METER VAULT INSTALLATION NOTES:

1. PIPE, METER SIZE AND VAULT SHALL BE APPROVED BY THE WATER UTILITIES DEPARTMENT DURING REVIEW PROCESS.

2. PREFABRICATED OR POURED IN PLACE VAULTS SHALL HAVE PRE CAST–CLASS H OR POURED–CLASS S CONCRETE, REINFORCED WITH MINIMUM #4 O.C.E.W.

3. METER VAULT MUST BE LOCATED BEHIND CURB AND/OR WALK AND OUT OF VEHICLE/PEDESTRIAN TRAFFIC, IN THE WATER UTILITY EASEMENT OR DEDICATED EASEMENT. METER VAULT TO BE PLACED IN A PROTECTED GRASSY AREA.

4. MAINLINE AND BYPASS VALVES WILL BE RESILIENT SEAT TYPE WITH CORROSION RESISTANT FUSION BONDED EPOXY COATING INSIDE AND OUT, NON–RISING STEM. ALL VALVES IN THE VAULT WILL HAVE HANDWHEELS. CUSTOMER VALVES SHALL BE LOCATED OUTSIDE OF VAULT AND EASEMENTS. ALL VALVES SHALL BE RIGHT–HAND TURN CLOSE.

5. ALL METERS SHALL BE EQUIPPED WITH ENCODER REGISTERS AND HAVE TOUCH PADS INSTALLED ON THE LID FOR READING PURPOSES. ALL METERS SHALL BE INSTALLED WITH STRAINERS ON THE INLET SIDE OF THE METER.

6. HATCH OPENING WILL BE ¾" ALUMINUM DIAMOND PLATE COVER WITH EXTRUDED ALUMINUM FRAME. HATCH TO BE FURNISHED WITH TYPE 316 STAINLESS STEEL SNAP AND LOCK WITH BRASS HINGES.

7. ALL VAULTS OVER 4 FT. IN DEPTH SHALL HAVE A LADDER INSTALLED AND SECURED TO THE VAULT WALL AT HATCH ENTRY.

8. VAULT BEDDING SHALL BE GRADE 4 STANDARD CRUSHED AGGREGATE, 1 IN. SIEVE.

9. THE TOP OF METER VAULT SHALL BE SET AT AN ELEVATION SUCH THAT THE SURROUNDING GROUND SLOPES AWAY FROM THE VAULT.

10. FOR 3" METERS AND ABOVE ON PROJECTS ON WHICH THE CITY INSTALLS THE TAP IN THE MAINLINE AND STUBS OUT THE SERVICE LINE TO THE BACK OF CURB, THE CONTRACTOR IS RESPONSIBLE FOR INSTALLATION OF ALL REMAINING PIPING FROM THE STUBOUT BEHIND THE CURB THROUGH THE VAULT.

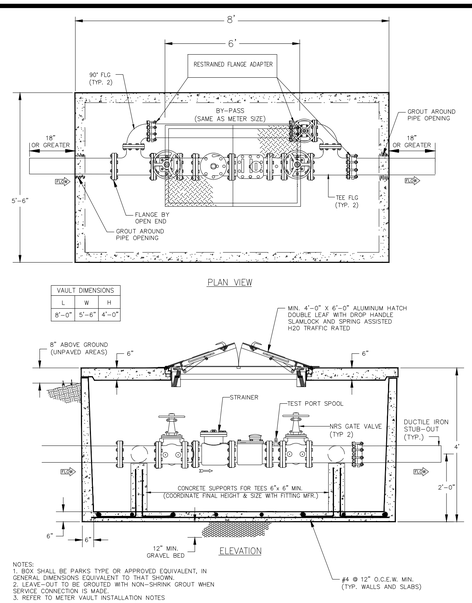
11. FOR WATER METER VAULT INSTALLATIONS WHERE THE METER IS NOT EQUIPPED WITH AN INTEGRAL TEST PORT, A SEPARATE SPOOL PIECE WILL BE PROVIDED BETWEEN THE METER AND THE DOWNSTREAM GATE VALVE. THE SPOOL PIECE WILL BE EQUIPPED WITH A TEST PORT AND THREADED BRASS PLUG SIZED PER THE MANUFACTURER'S REQUIREMENTS OR AS FOLLOWS:

12. WHERE NOT SPECIFICALLY NOTED, ALL FLANGED PIPE SHALL BE DUCTILE IRON PIPE WITH DUCTILE IRON FLANGES THREADED ON.

METER SIZE	TEST PORT
3"	1½"
4"	1½"
6"	2"
>8"	3"

WATER VAULT INSTALLATION NOTES

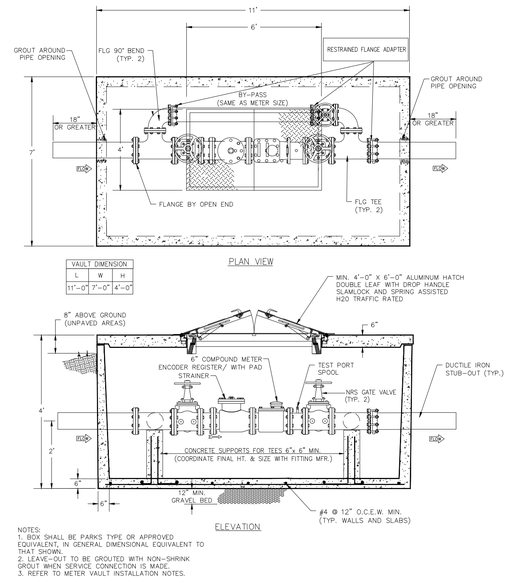
W100



NOTES:
1. BOX SHALL BE PARKS TYPE OR APPROVED EQUIVALENT, IN GENERAL DIMENSIONS EQUIVALENT TO THAT SHOWN.
2. LEAVE–OUT TO BE GROUTED WITH NON–SHRINK GROUT WHEN SERVICE CONNECTION IS MADE.
3. REFER TO METER VAULT INSTALLATION NOTES

3" AND 4" METER VAULTS

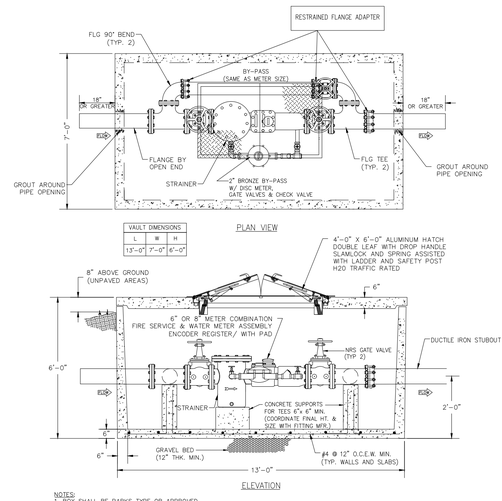
W101



NOTES:
1. BOX SHALL BE PARKS TYPE OR APPROVED EQUIVALENT, IN GENERAL DIMENSIONAL EQUIVALENT TO THAT SHOWN.
2. LEAVE–OUT TO BE GROUTED WITH NON–SHRINK GROUT WHEN SERVICE CONNECTION IS MADE.
3. REFER TO METER VAULT INSTALLATION NOTES.

6" METER VAULT

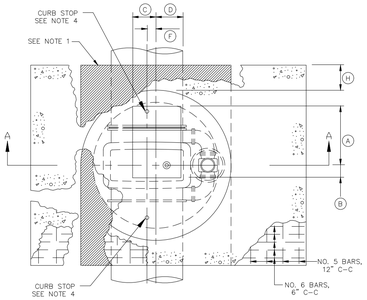
W102



NOTES:
1. BOX SHALL BE PARKS TYPE OR APPROVED EQUIVALENT, IN GENERAL DIMENSIONAL EQUIVALENT TO THAT SHOWN.
2. LEAVE–OUT TO BE GROUTED WITH NON–SHRINK GROUT WHEN SERVICE CONNECTION IS MADE.
3. REFER TO METER VAULT INSTALLATION NOTES

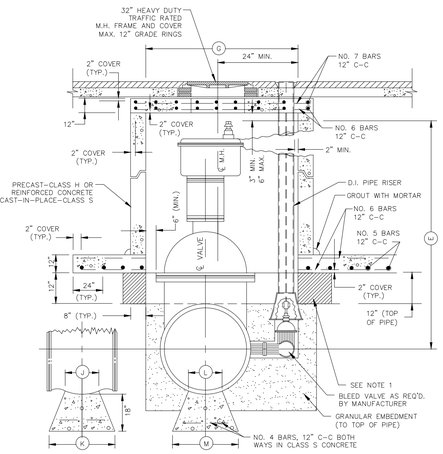
6" AND 8" FIRE SERVICE METER VAULTS

W103



GATE VALVE SIZE	DIMENSION TABLE											
	A	B	C	D	E	F	G	H	J	K	L	M
16"	20"	20"	12"	12"	44 1/2"	1"	48"	12"	10"	24"	12"	16"
18"	20"	20"	12"	12"	51 3/8"	2"	48"	12"	12"	24"	12"	18"
20"	22"	18"	12"	12"	56 5/8"	1"	54"	12"	12"	24"	16"	20"
24"	26"	14"	12"	12"	64 3/8"	1"	60"	18"	14"	30"	18"	24"
30"	28"	12"	12"	12"	80 5/8"	3"	66"	18"	18"	30"	20"	30"

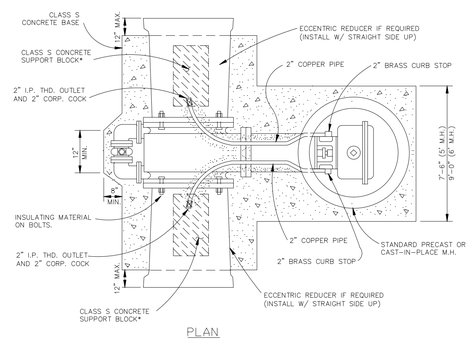
NOTES:
1. POLYURETHANE CUSHION PAD.
2. FOR 24" AND LARGER VALVES, PROVIDE SPUR GEAR AND VAULT.
3. FOR 30" AND LARGER VALVES, PROVIDE AND INTEGRALLY CAST BYPASS.
4. PROVED 2" CORPORATION AND CURB STOPS A MAX. OF 12" FROM EACH END OF GATE VALVE.

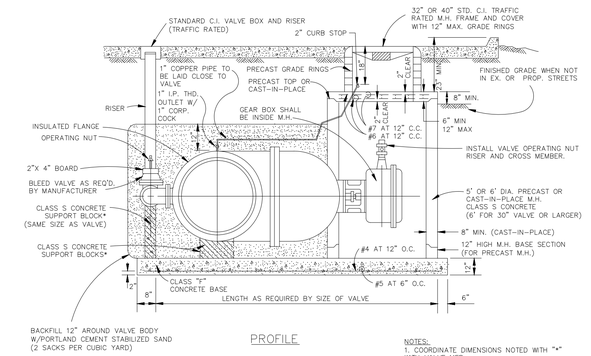


VAULT CONSTRUCTION VERTICAL GATE VALVE 24" AND LARGER

W104

W105





NOTES:
1. COORDINATE DIMENSIONS NOTED WITH "*" WITH VALVE MFR.
2. FOR 24" AND LARGER VALVES, PROVIDE SPUR GEAR AND VAULT.
3. FOR 30" AND LARGER VALVES, PROVIDE AND INTEGRALLY CAST BYPASS.

VAULT CONSTRUCTION HORIZONTAL GATE VALVE 24" AND LARGER

W106A

W106B

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CITY OF DENTON
ENGINEERING SERVICES

STANDARD DETAILS

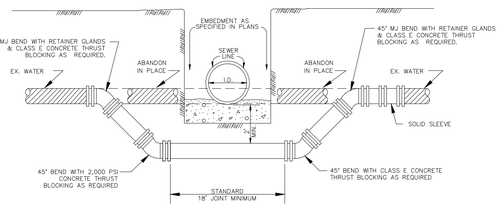
WATER DETAILS

DATE
JAN. 2021

SHEET No.
1 OF 20

SCALE
HOR 1"= N.T.S.
VER 1"= N/A

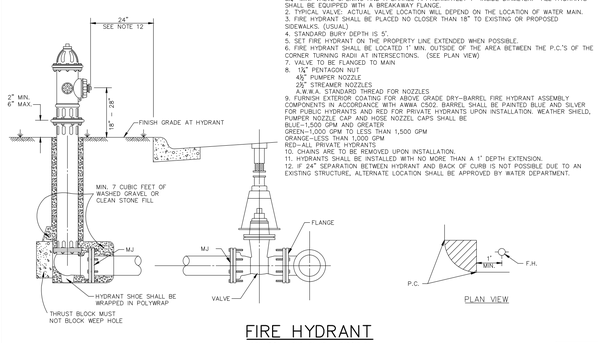
CERTIFICATION:
THIS CITY OF DENTON STANDARD DETAIL SHEET IS AUTHORIZED FOR USE IN THIS PROJECT BY THE ENGINEER WHOSE SEAL APPEARS HEREON, AND WHO CERTIFIES THE CONTENT OF THE DETAILS AND NOTES HEREIN HAVE NOT BEEN ALTERED AND ASSUMES RESPONSIBILITY FOR APPROPRIATE USE OF THE STANDARDS WITHIN THIS SHEET.



NOTES:
1. ONE SEGMENT OF THE WASTEWATER LINE SHALL BE CENTERED OVER THE WATER LINE SUCH THAT THE JOINTS OF THE WASTEWATER LINE ARE EQUIDISTANT AND AT LEAST NINE FEET HORIZONTALLY FROM THE CENTERLINE OF THE WATER LINE.
2. WATER AND WASTEWATER LINES MUST PASS A PRESSURE AND LEAKAGE TEST AS SPECIFIED IN AWWA C600 STANDARDS.

ABANDONING & LOWERING EXISTING WATER MAIN AT CROSSING

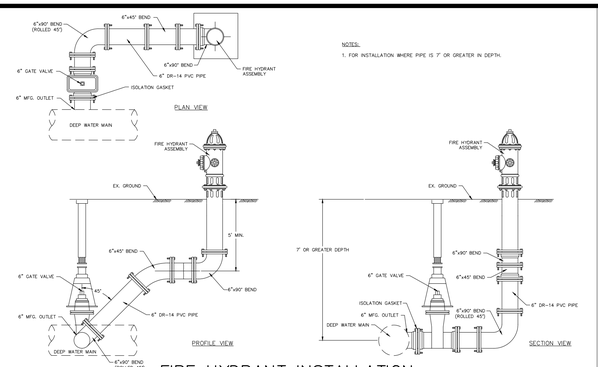
W301



NOTES:
1. IN GENERAL, ALL FIRE HYDRANTS SHALL CONFORM TO A.W.W.A. STANDARD SPECIFICATIONS FOR FIRE HYDRANTS FOR ORDINARY WATER WORKS SERVICE, C-502. FIRE HYDRANTS SHALL HAVE A 5¼" MIN. VALVE OPENING AND A BARREL APPROXIMATELY 7" INSIDE DIAMETER. ALL HYDRANTS SHALL BE EQUIPPED WITH A BREAKAWAY FLANGE.
2. TYPICAL VALVE: ACTUAL VALVE LOCATION WILL DEPEND ON THE LOCATION OF WATER MAIN.
3. FIRE HYDRANT SHALL BE PLACED NO CLOSER THAN 18" TO EXISTING OR PROPOSED SIDEWALKS. (USUAL)
4. STANDARD BURY DEPTH IS 5'.
5. SET FIRE HYDRANT ON THE PROPERTY LINE EXTENDED WHEN POSSIBLE.
6. FIRE HYDRANT SHALL BE LOCATED 1' MIN. OUTSIDE OF THE AREA BETWEEN THE P.C.'S OF THE CORNER TURNING RADII AT INTERSECTIONS. (SEE PLAN VIEW)
7. VALVE TO BE FLANGED TO MAIN
8. 1¾" PENTAGON NUT
   4½" PUMPER NOZZLE
   2½" STREAMER NOZZLES
   A.W.W.A. STANDARD THREAD FOR NOZZLES
9. FURNISH EXTERIOR COATING FOR ABOVE GRADE DRY-BARREL FIRE HYDRANT ASSEMBLY. COMPONENTS IN ACCORDANCE WITH AWWA C502. BARREL SHALL BE PAINTED BLUE AND SILVER FOR PUBLIC HYDRANTS AND RED FOR PRIVATE HYDRANTS UPON INSTALLATION. WEATHER SHIELD, PUMPER NOZZLE CAP AND HOSE NOZZEL CAPS SHALL BE
   BLUE-1,500 GPM AND GREATER
   GREEN-1,000 GPM TO LESS THAN 1,500 GPM
   ORANGE-LESS THAN 1,000 GPM
   RED-ALL PRIVATE HYDRANTS
10. CHAINS ARE TO BE REMOVED UPON INSTALLATION.
11. HYDRANTS SHALL BE INSTALLED WITH NO MORE THAN A 1" DEPTH EXTENSION.
12. IF 24" SEPARATION BETWEEN HYDRANT AND BACK OF CURB IS NOT POSSIBLE DUE TO AN EXISTING STRUCTURE, ALTERNATE LOCATION SHALL BE APPROVED BY WATER DEPARTMENT.

