS
	DATE
	4/11/01
	2/25/03
	JAN 06

CONCRETE TO BE PLACED ON UNDISTURBED SOIL

**STANDARD STRAIGHT MANHOLE
FOR DEPTHS OF 6'-0" OR LESS**

NOT TO SCALE

INSTALL 6" (150mm) OF FOUNDATION MATERIAL OR GEOTEXTILE FABRIC WHEN SOFT SUBGRADE IS ENCOUNTERED

PRECAST OR CAST IN PLACE BASE WITH #4 REBAR @ 8" (200mm) ON CENTER EACH WAY

AS REQUIRED

SHELF SLOPE 1:12

8" (200mm) MIN

3" (75mm)

PRECAST CONCRETE MANUFACTURED IN ACCORDANCE WITH ASTM DESIGNATION C-478

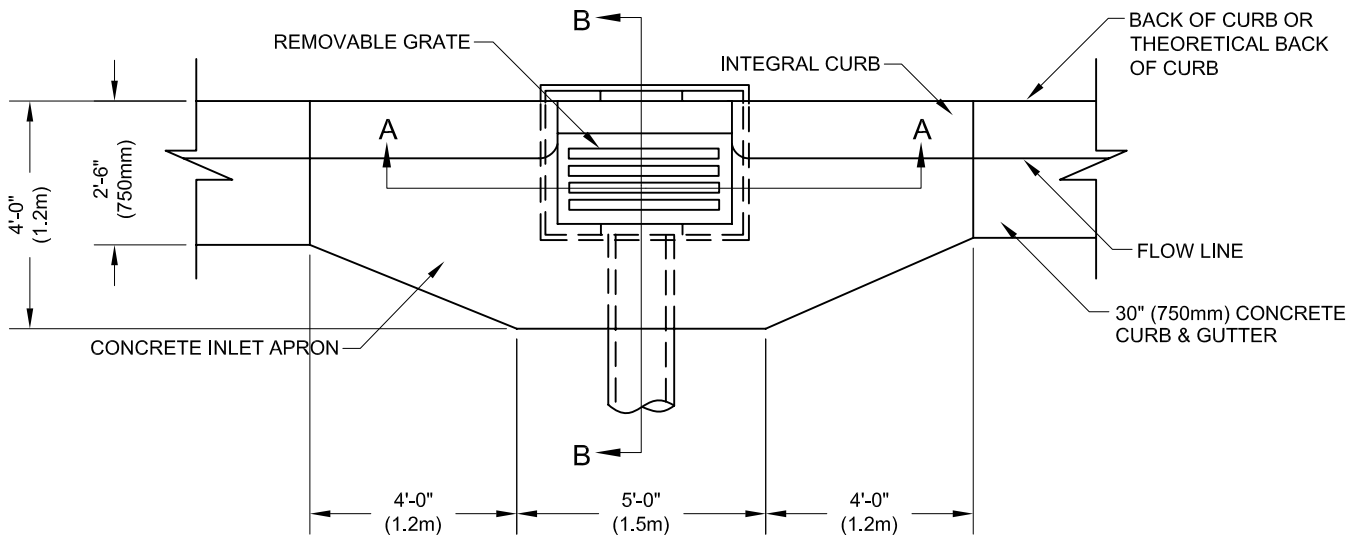
CONCRETE COLLAR

MANHOLE FRAME AND COVER SET AS PER CITY OF CASPER STANDARD DRAWING 602/2

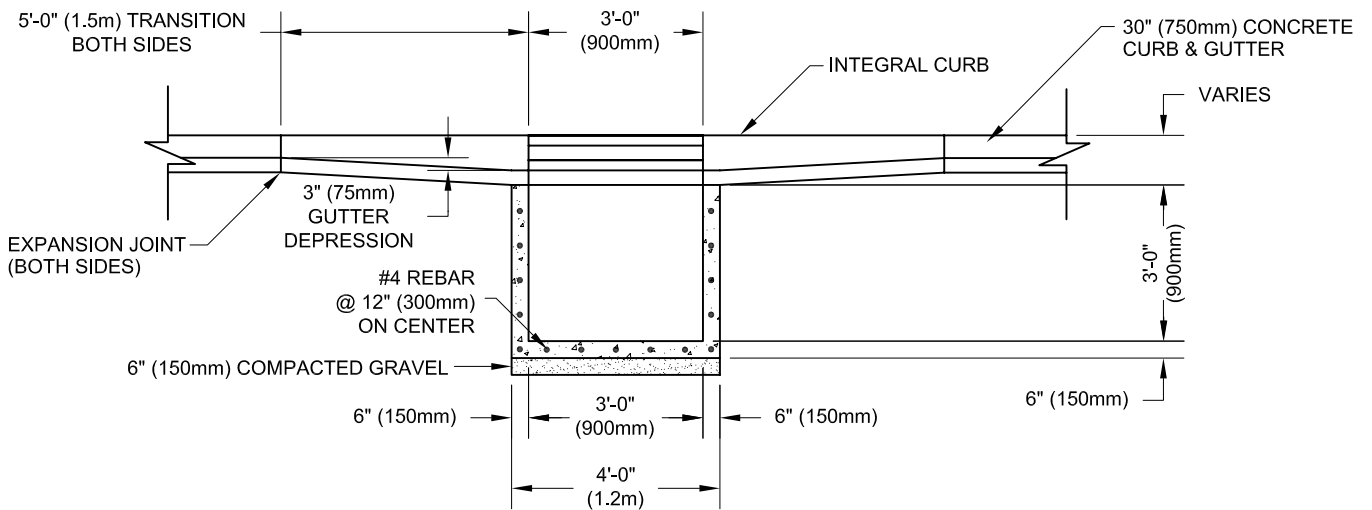
18" (450mm) CONCRETE COLLAR

ASPHALT

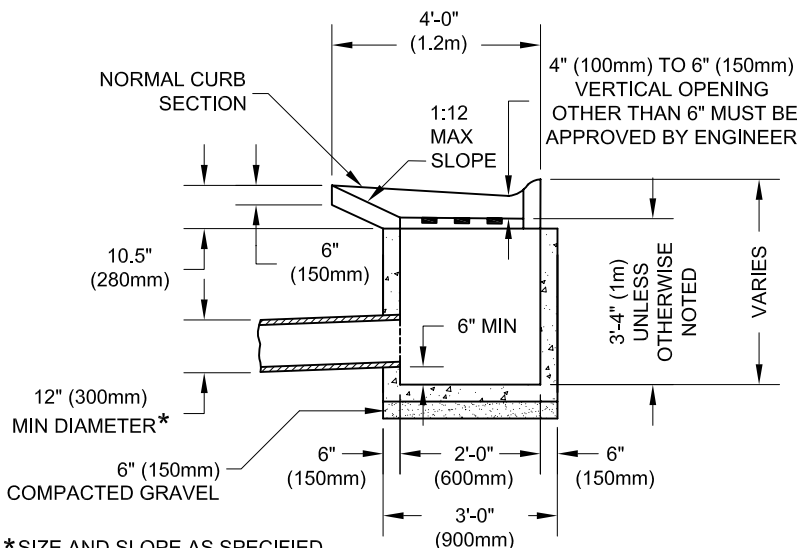
6'-0" (1.8m)