FIRE HYDRANT INSTALLATION

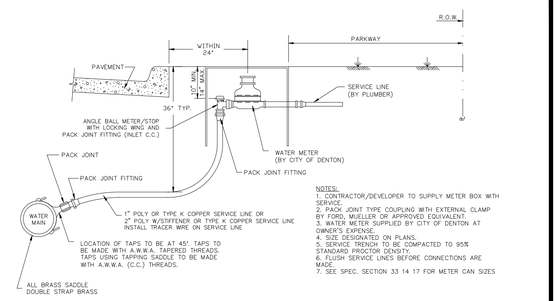
W401A



NOTES:
1. FOR INSTALLATION WHERE PIPE IS 7' OR GREATER IN DEPTH.

FIRE HYDRANT INSTALLATION SWIVEL/DEEP MAIN INSTALLATION

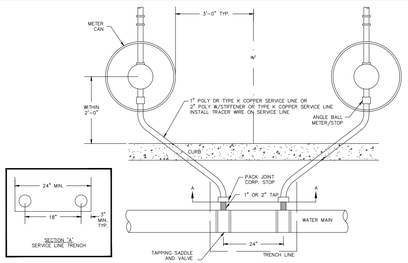
W401B

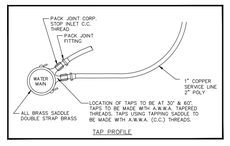


NOTES:
1. CONTRACTOR/DEVELOPER TO SUPPLY METER BOX WITH SERVICE.
2. PACK JOINT TYPE COUPLING WITH EXTERNAL CLAMP BY FORD, MUELLER OR APPROVED EQUIVALENT.
3. WATER METER SUPPLIED BY CITY OF DENTON AT OWNER'S EXPENSE.
4. SIZE DESIGNATED ON PLANS.
5. SERVICE TRENCH TO BE COMPACTED TO 95% STANDARD PROCTOR DENSITY.
6. FLUSH SERVICE LINES BEFORE CONNECTIONS ARE MADE.
7. SEE SPEC. SECTION 33 14 17 FOR METER CAN SIZES

TYPICAL WATER SERVICE CONNECTION

W501A



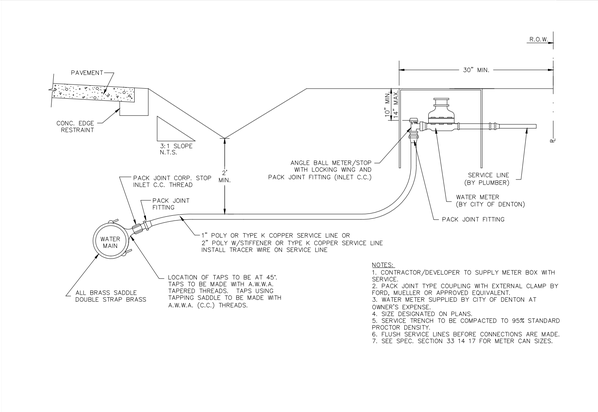


NOTES:
1. THIS ALTERNATIVE DESIGN IS ONLY FOR CERTAIN FIELD SITUATIONS AND IS ONLY ALLOWABLE WITH CITY APPROVAL.
2. MINIMUM TRENCH WIDTH IS 24" WITH MINIMUM CENTERLINE TO CENTERLINE SPACING OF 12" MIN. AND 18" MAX.
3. ALTERNATE METHOD – TWO SEPARATE TRENCHES SPACED 18" OR MORE TO MATCH EXISTING LOT LINES.
4. NO SERVICES ALLOWED IN CONCRETE.
5. SERVICE LINES SHALL HAVE ALL BRASS FITTINGS.
6. WATER METER SUPPLIED BY CITY OF DENTON AT OWNER'S EXPENSE.
7. CONTRACTOR/DEVELOPER TO SUPPLY METER BOX WITH SERVICE.
8. SIZE DESIGNATED ON PLANS.
9. METERS ARE TO BE SET 3' FROM THE SIDE PROPERTY LINE.
10. USE OF DUAL SERVICE TO BE APPROVED ON CASE BY CASE BASIS BY THE DIRECTOR OF WATER UTILITIES. NORMALLY ONLY FOR SUBDIVISIONS WITH LOTS 50' WIDE OR LESS.
11. SERVICE TRENCH TO BE COMPACTED TO 95% STANDARD PROCTOR DENSITY.
12. PACK JOINT TYPE COUPLING WITH EXTERNAL CLAMP BY FORD, MUELLER OR APPROVED EQUIVALENT.
13. FLUSH SERVICE LINES BEFORE CONNECTIONS ARE MADE.
14. SEE SPEC. SECTION 33 14 17 FOR METER CAN SIZES.

DUAL WATER SERVICE CONNECTION WITH 1" INSTALLATION

*** WITH CITY APPROVAL ONLY**

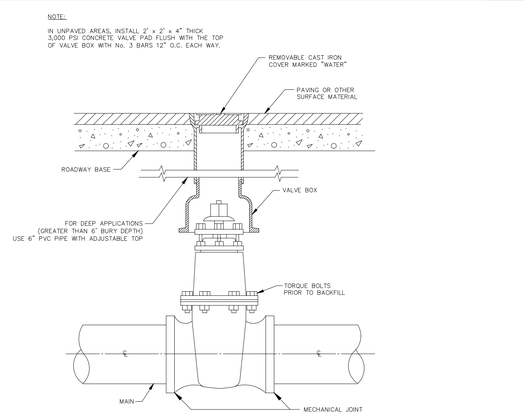
W501B



NOTES:
1. CONTRACTOR/DEVELOPER TO SUPPLY METER BOX WITH SERVICE.
2. PACK JOINT TYPE COUPLING WITH EXTERNAL CLAMP BY FORD, MUELLER OR APPROVED EQUIVALENT.
3. WATER METER SUPPLIED BY CITY OF DENTON AT OWNER'S EXPENSE.
4. SIZE DESIGNATED ON PLANS.
5. SERVICE TRENCH TO BE COMPACTED TO 95% STANDARD PROCTOR DENSITY.
6. FLUSH SERVICE LINES BEFORE CONNECTIONS ARE MADE.
7. SEE SPEC. SECTION 33 14 17 FOR METER CAN SIZES.

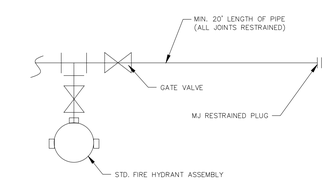
RURAL/SUBURBAN WATER SERVICE CONNECTION

W501C



DIRECT BURY GATE VALVE (4" TO 20") BOX

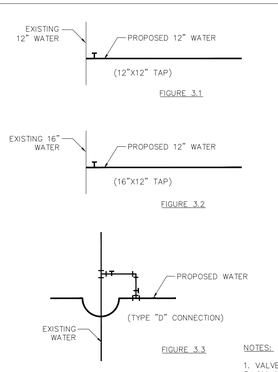
W601



NOTES:
1. LAST WATER SERVICE TAP SHALL BE UPSTREAM OF FIRE HYDRANT ASSEMBLY.
2. ALL WATER MAINS SHALL HAVE TRACER WIRE

WATER MAIN TERMINATION ASSEMBLY

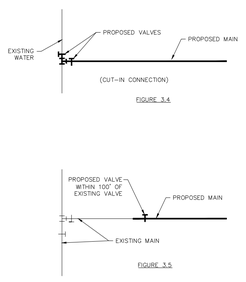
W603



NOTES:
1. VALVES ON TEES SHALL BE FLANGED.
2. ALL WATER MAINS SHALL HAVE TRACER WIRE.

TYPICAL TAPPING SLEEVE AND VALVE AND "D" CONNECTION

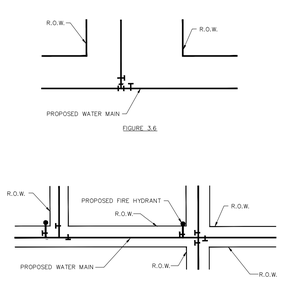
PIAZ13



NOTES:
1. VALVE ON TEE SHALL BE FLANGED.
2. ALL WATER MAINS SHALL HAVE TRACER WIRE.

TYPICAL CUT-IN CONNECTIONS

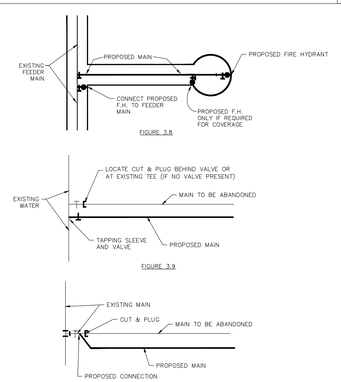
PIAZ14



NOTES:
1. VALVES ON TEES SHALL BE FLANGED.
2. ALL WATER MAINS SHALL HAVE TRACER WIRE.

TYPICAL VALVE PLACEMENT

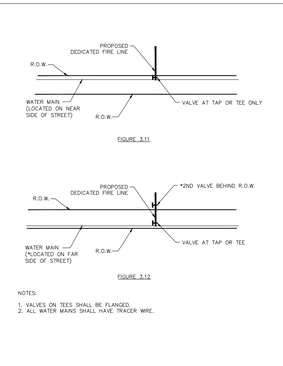
PIAZ15



NOTE:
ALL WATER MAINS SHALL HAVE TRACER WIRE.

TYPICAL LINE REPLACEMENT OR EXTENSION

PIAZ16



NOTES:
1. VALVES ON TEES SHALL BE FLANGED.
2. ALL WATER MAINS SHALL HAVE TRACER WIRE.

DEDICATED FIRE LINE CONNECTION AND VALVE PLACEMENT

PIAZ17

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CITY OF DENTON
ENGINEERING SERVICES

STANDARD DETAILS

WATER DETAILS

DATE
JAN. 2021

SHEET No.
2 OF 20

SCALE
HOR 1"= N.T.S.
VER 1"= N/A

CERTIFICATION:
THIS CITY OF DENTON STANDARD DETAIL SHEET IS AUTHORIZED FOR USE IN THIS PROJECT BY THE ENGINEER WHOSE SEAL APPEARS HEREON, AND WHO CERTIFIES THE CONTENT OF THE DETAILS AND NOTES HEREIN HAVE NOT BEEN ALTERED AND ASSUMES RESPONSIBILITY FOR APPROPRIATE USE OF THE STANDARDS WITHIN THIS SHEET.

GENERAL NOTES FOR ALL THRUST BLOCKS:

1. RESTRAINED JOINTS SHALL BE REQUIRED FOR ALL WATER MAINS 16" AND LARGER. JOINT RESTRAINT SHALL BE DESIGNED TO ACCOMMODATE THE ENTIRE DESIGN LOAD AS INDICATED IN THE APPLICABLE PIPE MATERIAL SPECIFICATION. THRUST BLOCKING SHALL BE PROVIDED ON ALL FITTINGS AND DEAD-ENDS FOR PIPE 24" AND SMALLER.

2. CONCRETE FOR BLOCKING SHALL BE CLASS B.

3. ALL CALCULATIONS ARE BASED ON INTERNAL PRESSURE OF 200 PSI FOR DUCTILE IRON, P.V.C., AND 150 PSI FOR CONCRETE PIPE.

4. VOLUMES OF THRUST BLOCKS ARE NET VOLUMES OF CONCRETE TO BE FURNISHED. THE CORRESPONDING WEIGHT OF THE CONCRETE (CLASS B) IS EQUAL TO OR GREATER THAN THE VERTICAL COMPONENT OF THE THRUST ON THE VERTICAL BEND.

5. WALL THICKNESS (T) ASSUMED HERE FOR ESTIMATING PURPOSES ONLY.

6. THE SOIL BEARING PRESSURES ARE BASED ON 1,000 LBS./S.F. IN SOIL AND 2,000 LBS./S.F. IN ROCK.

7. POUR CONCRETE FOR BLOCK AGAINST UNDISTURBED EARTH.

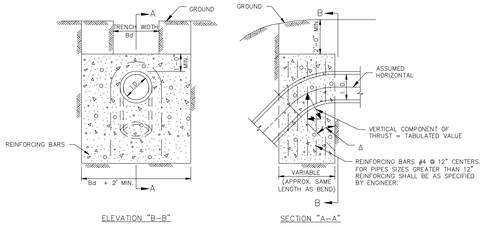
8. DIMENSIONS MAY BE VARIED AS REQUIRED BY FIELD CONDITIONS AND AS DIRECTED BY THE CITY. THE VOLUME OF CONCRETE BLOCKING SHALL NOT BE LESS THAN SHOWN HERE.

9. USE POLYETHYLENE WRAP OR EQUAL AS BOND BREAKER BETWEEN CONCRETE AND BEND, TEE, OR PLUG.

10. CONCRETE SHALL NOT EXTEND BEYOND JOINTS.

THRUST BLOCK GENERAL NOTES

W700



ELEVATION "B-B"

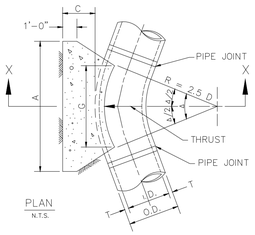
SECTION "A-A"

NOTES:
1. EXTEND CONCRETE THRUST BLOCK HORIZONTALLY INTO UNDISTURBED SOIL 2' MIN. ON EACH SIDE.
2. HORIZONTAL EXTENSION OF THRUST BLOCK MAY REQUIRE ADDITIONAL STEEL REINFORCEMENT. DETERMINATION TO BE MADE BY CITY ENGINEERING STAFF.

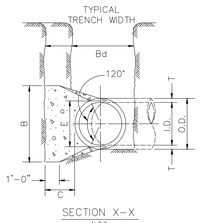
Δ → I.D. (IN.)	11.25° THRUST (TONS)	11.25° VOL. (C.Y.)	22.50° THRUST (TONS)	22.50° VOL. (C.Y.)	30° THRUST (TONS)	30° VOL. (C.Y.)	45° THRUST (TONS)	45° VOL. (C.Y.)	67.50° THRUST (TONS)	67.50° VOL. (C.Y.)	90° THRUST (TONS)	90° VOL. (C.Y.)	← Δ I.D. (IN.)
4,6,8	1.0	0.5	2.0	1.0	2.5	1.3	3.6	1.8	4.6	2.3	5.0	2.5	4,6,8
10,12	2.2	1.1	4.3	2.2	5.7	2.8	8.0	4.0	10.5	5.2	11.3	5.7	10,12
16,18	5.0	2.5	9.7	4.9	12.7	6.4	18.0	9.0	23.5	11.8	25.5	12.7	16,18
20	6.1	3.1	12.0	6.0	15.7	7.9	22.2	11.1	29.2	14.5	31.4	15.7	20
24	8.2	4.4	17.3	8.7	22.6	11.3	32.0	16.0	41.8	20.9	45.2	22.6	24

VERTICAL THRUST BLOCK AT PIPE BEND

W701



PLAN
N.T.S.



SECTION X-X
N.T.S.

I.D. (IN.)	T (IN.)	Δ = 11.25° (FT.)	Δ = 22.50° (FT.)	E (FT.)
4,6,8	0.4	1.5	1.5	0.9
10,12	0.5	1.5	1.5	1.2
16,18	0.6	1.5	1.5	1.6
20	0.7	1.5	1.5	1.8
24	0.9	1.5	1.5	2.1

TABLES OF DIMENSIONS AND QUANTITIES

	Δ = 11.25°								Δ= 22.50°							
			EARTH			ROCK					EARTH			ROCK		
I.D. (IN.)	G (FT.)	THRUST (TONS)	A (FT.)	B (FT.)	VOL. (C.Y.)	A (FT.)	B (FT.)	VOL. (C.Y.)	I.D. (IN.)	G (FT.)	THRUST (TONS)	A (FT.)	B (FT.)	VOL. (C.Y.)	A (FT.)	B (FT.)	VOL. (C.Y.)
4,6,8	0.4	1.0	1.0	1.5	0.1	1.0	1.0	0.1	4,6,8	0.8	2.0	1.5	1.5	0.1	1.0	1.0	0.1
10,12	0.6	2.2	1.5	1.5	0.1	1.0	1.5	0.1	10,12	1.1	4.4	2.0	2.5	0.3	1.5	1.5	0.1
16,18	0.8	5.0	2.0	2.5	0.3	1.5	2.0	0.2	16,18	1.6	9.9	3.0	3.5	0.6	2.0	2.5	0.3
20	0.9	6.2	2.0	3.5	0.4	1.5	3.0	0.3	20	1.8	12.3	3.5	3.5	0.7	2.0	3.0	0.4
24	1.1	8.9	3.0	3.5	0.5	1.5	3.0	0.3	24	2.2	17.7	4.0	4.5	1.0	3.0	3.5	0.5

TABLES OF DIMENSIONS AND QUANTITIES

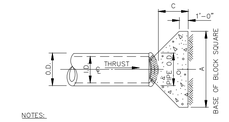
	Δ = 30°								Δ = 45°							
			EARTH			ROCK					EARTH			ROCK		
I.D. (IN.)	G (FT.)	THRUST (TONS)	A (FT.)	B (FT.)	VOL. (C.Y.)	A (FT.)	B (FT.)	VOL. (C.Y.)	I.D. (IN.)	G (FT.)	THRUST (TONS)	A (FT.)	B (FT.)	VOL. (C.Y.)	A (FT.)	B (FT.)	VOL. (C.Y.)
4,6,8	1.0	2.6	2.0	1.5	0.2	1.0	1.5	0.1	4,6,8	1.5	3.9	2.0	2.0	0.2	1.5	1.5	0.1
10,12	1.5	5.9	2.5	2.5	0.3	2.0	1.5	0.2	10,12	2.2	8.7	3.5	2.5	0.5	2.0	2.5	0.3
16,18	2.2	13.2	3.5	4.0	0.8	2.5	3.0	0.4	16,18	3.2	19.5	4.5	4.5	1.2	3.0	3.5	0.6
20	2.4	16.3	4.5	4.0	1.0	3.0	3.0	0.5	20	3.6	24.1	5.5	4.5	1.5	3.5	3.5	0.7
24	2.9	23.4	6.0	4.0	1.4	3.5	3.5	0.7	24	4.3	34.6	8.0	4.5	2.3	4.5	4.0	1.1

	Δ = 67.50°								Δ = 90°							
			EARTH			ROCK					EARTH			ROCK		
I.D. (IN.)	G (FT.)	THRUST (TONS)	A (FT.)	B (FT.)	VOL. (C.Y.)	A (FT.)	B (FT.)	VOL. (C.Y.)	I.D. (IN.)	G (FT.)	THRUST (TONS)	A (FT.)	B (FT.)	VOL. (C.Y.)	A (FT.)	B (FT.)	VOL. (C.Y.)
4,6,8	2.1	5.6	3.0	2.0	0.3	2.0	1.5	0.2	4,6,8	2.7	7.1	5.0	1.5	0.4	2.0	2.0	0.2
10,12	3.1	12.6	5.5	2.5	0.8	3.5	2.0	0.4	10,12	4.0	16.0	6.5	2.5	1.0	3.5	2.5	0.5
16,18	4.7	28.3	7.5	4.0	1.9	5.5	3.0	0.9	16,18	6.0	36.0	9.0	4.0	2.4	4.5	4.0	1.0
20	5.2	34.9	9.0	4.0	2.3	5.5	3.5	1.2	20	6.6	44.4	10.0	4.5	3.1	6.0	4.0	1.5
24	6.2	50.3	11.5	4.5	3.5	6.5	4.0	1.6	24	7.9	64.0	14.5	4.5	5.0	8.0	4.0	2.1

TABLES OF DIMENSIONS AND QUANTITIES

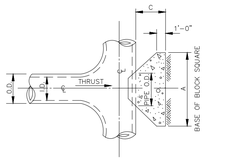
HORIZONTAL THRUST BLOCK AT PIPE BEND

W702A W702B W702C



NOTES:
1. SAME REQUIREMENTS APPLY TO ALL FIRE HYDRANT ELBOWS.

PLAN OF PLUG THRUST BLOCK

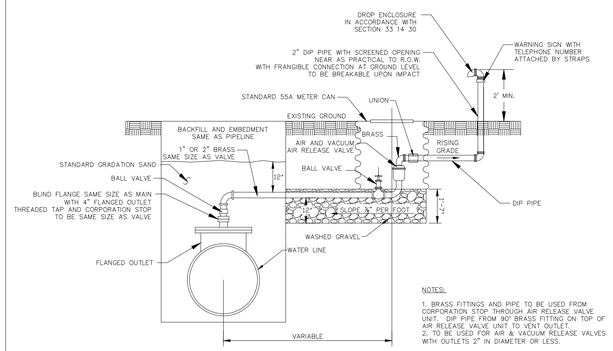


PLAN OF TEE THRUST BLOCK

			EARTH		ROCK	
I.D. (IN.)	THRUST (TONS)	C (FT.)	A (FT.)	VOL (C.Y.)	A (FT.)	VOL (C.Y.)
4,6,8	5.1	1.5	2.5	0.3	2.0	0.2
10,12	11.3	1.5	3.5	0.6	2.5	0.3
16,18	25.5	2.0	5.5	1.6	4.0	0.9
20	31.5	2.0	6.0	1.9	4.0	0.9
24	45.2	2.5	7.0	3.1	5.0	1.7

HORIZONTAL THRUST BLOCK AT TEES AND PLUGS

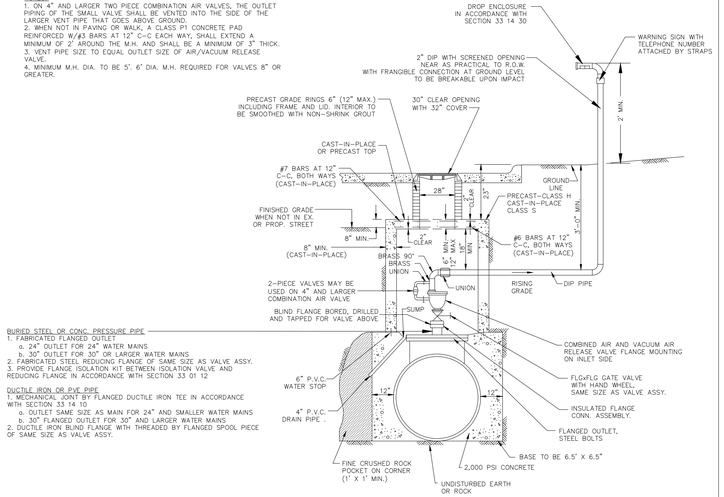
W703



NOTES:
1. BRASS FITTINGS AND PIPE TO BE USED FROM CORPORATION STOP THROUGH AIR RELEASE VALVE UNIT. DIP PIPE FROM 90° BRASS FITTING ON TOP OF AIR RELEASE VALVE UNIT TO VENT OUTLET.
2. TO BE USED FOR AIR & VACUUM RELEASE VALVES WITH OUTLETS 2" IN DIAMETER OR LESS.

COMBINATION AIR AND VACUUM VALVE ASSEMBLIES 1" AND 2"

W801



COMBINATION AIR AND VACUUM VALVE ASSEMBLIES 3" AND LARGER

W802

TRACER WIRE IS REQUIRED PER SECTION 33 05 97

TRACING WIRE

W900

ENTERED BY	PROJECT #	
DESIGNED BY	DATE	REVISION
CHECKED BY		
PROJ. ENGR.		
PATH S:\Water Engineering\Engr\Design\Projects\Standard Details\water details\Water Details Sheet 1-3.dwg		

CITY OF DENTON
ENGINEERING SERVICES

STANDARD DETAILS

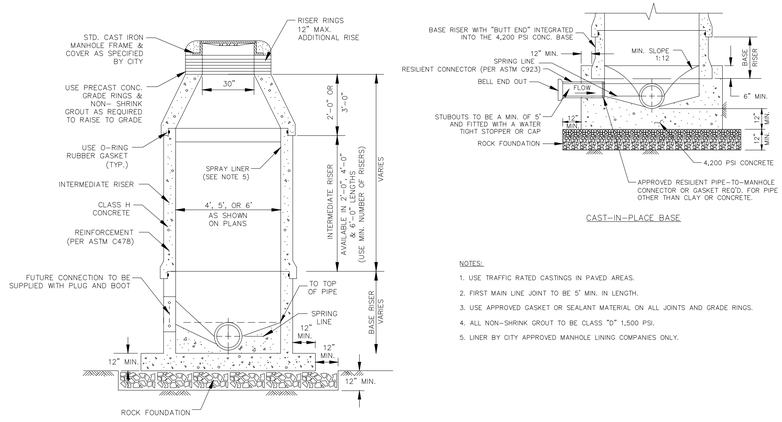
WATER DETAILS

DATE
JAN. 2021

SHEET No.
3 OF 20

SCALE
HOR 1"= N.T.S.
VER 1"= N/A

CERTIFICATION:
THIS CITY OF DENTON STANDARD DETAIL SHEET IS AUTHORIZED FOR USE IN THIS PROJECT BY THE ENGINEER WHOSE SEAL APPEARS HEREON, AND WHO CERTIFIES THE CONTENT OF THE DETAILS AND NOTES HEREIN HAVE NOT BEEN ALTERED AND ASSUMES RESPONSIBILITY FOR APPROPRIATE USE OF THE STANDARDS WITHIN THIS SHEET.



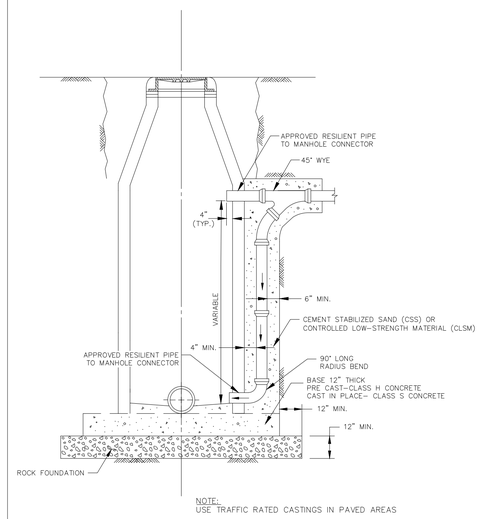
CAST-IN-PLACE BASE

NOTES:

1. USE TRAFFIC RATED CASTINGS IN PAVED AREAS.
2. FIRST MAIN LINE JOINT TO BE 5' MIN. IN LENGTH.
3. USE APPROVED GASKET OR SEALANT MATERIAL ON ALL JOINTS AND GRADE RINGS.
4. ALL NON-SHRINK GROUT TO BE CLASS "D" 1,500 PSI.
5. LINER BY CITY APPROVED MANHOLE LINING COMPANIES ONLY.

PRE-CAST MANHOLE WITH LINING

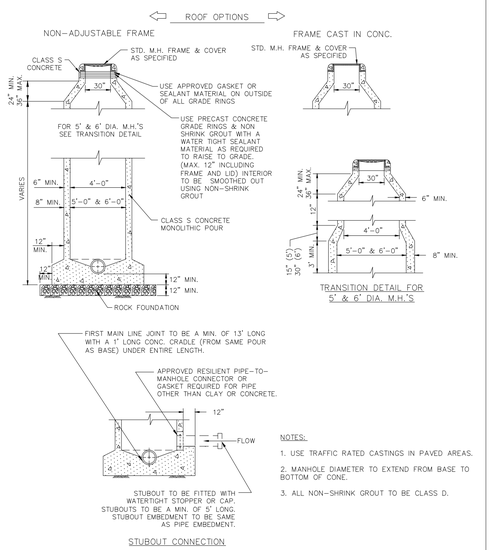
S101



NOTE:
USE TRAFFIC RATED CASTINGS IN PAVED AREAS

DROP MANHOLE

S102



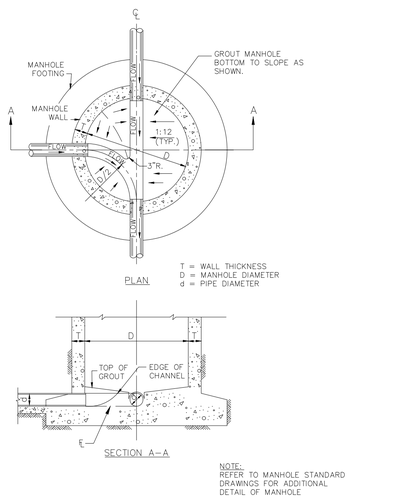
NOTES:

1. USE TRAFFIC RATED CASTINGS IN PAVED AREAS.
2. MANHOLE DIAMETER TO EXTEND FROM BASE TO BOTTOM OF CONE.
3. ALL NON-SHRINK GROUT TO BE CLASS D.

STUBOUT CONNECTION

CAST-IN-PLACE MANHOLE

S103



T = WALL THICKNESS
D = MANHOLE DIAMETER
d = PIPE DIAMETER

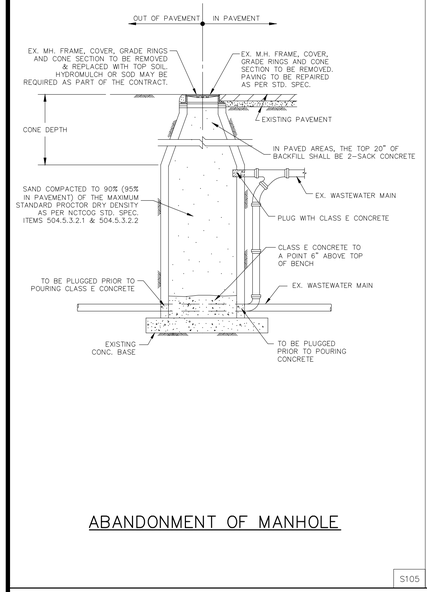
PLAN

SECTION A-A

NOTE:
REFER TO MANHOLE STANDARD DRAWINGS FOR ADDITIONAL DETAIL OF MANHOLE

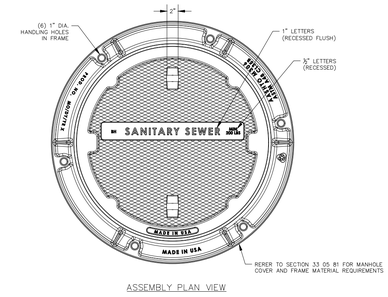
SEWERLINE INTERSECTION

S104

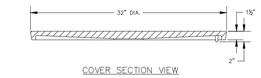


ABANDONMENT OF MANHOLE

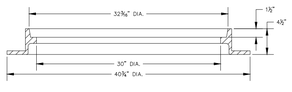
S105



ASSEMBLY PLAN VIEW



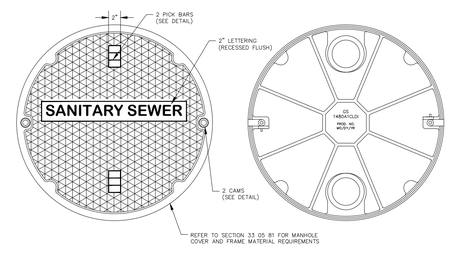
COVER SECTION VIEW



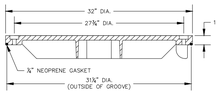
FRAME SECTION VIEW

MANHOLE FRAME AND COVER

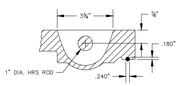
S106A



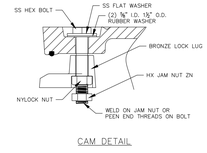
COVER PLAN VIEW COVER BOTTOM VIEW



COVER SECTION VIEW



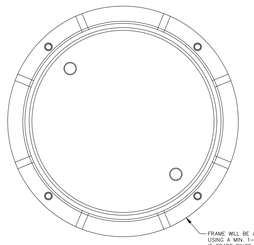
PICKBAR & GASKET GROOVE DETAIL



CAM DETAIL

WATERTIGHT MANHOLE COVER WITH CAM LOCKS AND GASKET

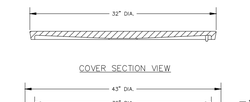
S106B



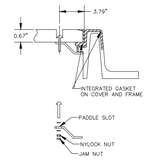
NOTES:

1. THE ACCESS COVER LOCK IS DESIGNED AS A SECURITY BOLT REQUIRING A SPECIAL TOOL TO OPERATE THE QUARTER TURN BOLT AND LIFT THE COVER FROM THE FRAME. IT FUNCTIONS WITH EITHER THE STANDARD CAM LOCK QUARTER TURN HANDLE OR THE EXTENDED SURCHARGE PADDLE.
2. THE BOLT HEAD IS MACHINED FROM 2" DIA. 316 STAINLESS STEEL AND FEATURES A DOMED HEAD WITH 3 EQUALLY SPACED "J" SLOTS RUNNING HORIZONTALLY AROUND THE BOLT HEAD.
3. STANDARD BOLT SIZES ARE 1¼ MM COARSE THREAD WITH A FLAT MACHINED ON TWO SIDES TO ENGAGE PADDLE.
4. THE PADDLE IS DIE CAST FROM 304 STAINLESS STEEL AND ALSO FITS THE STANDARD CAM LOCK DESIGN, OR EXTENDED SURCHARGE CONFIGURATIONS.
5. THE BOLT AND PADDLE WILL BE ASSEMBLED USING TWO STAINLESS STEEL 14 MM NUTS. THE BOTTOM NUT IS A STANDARD NUT THAT WILL BE TORQUE TO 35 FT. LBS. TO GIVE THE DESIRED TENSION ON THE BOLT. A SECOND LOCK NUT (JS USED AS A JAM NUT, AND TORQUE TO 90 FT. LBS. STAINLESS STEEL WASHERS ARE USED TO PROVIDE CONSISTENT TURNING TORQUE.
6. A ¾" STAINLESS STEEL SET SCREW, SET IN THREADED HOLE IN THE COVER PROVIDES A STOP AT ¾ TURN OF OPERATION.
7. THE BOLT WILL BE OPERATED BY MEANS OF A SPECIALLY MADE OPENING KEY CONSISTING OF A SPECIAL SOCKET ATTACHED TO A "T" HANDLE USED TO BOTH TURN THE BOLT, AND LIFT OUT THE COVER.
8. THE BOLT HEAD IS PROTECTED BY A WEATHER RESISTANT PLASTIC CAP.
9. WATERTIGHT COMPOSITE MANHOLE COVERS SHALL NOT BE USED IN TRAFFIC AREAS.

ASSEMBLY PLAN VIEW



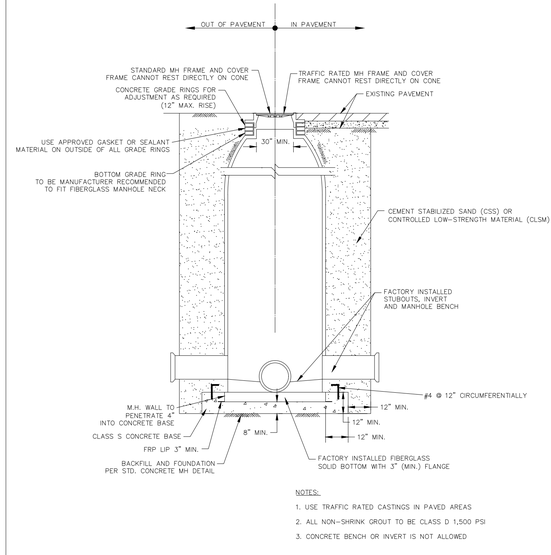
COVER SECTION VIEW FRAME SECTION VIEW



BOLT DOWN DETAIL

COMPOSITE WATERTIGHT MANHOLE COVER WITH CAM LOCKS AND GASKET

S106C



NOTES:

1. USE TRAFFIC RATED CASTINGS IN PAVED AREAS
2. ALL NON-SHRINK GROUT TO BE CLASS D 1,500 PSI
3. CONCRETE BENCH OR INVERT IS NOT ALLOWED

FIBERGLASS MANHOLE WITH STUBOUTS

S107B

ENTERED BY	PROJECT #	
DESIGNED BY	DATE	REVISION
CHECKED BY		
PROJ. ENGR.		
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CITY OF DENTON
ENGINEERING SERVICES

STANDARD DETAILS

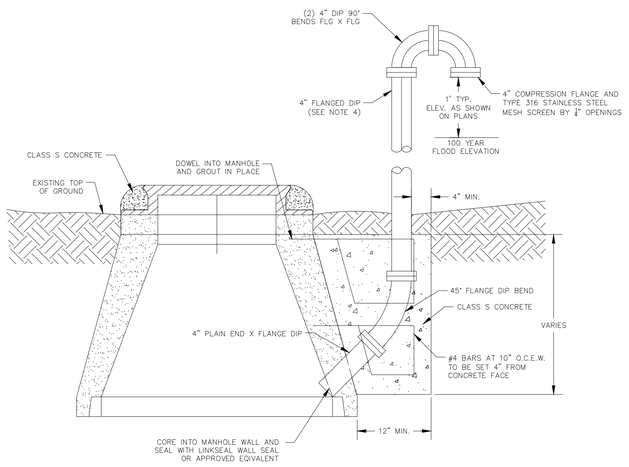
WASTEWATER DETAILS

DATE
JAN. 2021

SHEET No.
4 OF 20

SCALE
HOR 1"= N.T.S.
VER 1"= N/A

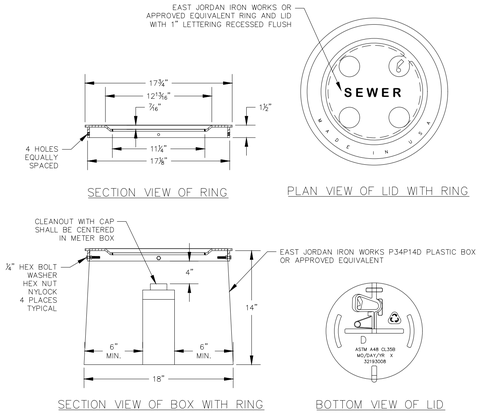
CERTIFICATION:
THIS CITY OF DENTON STANDARD DETAIL SHEET IS AUTHORIZED FOR USE IN THIS PROJECT BY THE ENGINEER WHOSE SEAL APPEARS HEREON, AND WHO CERTIFIES THE CONTENT OF THE DETAILS AND NOTES HEREIN HAVE NOT BEEN ALTERED AND ASSUMES RESPONSIBILITY FOR APPROPRIATE USE OF THE STANDARDS WITHIN THIS SHEET.



NOTES:
1. DUCTILE IRON PIPE AND FITTINGS SHALL HAVE 40 MIL POLYETHYLENE INTERIOR COATING.
2. ALL BOLTS AND NUTS TO BE TYPE 316 STAINLESS STEEL.
3. FINISH COATING
   A. WIRE BRUSH TO REMOVE ALL DIRT AND CONC. AND TO ROUGH UP FINISH.
   B. APPLY ONE PRIME COAT OF TNEMEC SERIES 37 CHEM PRIME (GRAY) TO 3 MILS DRY THICKNESS. GIVE SPECIAL ATTENTION AND SECOND COAT TO CORNERS AND BOLTS.
   C. APPLY ONE FINISH COAT OF TNEMEC SERIES 48-38 ALKYD ALUMINUM TO 2 MILS DRY THICKNESS.
4. VENT PIPES LONGER THAN 6' TO BE 6" DUCTILE IRON PIPE AND FITTINGS.
5. REFLECTIVE TAPE TO BE PLACED ON VENT 4.25 FEET ABOVE FINAL GRADE.

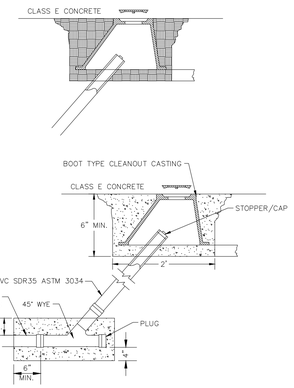
VENT MANHOLE

S108



18" X 14" PLASTIC BOX WITH SEWER LID

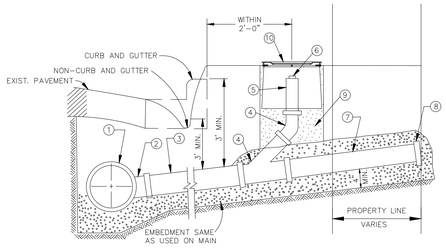
S201



SANITARY SEWER MAINLINE CLEANOUT

S402

KEY:
1. WASTERWATER MAIN
2. WYE PLACED BETWEEN 3 & 9 POSITION (4" RESIDENTIAL-6" COMMERCIAL)
3. WASTEWATER LAT. (LENGTH VARIES) (4" RESIDENTIAL-6" COMMERCIAL)
4. WYE AND 45° BEND FOR RISER AS REQ'D BY CITY (4" RESIDENTIAL-6" COMMERCIAL)
5. STACK (LENGTH VARIES) (4" RESIDENTIAL-6" COMMERCIAL)
6. WASTEWATER RISER WITH CLEANOUT CAP (4" RESIDENTIAL-6" COMMERCIAL)
7. WASTEWATER PIPE (LENGTH VARIES) (4" RESIDENTIAL-6" COMMERCIAL)
8. END CAP EXTEND TO EASEMENT LINE AND END CAP
9. NATURAL FILL COMPACTED TO 95% STANDARD PROCTOR DENSITY
10. 18" X 14" PLASTIC BOX WITH SEWER LID

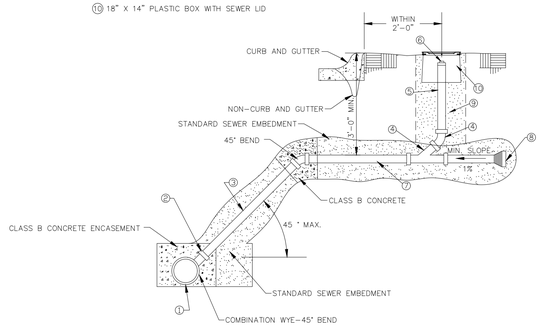


NOTES:
1. CLEANOUT CASTING TO BE FURNISHED AND PLACED PER SPECIAL CONDITIONS. IN VEHICLE TRAFFIC AREAS AND FOR COMMERCIAL MAINLINE LATERALS, WASTEWATER CLEANOUT CASTING SHALL BE OF CAST IRON CONFORMING TO ASTM A48 CLASS 35B.
2. SLOPE OF LATERAL TO BE 1% MIN., 2% MAX. UNLESS INSTRUCTED OTHERWISE BY CITY.
3. THE WASTEWATER LATERAL SHALL BE CONSTRUCTED FOR BUILDING LATERAL AND CONSTRUCTED TO CLEAR EXISTING UTILITES AND PROPOSED FACILITIES SUCH AS STORM SEWER MAINS, PAVING, SIDEWALKS, RETAINING WALLS, ETC. VERTICAL BENDS (22.5° MAX.) MAY BE USED IF APPROVED BY CITY.
4. THE MAINLINE LATERAL CONNECTION TO THE PRIVATE BUILDING LATERAL SHALL BE AS CLOSE TO THE PROPERTY LINE AS POSSIBLE.
5. INSTALL STOPPER OR CAP AT PROPERTY LINE IF BUILDING LATERAL DOES NOT EXIST.
6. THE CLEANOUT STACK & CASTING MAY NOT BE PLACED IN VEHICLE TRAFFIC AREAS, OR SIDEWALK WITHOUT APPROVAL BY THE WASTEWATER DEPARTMENT.
7. THE CLEANOUT SHALL BE CENTERED IN PLASTIC BOX.
8. CENTER OF CLEANOUT TO BE LOCATED NO FURTHER THAN 2'-0" BEHIND BACK OF CURB OR TOP OF SLOPE FOR NON-CURB AND GUTTER SECTION WITHIN R.O.W.
9. PLUMBERS NOT ALLOWED TO CONNECT TO STACK, ONLY TO THE BOTTOM OF WYE.

SANITARY SEWER SERVICE WITH SINGLE CLEANOUT

S403

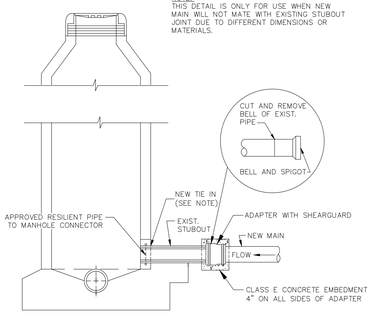
KEY:
1. WASTERWATER MAIN
2. WYE PLACED BETWEEN 3 & 9 POSITION (4" RESIDENTIAL-6" COMMERCIAL)
3. WASTEWATER LAT. (LENGTH VARIES) (4" RESIDENTIAL-6" COMMERCIAL)
4. WYE AND 45° BEND FOR RISER AS REQ'D BY CITY (4" RESIDENTIAL-6" COMMERCIAL)
5. STACK (LENGTH VARIES) (4" RESIDENTIAL-6" COMMERCIAL)
6. WASTEWATER RISER WITH CLEANOUT CAP (4" RESIDENTIAL-6" COMMERCIAL)
7. WASTEWATER PIPE (LENGTH VARIES) (4" RESIDENTIAL-6" COMMERCIAL)
8. END CAP EXTEND TO EASEMENT LINE AND END CAP
9. NATURAL FILL COMPACTED TO 95% STANDARD PROCTOR DENSITY
10. 18" X 14" PLASTIC BOX WITH SEWER LID



1. CLEANOUT CASTING TO BE FURNISHED AND PLACED PER SPECIAL CONDITIONS. IN VEHICLE TRAFFIC AREAS AND FOR COMMERCIAL MAINLINE LATERALS, WASTEWATER CLEANOUT CASTING SHALL BE OF CAST IRON CONFORMING TO ASTM A48 CLASS 35B.
2. SLOPE OF SHALLOW LATERAL SECTION TO BE 1% MIN., 2% MAX. UNLESS INSTRUCTED OTHERWISE BY CITY.
3. THE WASTEWATER LATERAL SHALL BE CONSTRUCTED FOR BUILDING LATERAL AND CONSTRUCTED TO CLEAR EXISTING UTILITIES AND PROPOSED FACILITIES SUCH AS STORM SEWER MAINS, PAVING, SIDEWALKS, RETAINING WALLS, ETC. VERTICAL BENDS (22.5° MAX.) MAY BE USED IF APPROVED BY CITY.
4. THE MAINLINE LATERAL CONNECTION TO THE PRIVATE BUILDING LATERAL SHALL BE AS CLOSE TO THE PROPERTY LINE AS POSSIBLE.
5. INSTALL STOPPER OR CAP AT PROPERTY LINE IF BUILDING LATERAL DOES NOT EXIST.
6. THE CLEANOUT STACK & CASTING MAY NOT BE PLACED IN VEHICLE TRAFFIC AREAS, OR SIDEWALK WITHOUT APPROVAL BY THE WASTEWATER DEPARTMENT.
7. CONNECTION FITTING TO MAIN TO BE ENCASED IN CLASS B CONCRETE.
8. THE CLEANOUT SHALL BE CENTERED IN PLASTIC BOX.
9. CENTER OF CLEANOUT TO BE LOCATED NO FURTHER THAN 2'-0" BEHIND BACK OF CURB OR TOP OF SLOPE FOR NON-CURB AND GUTTER SECTION WITHIN R.O.W.
10. PLUMBERS NOT ALLOWED TO CONNECT TO STACK, ONLY TO THE BOTTOM OF WYE.