PLAN VIEW



SECTION A-A



*SIZE AND SLOPE AS SPECIFIED ON CONSTRUCTION DRAWINGS

SECTION B-B

STANDARD CATCH BASIN DETAIL

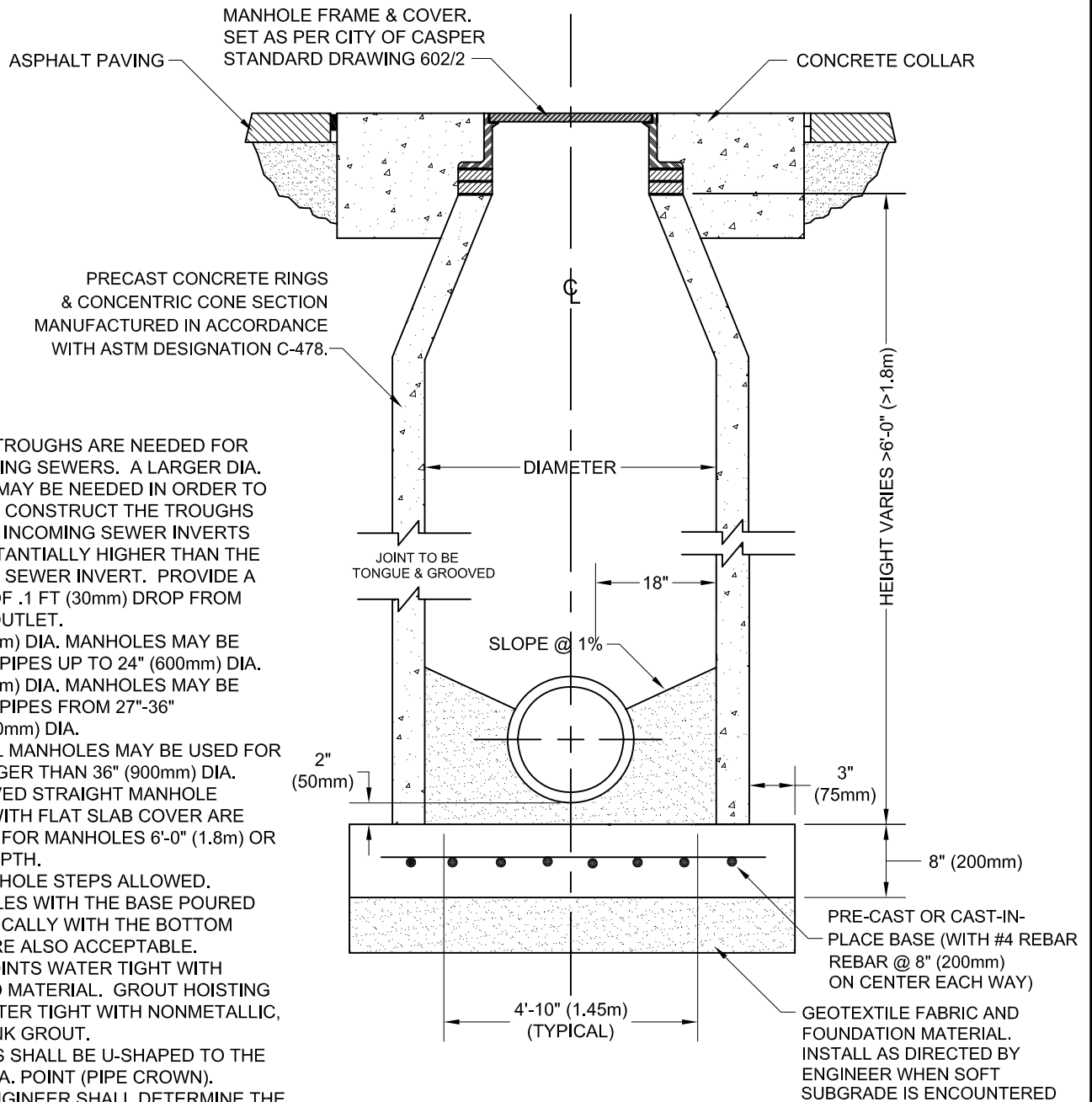
NOT TO SCALE

*CITY OF CASPER
ENGINEERING DIVISION*

STANDARD CATCH BASIN DETAILS

602
4

REV.	DESCRIPTION	DATE
1	REDRAFTED ONTO COMPUTER- Z.T.L.	3/21/01
2	DRAWING STANDARDS REVISIONS	JAN 06



NOTES:

1. FLOOR TROUGHS ARE NEEDED FOR ALL INCOMING SEWERS. A LARGER DIA. MANHOLE MAY BE NEEDED IN ORDER TO PROPERLY CONSTRUCT THE TROUGHS WHEN THE INCOMING SEWER INVERTS ARE SUBSTANTIALLY HIGHER THAN THE OUTGOING SEWER INVERT. PROVIDE A MINIMUM OF .1 FT (30mm) DROP FROM INLET TO OUTLET.
2. 4'-0" (1.2m) DIA. MANHOLES MAY BE USED FOR PIPES UP TO 24" (600mm) DIA.
3. 5'-0" (1.5m) DIA. MANHOLES MAY BE USED FOR PIPES FROM 27"-36" (675mm-900mm) DIA.
4. SPECIAL MANHOLES MAY BE USED FOR PIPES LARGER THAN 36" (900mm) DIA.
5. APPROVED STRAIGHT MANHOLE SECTION WITH FLAT SLAB COVER ARE REQUIRED FOR MANHOLES 6'-0" (1.8m) OR LESS IN DEPTH.
6. NO MANHOLE STEPS ALLOWED.
7. MANHOLES WITH THE BASE POURED MONOLITHICALLY WITH THE BOTTOM BARREL ARE ALSO ACCEPTABLE.
8. SEAL JOINTS WATER TIGHT WITH APPROVED MATERIAL. GROUT HOISTING HOLES WATER TIGHT WITH NONMETALLIC, NON-SHRINK GROUT.
9. INVERTS SHALL BE U-SHAPED TO THE I.D. PIPE DIA. POINT (PIPE CROWN).
10. THE ENGINEER SHALL DETERMINE THE MANHOLE SIZE BASED ON THE ANGLE, NUMBER AND SIZE OF PIPE PENETRATIONS. THE MINIMUM DISTANCE BETWEEN KNOCKOUTS IS 12" (300mm).

**STANDARD STORM
SEWER MANHOLE DETAIL**
(FOR MANHOLE DEPTH ≥6' BASE TO LID)
NOT TO SCALE

*CITY OF CASPER
ENGINEERING DIVISION*

**STANDARD STORM
SEWER MANHOLE DETAIL**

FOR MANHOLE DEPTH ≥6'
BASE TO LID

**602
5**

REV.	DESCRIPTION	DATE
1	REDRAFTED ONTO COMPUTER- Z.T.L.	3/23/01
2	DRAWING STANDARDS REVISIONS	JAN 06