SANITARY SEWER SERVICE WITH SINGLE CLEANOUT 12' DEEP OR GREATER

S404



SANITARY SEWER MAIN TIE-IN WITH STUBOUT OF DISSIMILAR SIZE OR TYPE

S405

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CITY OF DENTON
ENGINEERING SERVICES

STANDARD DETAILS

WASTEWATER DETAILS

DATE
JAN. 2021

SHEET No.
5 OF 20

SCALE
HOR 1"= N.T.S.
VER 1"= N/A

CERTIFICATION:
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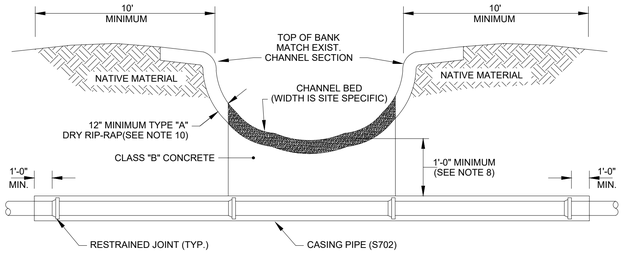
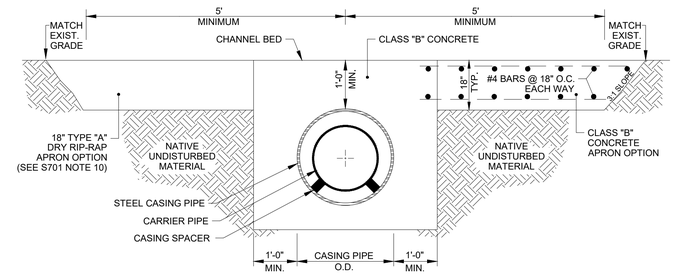


NOTES:

1. CROSSING RAMPS (10' WIDE) SHALL BE PROVIDED ON BOTH SIDES OF THE CHANNEL FOR A MOVING TRACTOR TO NAVIGATE.
2. A STORM WATER EROSION CONTROL AND POLLUTION PREVENTION PLAN MUST BE DESIGNED AND IMPLEMENTED TO MITIGATE THE IMPACT OF CONSTRUCTION ACTIVITIES ON THE FEATURE BEING CROSSED.
3. PIPE SHOULD BE FULLY RESTRAINED AND PRESSURE RATED AS DETERMINED BY THE ENGINEER.
4. ACCESS TO THE BANKS ON EITHER SIDE OF THE CROSSING MUST BE AVAILABLE AS WELL AS ADEQUATE ROOM FOR ASSEMBLY AND EQUIPMENT. BANK GRADE AND STABILITY MUST BE ADEQUATE. A GEOTECHNICAL ENGINEER SHOULD BE CONSULTED TO ASSIST WITH BANK ANALYSIS AND STREAM BED ANALYSIS TO PROVIDE ADDITIONAL DATA AND RECOMMENDATIONS ON THE VIABILITY OF OPEN-CUT VS TRENCHLESS CROSSINGS.
5. PIPE USED FOR LOW WATER CROSSINGS SHALL BE RESTRAINED FOR A MINIMUM OF 20 FT BEYOND TOP OF BANK ON EACH SIDE OF CREEK.
6. CASING PIPE IS REQUIRED WHEN DEPTH OF COVER IS LESS THAN 3 FT.
7. PLACE STONE RIP-RAP A MINIMUM OF 5 FT UPSTREAM & 5 FT DOWNSTREAM FROM CENTERLINE OF PIPE ALONG LOW WATER CROSSING BED.
8. STONES SHALL WEIGH BETWEEN 50 LBS LBS EACH, AND AT LEAST 60% SHALL WEIGH MORE THAN 100 LBS.
9. REFER TO STEEL CASING DETAIL FOR ADDITIONAL PIPE INFORMATION.

LOW WATER CHANNEL CROSSING
DETAIL SECTION I

S701

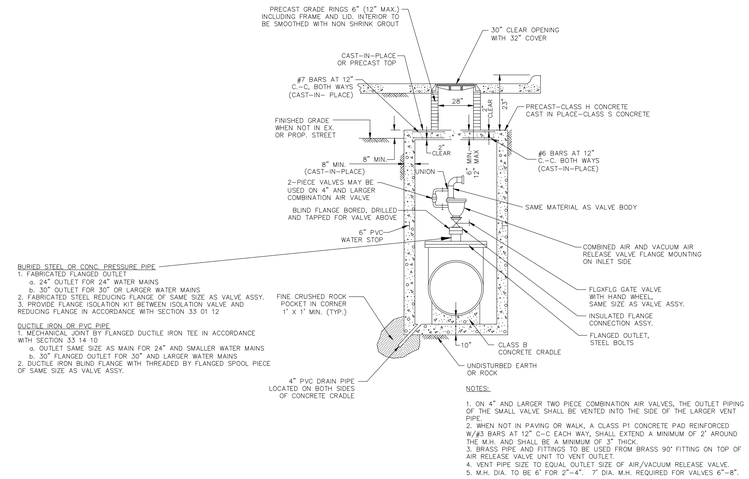


NOTES:

1. RIP-RAP OR CONCRETE IN ACCORDANCE WITH THE DRAWINGS.
2. APRON & PIPE TRENCH MUST HAVE A CONSTANT UPSTREAM TO DOWNSTREAM SLOPE TO MATCH PRE-CONSTRUCTION CHANNEL BED.
3. FOR CARRIER PIPE LESS THAN 36".
4. REFER TO STEEL CASING DETAIL FOR ADDITIONAL PIPE INFORMATION.

LOW WATER CHANNEL CROSSING
DETAIL SECTION II

S702



BURIED STEEL OR CONC. PRESSURE PIPE
1. FABRICATED FLANGED OUTLET
   a. 24" OUTLET FOR 24" WATER MAINS
   b. 30" OUTLET FOR 30" OR LARGER WATER MAINS
2. FABRICATED STEEL REDUCING FLANGE OF SAME SIZE AS VALVE ASSY.
3. PROVIDE FLANGE ISOLATION KIT BETWEEN ISOLATION VALVE AND REDUCING FLANGE IN ACCORDANCE WITH SECTION 33 01 12

DUCTILE IRON OR PVC PIPE
1. MECHANICAL JOINT BY FLANGED DUCTILE IRON TEE IN ACCORDANCE WITH SECTION 33 14 10
   a. OUTLET SAME SIZE AS MAIN FOR 24" AND SMALLER WATER MAINS
   b. 30" FLANGED OUTLET FOR 30" AND LARGER WATER MAINS
2. DUCTILE IRON BLIND FLANGE WITH THREADED BY FLANGED SPOOL PIECE OF SAME SIZE AS VALVE ASSY.

NOTES:

1. ON 4" AND LARGER TWO PIECE COMBINATION AIR VALVES, THE OUTLET PIPING OF THE SMALL VALVE SHALL BE VENTED INTO THE SIDE OF THE LARGER VENT PIPE.
2. WHEN NOT IN PAVING OR WALK, A CLASS P1 CONCRETE PAD REINFORCED W/#3 BARS AT 12" C-C EACH WAY, SHALL EXTEND A MINIMUM OF 2" AROUND THE M.H. AND SHALL BE A MINIMUM OF 3" THICK.
3. BRASS PIPE AND FITTINGS TO BE USED FROM BRASS 90° FITTING ON TOP OF AIR RELEASE VALVE UNIT TO VENT OUTLET.
4. VENT PIPE SIZE TO EQUAL OUTLET SIZE OF AIR/VACUUM RELEASE VALVE.
5. M.H. DIA. TO BE 6' FOR 2"-4", 7' DIA. M.H. REQUIRED FOR VALVES 6"-8".

COMBINATION AIR AND VACUUM RELEASE VALVE
FROM 2" TO 8"
FOR SEWER FORCE MAINS

S803

TRACER WIRE IS REQUIRED PER SECTION 33 05 97

TRACING WIRE

S900

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CITY OF DENTON
ENGINEERING SERVICES

STANDARD DETAILS
WASTEWATER DETAILS

DATE
JAN. 2021

SHEET No.
6 OF 20

SCALE
HOR 1"= N.T.S.
VER 1"= N/A

CERTIFICATION:
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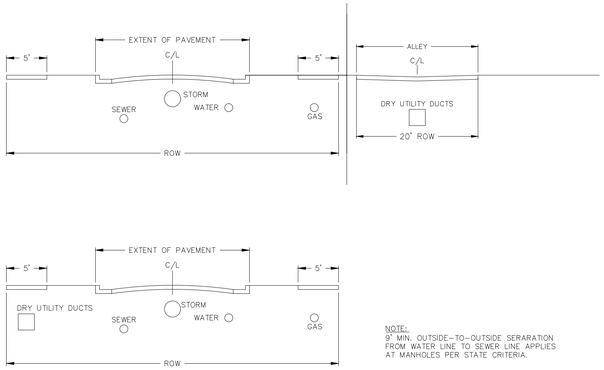
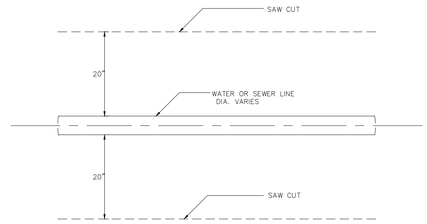


NOTE:
9' MIN. OUTSIDE-TO-OUTSIDE SERARATION FROM WATER LINE TO SEWER LINE APPLIES AT MANHOLES PER STATE CRITERIA.

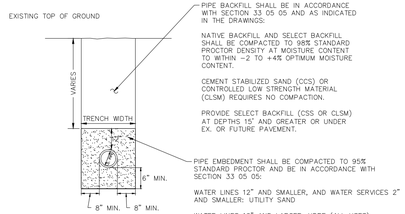
TYPICAL UTILITY PLACEMENTS

U101



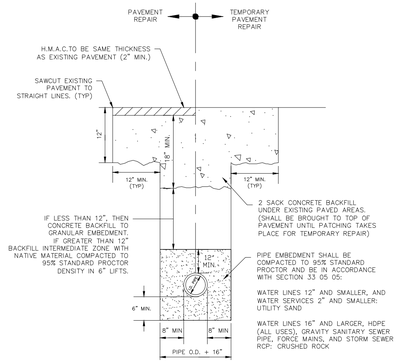
TYPICAL SAW-CUT

U102



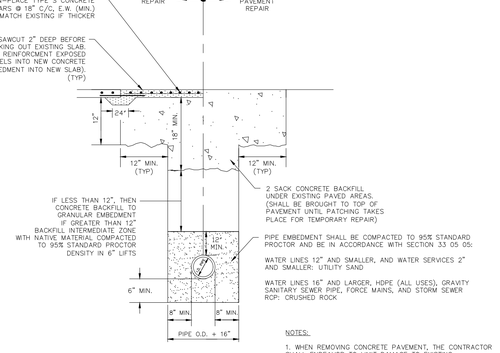
PROPOSED PAVEMENT TRENCH

U201



EXISTING PAVEMENT TRENCH AND REPAIR ASPHALT

U203A

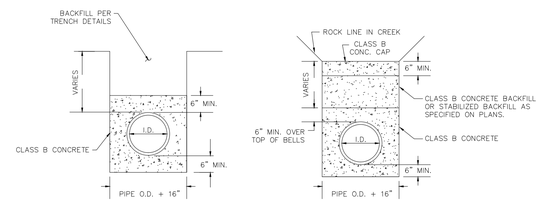


NOTES:

1. WHEN REMOVING CONCRETE PAVEMENT, THE CONTRACTOR SHALL ENDEAVOR TO LIMIT DAMAGE TO EXISTING REINFORCEMENT SO IT MAY BE EMPLOYED IN THE REPLACEMENT OPERATION. IF ORIGINAL REINFORCEMENT IS CUT OR BROKEN, REPLACEMENT BARS OF THE SAME SIZE SHALL BE INSTALLED BY DRILLING AND DOWELING.
2. IF DRILLING AND DOWELING IS REQUIRED, DOWELED BARS SHALL BE DRILLED INTO PAVEMENT HORIZONTALLY BY USE OF A MECHANICAL RIG. DRILLING BY HAND IS NOT ALLOWED. DRILLED HOLES SHALL BE BLOWN CLEAN AND DOWELS COATED WITH EPOXY RESIN. MINIMUM EMBEDMENT IS TO BE 12 INCHES.
3. USE SAND TO SMOOTH AND LEVEL SUBGRADE PRIOR TO CONCRETE POUR.
4. ALL CONCRETE REPAIRS MUST BE FULL PANELS.

EXISTING PAVEMENT TRENCH AND REPAIR CONCRETE

U203C



TYPICAL INSTALLATION

INSTALLATION IN DITCHES AND CREEKS

CONCRETE ENCASEMENT FOR UTILITY LINES

U204

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DESIGNED BY	DATE	REVISION
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CITY OF DENTON
ENGINEERING SERVICES

STANDARD DETAILS

WATER/WASTEWATER SHARED DETAILS

DATE
JAN. 2021

SHEET No.
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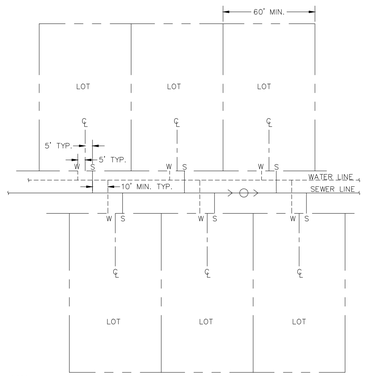


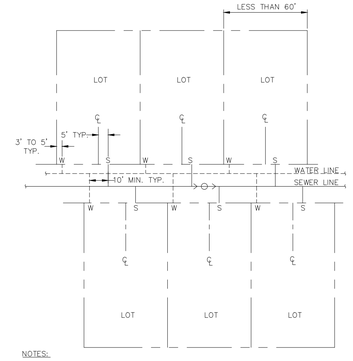
NOTES:

1. WATER METERS PLACED IN UNPAVED PUBLIC R.O.W. OR UTILITY EASEMENT.

2. IF WIDTH OF LOT IS LESS THAN 60' WIDE, USE DETAIL U206B.

TYPICAL SERVICE LINE LAYOUT

U206A



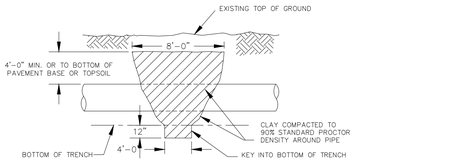
NOTES:

1. WATER METERS PLACED IN UNPAVED PUBLIC R.O.W. OR UTILITY EASEMENT.

2. IF WIDTH OF LOT IS 60' OR GREATER, USE DETAIL U206A.

ALTERNATE SERVICE LINE LAYOUT
*(FOR LOTS LESS THAN 60' WIDE)

U206B



NOTES:

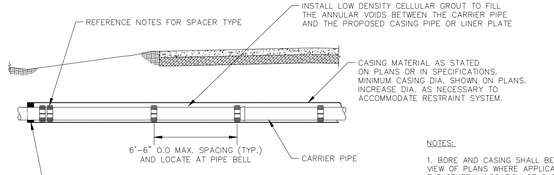
1. CLAY SHALL SERVE AS A WATER STOP.

2. CLAY SHALL HAVE A HIGH P.I. (NOT LESS THAN 18)

3. SEE PLAN AND PROFILE SHEETS FOR LOCATION OF CLAY DAMS.

CLAY DAM

U207



FOR WATER LINES AND FORCE MAINS LESS THAN 24" PROVIDE MORTARED BRICK WITH NON-SHRINK GROUT OR LINK SEAL.

FOR WATER LINES AND FORCE MAINS 24" AND LARGER PROVIDE PULL-ON SYNTHETIC RUBBER SEAL.

GRAVITY SANITARY SEWER PIPING DOES NOT REQUIRE END SEALS.

NOTES:

1. BORE AND CASING SHALL BE INSTALLED AS SHOWN IN PROFILE VIEW OF PLANS WHERE APPLICABLE. THIS DETAIL ILLUSTRATES THE GENERAL LOCATION OF CASING SPACERS FOR SUPPORTING CARRIER PIPE AND GROUTING ENDS OF CASING PIPE.

2. FOR PRESSURIZED PIPE, ALL INTERIOR JOINTS SHALL BE RESTRAINED BY A DUCTILE IRON PIPE RESTRAINING HARNESS. FOR NON-PRESSURIZED PIPE, ALL INTERIOR JOINTS SHALL BE RESTRAINED BY A DUCTILE IRON PIPE RESTRAINING HARNESS, LOCKING GASKETS OR AN APPROVED MECHANICAL JOINT SYSTEM.

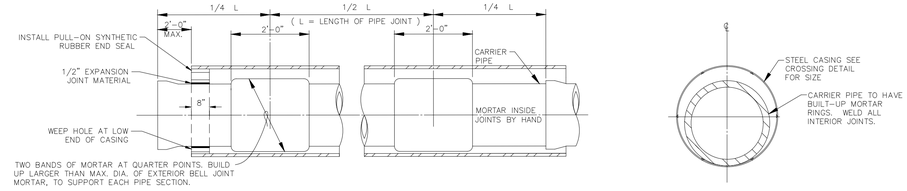
3. FOR BORES 150 LF OR LONGER ON WATER LINES OR FORCE MAINS: 12" WIDE 304 STAINLESS BAND AND 2" WIDE PLASTIC OR POLYETHYLENE RUNNERS, PIPELINE SEAL & INSULATOR, INC., MODEL S126-2 OR APPROVED EQUIVALENT. FOR BORES LESS THAN 150 LF: RECON "RACI" CASING SPACERS OR APPROVED EQUIVALENT AND DOUBLE SPACERS AT EACH END.

4. PIPE INSTALLATION INTO BORE CASING SHALL BE PULLED OR PUSHED PER MANUFACTURERS RECOMMENDATION.

5. REFER TO CITY STANDARD TRENCH DETAILS FOR CASING EMBEDMENT.

INSTALLATION IN STEEL CASING OR LINER PLATE FOR PVC AND DIP

U208A



SIDE VIEW

END VIEW

INSTALLATION IN STEEL CASING FOR CONCRETE PRESSURE PIPE BAR-WRAPPED STEEL CYLINDER TYPE

U208B

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CITY OF DENTON
ENGINEERING SERVICES

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WATER/WASTEWATER SHARED DETAILS

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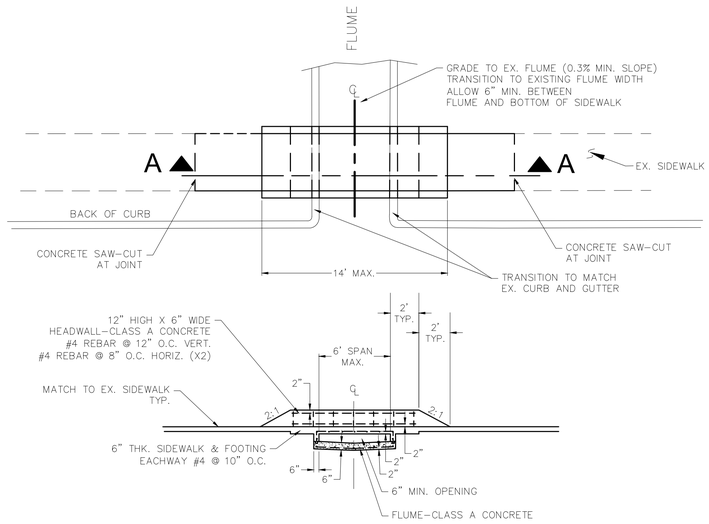
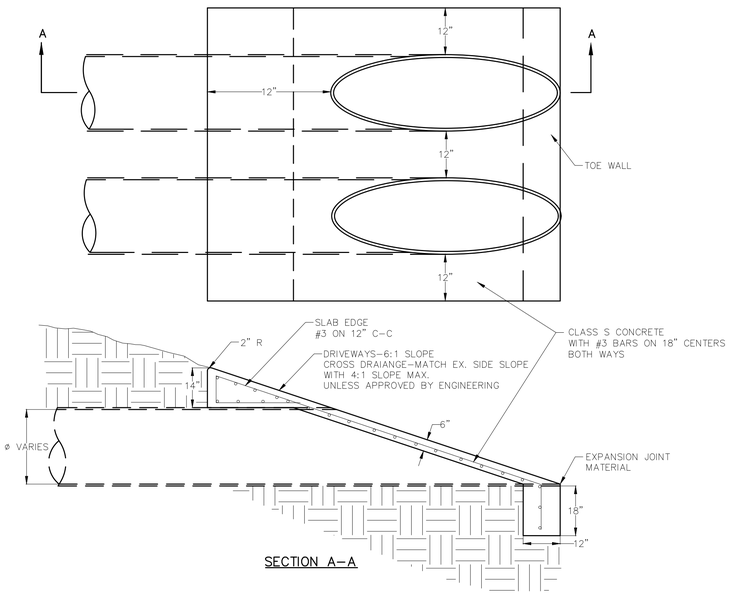


A-A

SIDEWALK SPANNING FLUME

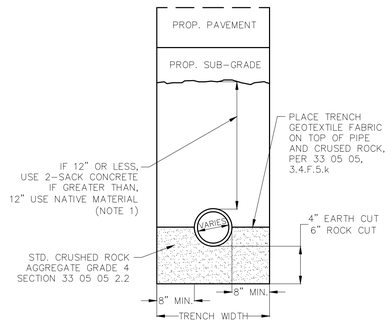
D101



SECTION A-A

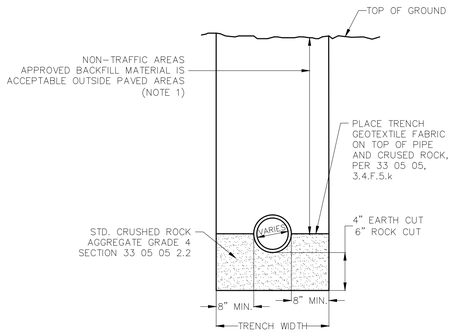
SAFETY END TREATMENT

D103



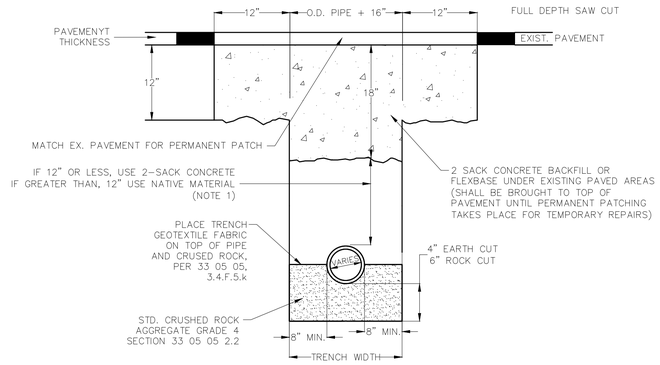
PROPOSED PAVEMENT
STORM DRAIN BACKFILL

D201



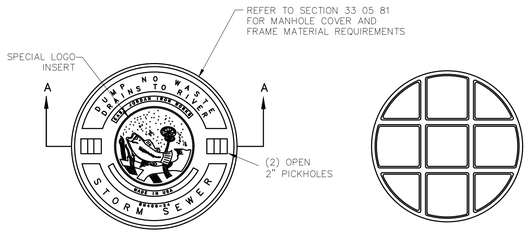
UNPAVED
STORM DRAIN BACKFILL

D202



EXISTING PAVEMENT
STORM DRAIN BACKFILL

D203

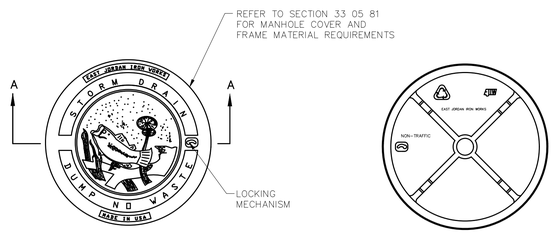


TOP VIEW

BOTTOM VIEW

JUNCTION BOX AND MANHOLE COVER

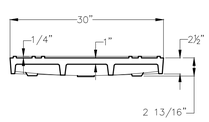
D106A



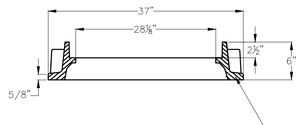
TOP VIEW

BOTTOM VIEW

INLET COVER WITH LOCKING MECHANISM

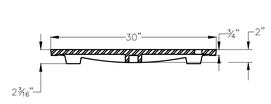


SECTION A-A

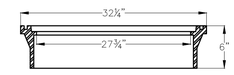


M.H. RING DETAIL

STACK DETAIL

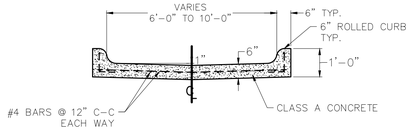


SECTION A-A



INLET FRAME DETAIL

D106B



FLUME

D102

GENERAL NOTES:

1. COMPACT BACKFILL MATERIAL TO MINIMUM 98% STANDARD PROCTOR DENSITY WITH A MOISTURE CONTENT FROM -2% TO +4% OF OPTIMUM - MAXIMUM 8" LOOSE LIFTS.

2. HEAVY DUTY MANHOLE COVERS ON JUNCTION BOXES AND MANHOLES ARE REQUIRED IN ALL VEHICLE TRAFFIC AREAS.

3. LIGHT DUTY INLET COVERS ON INLETS OUTSIDE OF VEHICLE TRAFFIC AREAS.

4. PIPES SHALL BE RCP CLASS III WITH 2' OR GREATER COVER, RCP CLASS IV WITH 1' TO 2' COVER AND RCP CLASS V WITH LESS THAN 1' COVER. SEE TABLE 1 SECTION 33 42 11.

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CITY OF DENTON
ENGINEERING SERVICES

STANDARD DETAILS

STORM DRAINAGE DETAILS

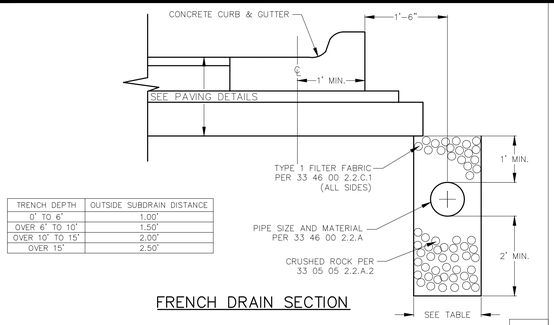
DATE
JAN. 2021

SHEET No.
9 OF 20

SCALE

HOR 1"= N.T.S.
VER 1"= N.T.S.

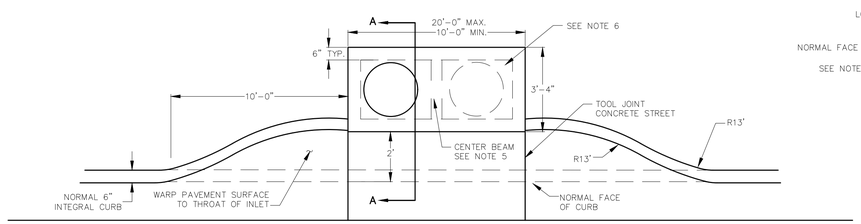
CERTIFICATION:
THIS CITY OF DENTON STANDARD DETAIL SHEET IS AUTHORIZED FOR USE IN THIS PROJECT BY THE ENGINEER WHOSE SEAL APPEARS HEREON, AND WHO CERTIFIES THE CONTENT OF THE DETAILS AND NOTES HEREIN HAVE NOT BEEN ALTERED AND ASSUMES RESPONSIBILITY FOR APPROPRIATE USE OF THE STANDARDS WITHIN THIS SHEET.



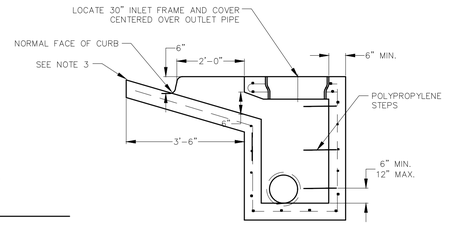
TRENCH DEPTH	OUTSIDE SUBDRAIN DISTANCE
0' TO 6'	1.00'
OVER 6' TO 10'	1.50'
OVER 10' TO 15'	2.00'
OVER 15'	2.50'

FRENCH DRAIN SECTION

D104

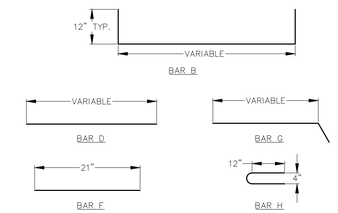


RECESSED INLET DETAIL (PLAN)



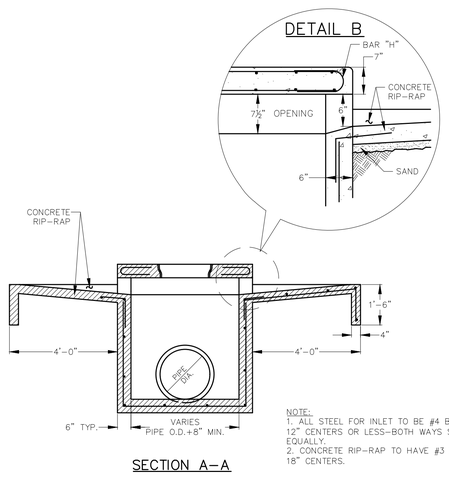
SECTION A–A

D301



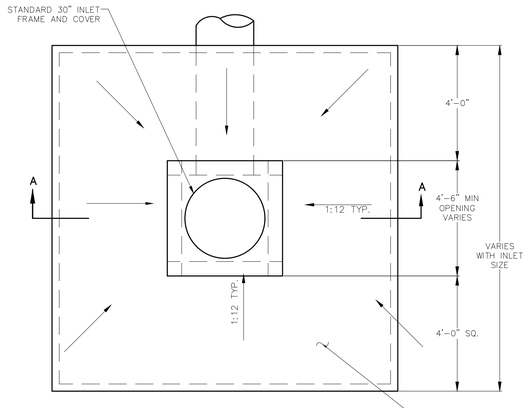
BAR DETAIL

D305



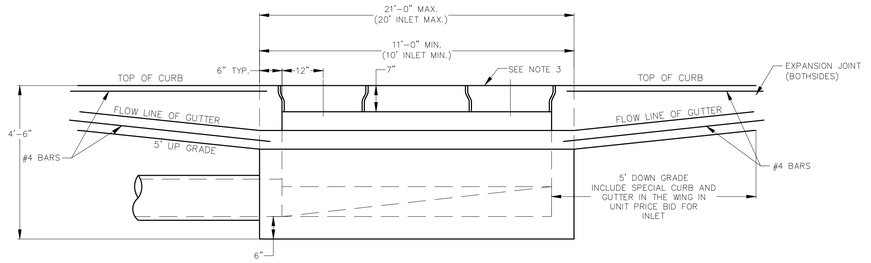
NOTE:
1. ALL STEEL FOR INLET TO BE #4 BARS ON 12" CENTERS OR LESS–BOTH WAYS SPACED EQUALLY.
2. CONCRETE RIP–RAP TO HAVE #3 BARS ON 18" CENTERS.

SECTION A–A

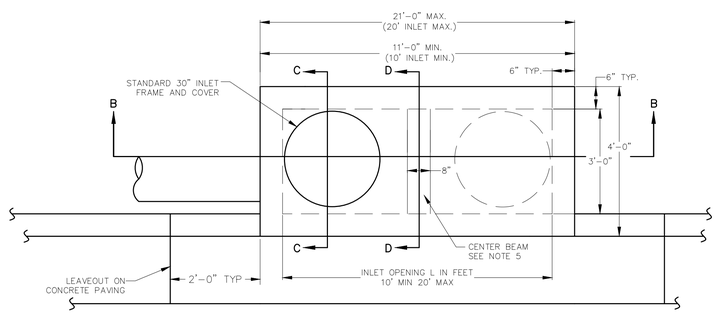


YARD INLET DETAIL (PLAN)

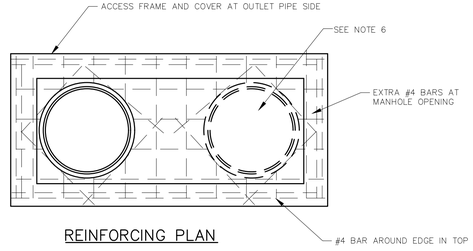
D303



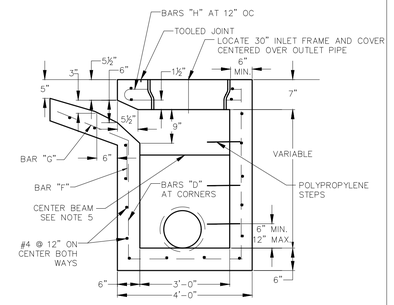
PROFILE



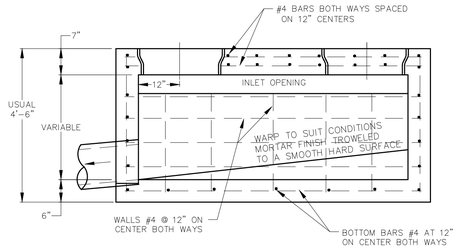
STANDARD CURB INLET (PLAN)



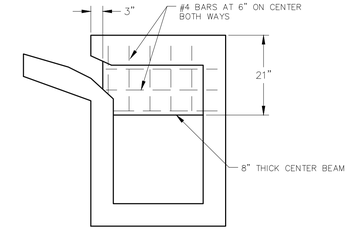
REINFORCING PLAN



SECTION C–C

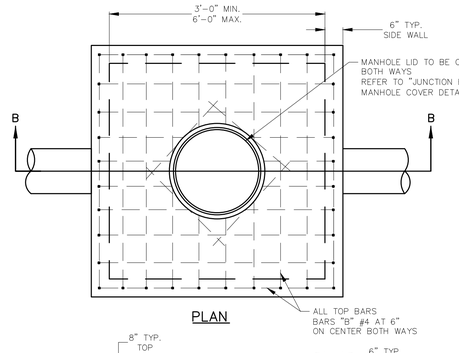


SECTION B–B

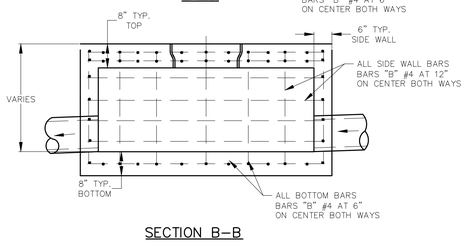


SECTION D–D

D302



PLAN



SECTION B–B

JUNCTION BOX DETAIL

D304

GENERAL NOTES:

1. ALL STEEL REINFORCING BARS TO BE GRADE 60 #4 STEEL BARS ON 12" CENTER.
2. ALL EXPOSED EDGES TO BE CHAMFERED ¾".
3. TOOLED JOINT 6" FROM FACE.
4. PROVIDE MINIMUM 2" CONCRETE COVER MEASURED FROM CENTER OF REINFORCEMENT.
5. ALL INLETS SHALL HAVE A CENTER BEAM.
6. INLETS OVER 10 FEET OPENING IN LENGTH SHALL HAVE TWO ACCESS COVERS.
7. ALL INLETS SHALL HAVE AT LEAST ONE FRAME AND COVER CENTERED OVER OUTLET PIPE.
8. ALL CAST IN PLACE CONCRETE SHALL BE CLASS S TABLE 2 03 00 00 AND ALL PRE–CAST CONCRETE SHALL BE CLASS H PER 33 42 33, 2.2.B
9. POLYPROPYLENE STEPS SHALL BE 12" WIDE AND 12" MAX. BETWEEN STEPS PER 33 42 33, 2.2.E.1 AND 3.4.D.
   CAST–IN–PLACE: CAST STEPS INTO INLET WALLS
   PRECAST: DRILL AND EPOXY OR GROUT STEPS INTO PLACE IN ACCORDANCE WITH MANUFACTURE'S RECOMMENDATIONS

ENTERED BY	PROJECT #	
DESIGNED BY	DATE	REVISION
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CITY OF DENTON
ENGINEERING SERVICES

STANDARD DETAILS

STORM DRAINAGE DETAILS

DATE
JAN. 2021

SHEET No.
10 OF 20

SCALE
HOR 1"= N.T.S.
VER 1"= N/A

CERTIFICATION:
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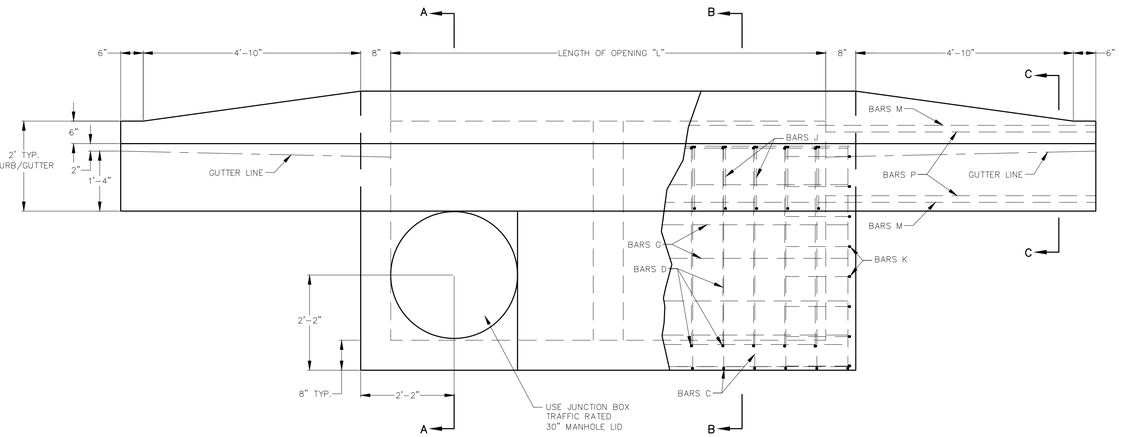
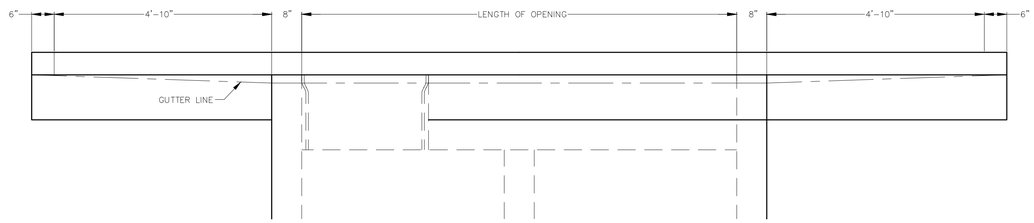
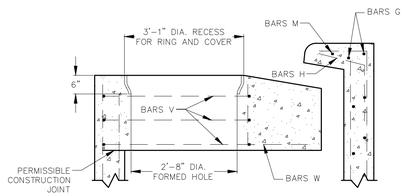


TYPE 2 INLET (PLAN)

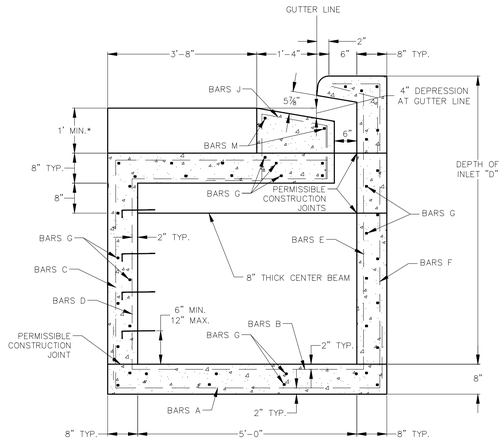


PROFILE VIEW

TYPE 2 INLET

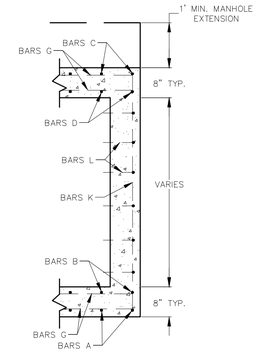


SECTION "A-A"



* MATCH DEPTH OF PAVEMENT STRUCTURE (BASE AND SURFACE)

SECTION "B-B"



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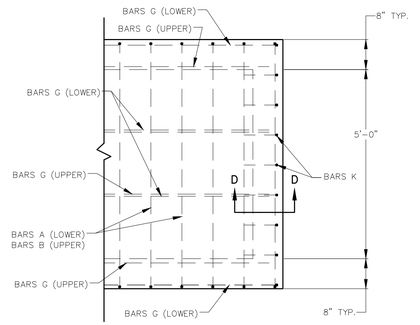
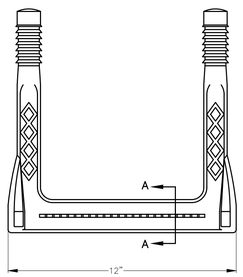
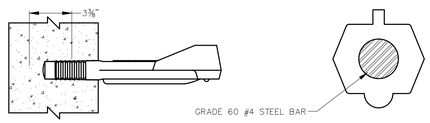


PARTIAL PLAN VIEW BOTTOM SLAB





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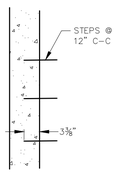
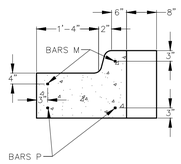
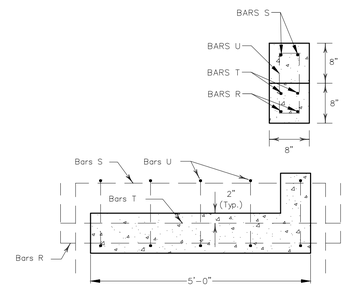


INLET STEP DETAIL

POLYPROPYLENE STEPS



SECTION "C-C"



TRAVERSE BEAM

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DESIGNED BY	DATE	REVISION
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CITY OF DENTON
ENGINEERING SERVICES

STANDARD DETAILS

STORM DRAINAGE DETAILS

DATE
JAN. 2021

SHEET No.
11 OF 20

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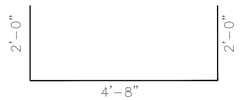
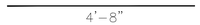
Bill Of Reinforcing Steel for Inlet Depth of 6'

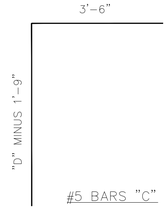
Length of Opening	#5 Bars A @ 6"		#5 Bars B @ 6"		#5 Bars C @ 6"		#5 Bars D @ 6"		#5 Bars E @ 6"		#5 Bars F @ 6"		#4 Bars G			#4 Bars H @ 12"		#4 Bars J @ 12"		#4 Bars K @ 8"		#4 Bars L @ 12"		#4 Bars M			#4 Bars P		#6 Bars R		#6 Bars S		#6 Bars T		#4 Bars U @ 10"		#4 Bars V @ 5"		#4 Bars W	
	No.	Wt.	No.	Wt.	No.	Wt.	No.	Wt.	No.	Wt.	No.	Wt.	No.	Length	Wt.	No.	Wt.	No.	Wt.	No.	Wt.	No.	Wt.	No.	Length	Wt.	No.	Wt.	No.	Wt.	No.	Wt.	No.	Wt.	No.	Wt.	No.	Wt.	No.	Wt.	No.	Wt.
10'	22	198.87	22	107.08	22	200.86	22	193.13	22	130.03	22	149.15	20	11.83	158.05	11	13.47	11	31.54	14	62.35	4	17.59	3	21'8"	43.42	2	7.57	2	21.03	2	21.03	2	15.02	4	8.46	3	24.72	6	9.02
15'	32	289.26	32	155.75	32	292.16	32	280.91	32	189.13	32	216.94	20	16.83	224.85	16	19.59	16	45.87	14	62.35	4	17.59	3	26'8"	53.44	2	7.57	2	21.03	2	21.03	2	15.02	4	8.46	3	24.72	6	9.02
20'	42	379.65	42	204.43	42	383.46	42	368.7	42	248.23	42	284.74	20	21.83	291.65	21	25.72	21	60.2	14	62.35	4	17.59	3	31'8"	63.46	2	7.57	2	21.03	2	21.03	2	15.02	4	8.46	3	24.72	6	9.02



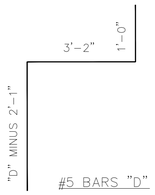
#5 BARS "A"



#5 BARS "B"



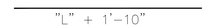
#5 BARS "C"



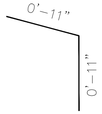
#5 BARS "D"

#5 BARS "E"

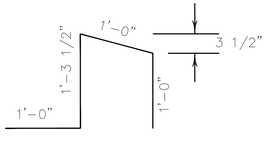
#5 BARS "F"



#4 BARS "G"

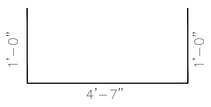


#4 BARS "H"

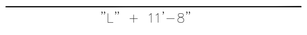


#4 BARS "J"

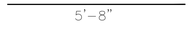
#4 BARS "K"



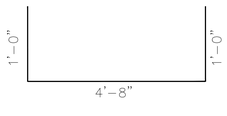
#4 BARS "L"



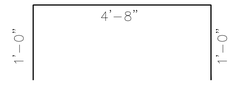
#4 BARS "M"
PLACE AS SHOWN



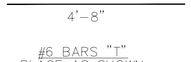
#4 BARS "P"
PLACE AS SHOWN



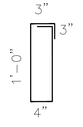
#4 BARS "R"
PLACE AS SHOWN



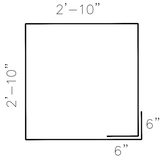
#6 BARS "S"
PLACE AS SHOWN



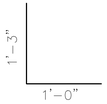
#6 BARS "T"
PLACE AS SHOWN



#4 BARS "U"



#4 BARS "V"



#4 BARS "W"

6 EACH TO BE PLACED AT 16" SPACING ALONG GUTTER SIDE AND INLET SIDE OF RING. (3 EACH SIDE)

BAR SPACING:

BOTTOM SLAB, LOWER MAT – 1'–6"
BOTTOM SLAB, UPPER MAT – 1'–3"
BACK WALL, OUTER MAT – 0'–9"
BACK WALL, INNER MAT – 0'–10"
FRONT WALL, OUTER MAT – 0'–9"
FRONT WALL, INNER MAT – 0'–10"
UPPER SLAB, LOWER MAT – 0'–9"
UPPER SLAB, UPPER MAT – 0'–10"
GUTTER – PLACE AS SHOWN

TYPE 2 INLET BAR DETAILS

GENERAL NOTES:

1. ALL STEEL REINFORCING BARS TO BE GRADE 60 #4 STEEL BARS ON 12" CENTER.
2. ALL EXPOSED EDGES TO BE CHAMFERED ¾".
3. TOOLED JOINT 6" FROM FACE.
4. PROVIDE MINIMUM 2" CONCRETE COVER MEASURED FROM CENTER OF REINFORCEMENT.
5. ALL INLETS SHALL HAVE A CENTER BEAM.
6. INLETS OVER 10 FEET OPENING IN LENGTH SHALL HAVE TWO ACCESS COVERS.
7. ALL INLETS SHALL HAVE AT LEAST ONE FRAME AND COVER CENTERED OVER OUTLET PIPE.
8. ALL CAST IN PLACE CONCRETE SHALL BE CLASS S TABLE 2 03 00 00 AND ALL PRE-CAST CONCRETE SHALL BE CLASS H PER 33 42 33, 2.2.B
9. POLYPROPYLENE STEPS SHALL BE 12" WIDE AND 12" MAX. BETWEEN STEPS PER 33 42 33, 2.2.E.1. AND 3.4.D.
   CAST-IN-PLACE: CAST STEPS INTO INLET WALLS
   PRECAST: DRILL AND EPOXY OR GROUT STEPS INTO PLACE IN ACCORDANCE WITH MANUFACTURE'S RECOMMENDATIONS

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CHECKED BY		
PROJ. ENGR.		
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CITY OF DENTON
ENGINEERING SERVICES

STANDARD DETAILS

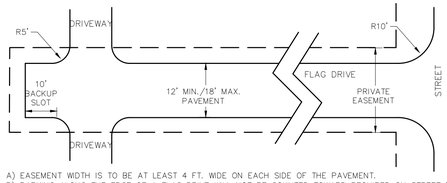
STORM DRAINAGE DETAILS

DATE
JAN. 2021

SHEET No.
12 OF 20

SCALE
HOR 1"= N.T.S.
VER 1"= N/A

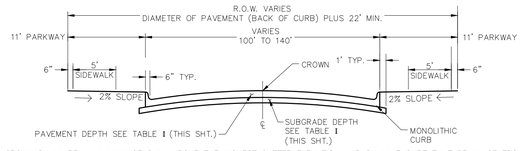
CERTIFICATION:
THIS CITY OF DENTON STANDARD DETAIL SHEET IS AUTHORIZED FOR USE IN THIS PROJECT BY THE ENGINEER WHOSE SEAL APPEARS HEREON, AND WHO CERTIFIES THE CONTENT OF THE DETAILS AND NOTES HEREIN HAVE NOT BEEN ALTERED AND ASSUMES RESPONSIBILITY FOR APPROPRIATE USE OF THE STANDARDS WITHIN THIS SHEET.



A) EASEMENT WIDTH IS TO BE AT LEAST 4 FT. WIDE ON EACH SIDE OF THE PAVEMENT.
B) PARKING ALONG THE EDGE OF A FLAG DRIVE WILL NOT BE COUNTED TOWARD REQUIRED ON STREET PARKING.
C) PAVEMENT DEPTH MINIMUM IS 6 IN. WITH COMPACTED NATURAL SOIL SUBBASE.
D) MUST MEET FIRE SPECS AND SECTION 03 00 00 AND 32 16 00.

FLAG DRIVE PLAN VIEW

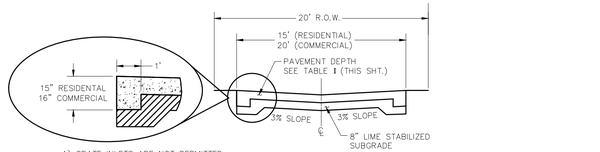
T101C



A) CROWN SHALL BE A MINIMUM OF 8 IN. ABOVE THE HIGHEST GUTTER ELEVATION AND SHALL ENSURE THAT DRAINAGE FROM CENTER COLLECTS TO NEAREST GUTTER.
B) 30 FT. RADIUS WILL BE PROVIDED AT THE JUNCTION OF THE STREET WITH THE CUL-DE-SAC.

CUL-DE-SAC SECTION

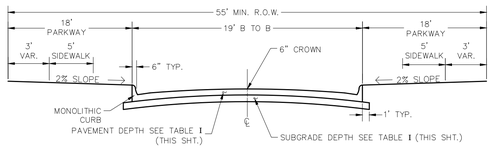
T102C



A) GRATE INLETS ARE NOT PERMITTED.
B) ANY INLET MUST BE PLACED OUTSIDE OF THE PAVEMENT.
C) TRANSITION SHALL BE GRADUAL FROM STANDARD SECTION TO INLET SECTION TO PROPERLY ACCOMMODATE DRAINAGE.
D) A DRAINAGE EASEMENT SHALL BE DEDICATED TO COMPLETELY CONTAIN THE INLET STRUCTURE PLUS SUFFICIENT ROOM FOR MAINTENANCE.

ALLEY SECTION

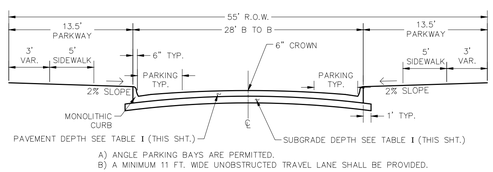
T103C



A) STANDARD PARKING IS ALLOWED ON ONE SIDE OF THE STREET FOR CROSS-SECTION SHOWN.
B) A NO PARKING RESTRICTION IS REQUIRED OPPOSITE THE SIDE OF THE STREET WHERE PARKING IS ALLOWED, UNLESS PARKING BAYS ARE PROVIDED WHERE THE NO PARKING PARKING RESTRICTION WOULD BE.
C) ANGLE PARKING BAYS ARE PERMITTED.
D) A MINIMUM 10 FT. WIDE UNOBSTRUCTED TRAVEL LANE SHALL BE PROVIDED.

RESIDENTIAL LANE SECTION

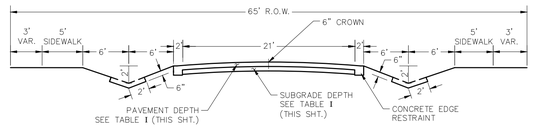
T104C



A) ANGLE PARKING BAYS ARE PERMITTED.
B) A MINIMUM 11 FT. WIDE UNOBSTRUCTED TRAVEL LANE SHALL BE PROVIDED.

RESIDENTIAL STREET SECTION

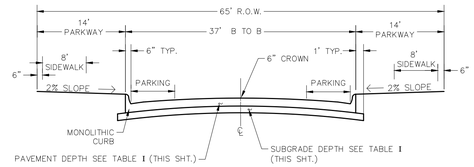
T105C



A) PILOT CHANNEL TO BE INSTALLED AT BOTTOM OF DITCH LINE.
B) PILOT CHANNEL CONCRETE SHALL BE CLASS A CONCRETE AND SHALL USE CITY APPROVED REINFORCEMENT.
C) REFER TO DENTON DEVELOPMENT CODE (DDC) FOR SIDEWALK REQUIREMENTS. IF SIDEWALK IS NOT REQUIRED, R.O.W. MAY BE REDUCED BY THE APPLICABLE AMOUNT UPON APPROVAL BY THE CITY ENGINEER.
D) ALL BORROW DITCH SLOPES 4:1 MINIMUM.
E) DITCH SHALL FULLY CONTAIN 100 YR. FLOOD. R.O.W. WIDTH SHALL BE INCREASED ACCORDINGLY TO ACCOMMODATE ANY ADDITIONAL DITCH CAPACITY WIDTH REQUIREMENTS.
F) AN UNDERGROUND DRAINAGE SYSTEM MAY BE USED IN LIEU OF LARGE BORROW DITCHES.
G) CONCRETE EDGE RESTRAINTS ARE REQUIRED.
H) NO PARKING RESTRICTION IS REQUIRED ON BOTH SIDES.

RURAL/SUBURBAN RESIDENTIAL STREET SECTION

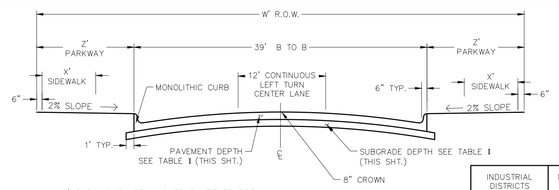
T106C



A) ANGLE PARKING BAYS ARE PERMITTED.
B) A MINIMUM 20 FT. WIDE UNOBSTRUCTED TRAVEL LANE SHALL BE PROVIDED.
C) ON-STREET PARKING CAN BE REMOVED IF LEFT TURN POCKETS ARE REQUIRED.

RESIDENTIAL STREET COLLECTOR SECTION

T107C

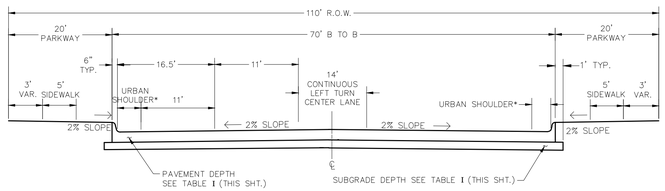


A) PARKING IS NOT ALLOWED ON EITHER SIDE.
B) PARKING BAYS ARE NOT ALLOWED ON EITHER SIDE.

	INDUSTRIAL DISTRICTS	NON-INDUSTRIAL DISTRICTS
W	ROW WIDTH	
	59 FT.	65 FT.
Z	PARKWAY WIDTH	
	10 FT.	13 FT.
X	SIDEWALK	
	5 FT.	8 FT.

COMMERCIAL STREET COLLECTOR SECTION

T108C

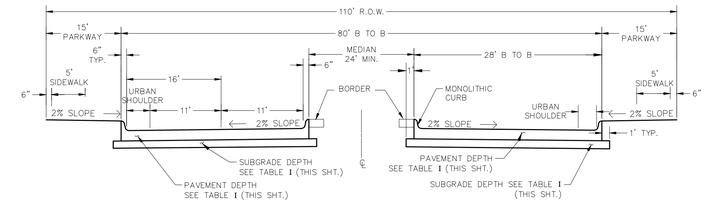


A) FOR USE IN INFILL AREAS ONLY AND UPON WRITTEN APPROVAL BY THE CITY ENGINEER
B) AN ADDITIONAL 10 FT. OF ROW SHALL BE DEDICATED FOR A RIGHT TURN BAY/LANE OR BUS BAY, WHERE REQUIRED
C) URBAN SHOULDER SHALL BE DESIGNATED BY USING A 4" WHITE PAVEMENT MARKING

* IF STREET IS DESIGNATED ON BIKE PLAN, ADD 1' FOOT TO URBAN SHOULDER FROM PARKWAY WIDTH AS NEEDED TO CREATE A 5.5 MIN. BIKE LANE.

MODIFIED SECONDARY ARTERIAL SECTION

T109C

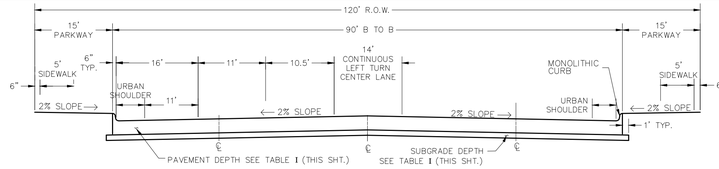


A) AN ADDITIONAL 10 FT. OF ROW SHALL BE DEDICATED FOR A RIGHT TURN BAY/LANE OR BUS BAY, WHERE REQUIRED
B) URBAN SHOULDER SHALL BE DESIGNATED BY USING A 4" WIDE WHITE PAVEMENT MARKING
C) ROW AT THE INTERSECTION WITH ANOTHER ARTERIAL SHALL BE A MIN. OF 112 FT. IN WIDTH FOR A MIN. DISTANCE OF 150 FT PRIOR TO THE CROSS-STREET'S ROW IN ORDER TO ACCOMMODATE A RIGHT TURN BAY/LANE AND A MIN. 6 FT WIDE PEDESTRIAN REFUGE ISLAND. THE TAPER PRIOR TO THIS WIDENING SHALL BE A MIN. OF 10:1 TO MATCH THE 100 FT ROW. ALL ADDITIONAL ROW AND PAVEMENT SHALL BE ON THE APPROACH SIDE (OF THE STREET) TO THE INTERSECTION.
D) BORDER SHALL BE A MIN. OF 18" IN WIDTH, PATTERNED CLASS P2 CONCRETE, COLORED TERRA COTTA RED; AND MIN. 4" DEEP. PATTERN SHALL BE APPROVED BY CITY ENGINEER PRIOR TO INSTALLATION.

* IF STREET IS DESIGNATED ON BIKE PLAN, ADD 1' FOOT TO URBAN SHOULDER FROM PARKWAY WIDTH AS NEEDED TO CREATE A 5.5 MIN. BIKE LANE.

SECONDARY ARTERIAL SECTION

T110C

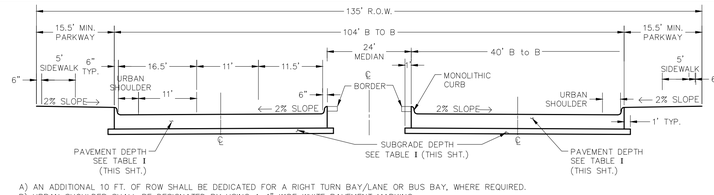


A) AN ADDITIONAL 10 FT. OF ROW SHALL BE DEDICATED FOR A RIGHT TURN BAY/LANE OR BUS BAY, WHERE REQUIRED.
B) FOR USE IN INFILL AREAS ONLY AND UPON WRITTEN APPROVAL BY THE CITY ENGINEER
C) URBAN SHOULDER SHALL BE DESIGNATED BY USING A 4" WIDE WHITE PAVEMENT MARKING

* IF STREET IS DESIGNATED ON BIKE PLAN, ADD 1' FOOT TO URBAN SHOULDER FROM PARKWAY WIDTH AS NEEDED TO CREATE A 5.5 MIN. BIKE LANE.

MODIFIED PRIMARY ARTERIAL SECTION

T111C



A) AN ADDITIONAL 10 FT. OF ROW SHALL BE DEDICATED FOR A RIGHT TURN BAY/LANE OR BUS BAY, WHERE REQUIRED.
B) URBAN SHOULDER SHALL BE DESIGNATED BY USING A 4" WIDE WHITE PAVEMENT MARKING.
C) ROW AT THE INTERSECTION WITH ANOTHER ARTERIAL SHALL BE A MIN. OF 134 FT. FOR A MIN. DISTANCE OF 150 FT PRIOR TO THE CROSS-STREET'S ROW TO ACCOMMODATE A RIGHT TURN BAY LANE AND A MIN. 6 FT WIDE PEDESTRIAN REFUGE ISLAND. THE TAPER PRIOR TO THIS WIDENING SHALL BE A MIN. OF 10:1 TO MATCH THE 122 FT ROW. ALL ADDITIONAL ROW AND PAVEMENT SHALL BE ON THE APPROACH SIDE (OF THE STREET) TO THE INTERSECTION.
D) BORDER SHALL BE A MIN. OF 18" IN WIDTH, PATTERNED CLASS P2 CONCRETE, COLORED TERRA COTTA RED; AND MIN. 4" DEEP. PATTERN SHALL BE APPROVED BY CITY ENGINEER PRIOR TO INSTALLATION.

* IF STREET IS DESIGNATED ON BIKE PLAN, ADD 1' FOOT TO URBAN SHOULDER FROM PARKWAY WIDTH AS NEEDED TO CREATE A 5.5 MIN. BIKE LANE.

PRIMARY ARTERIAL SECTION

T112C

TABLE I

PORTLAND CEMENT CONCRETE (RIGID) PAVEMENT SECTION				
PAVEMENT SECTION	DESIGN VALUE			
	ARTERIAL	COMMERCIAL COLLECTOR	RESIDENTIAL COLLECTOR	ALL RESIDENTIAL
JOINT REINFORCEMENT PAVEMENT DEPTH (INCHES)	11	10	8	7
STABILIZED SUBGRADE DEPTH (INCHES)	12	12	8	8
MINIMUM CONTINUOUS REINFORCING STEEL	#4 ON 18" CENTERS BOTH WAYS		#3 ON 18" CENTERS BOTH WAYS	

A) DEPTHS PROVIDED ARE MIN. CITY REQUIREMENTS. ENGINEER OF RECORD IS RESPONSIBLE FOR ENSURING THIS MIN. DESIGN MEETS DESIGN REQUIREMENTS FOR THE SPECIFIC PROJECT AND MAY BE REQUIRED TO PROVIDE ADDITIONAL ANALYSIS DEPENDING ON LOCAL SOIL AND MOISTURE CONDITIONS AS WELL AS HIGHER THAN EXPECTED TRAFFIC VOLUMES AND/OR TRUCK MIX.

GENERAL NOTES:

1) ALL REBAR TO BE SUPPORTED ON APPROVED PLASTIC CHAIRS.
2) APPROVED CURING COMPOUND SHALL BE APPLIED TO THE FINISHED SLAB AS SOON AS POSSIBLE AFTER PLACEMENT OF CONCRETE.
3) JOINTS ARE TO BE SAWED AS SOON AS THE SETTING OF THE CONCRETE WILL PERMIT WITHOUT SPALLING OR MARKING THE SLAB.
4) REFER TO TABLE I FOR STEEL REINFORCEMENT.
5) STANDARD DIVIDED STREET CROSS SLOPE (2% AVERAGE) MAY VARY UPON CITY ENGINEER'S APPROVAL.
6) CONCRETE SHALL BE MACHINE PLACED-CLASS P1 OR HAND PLACED-CLASS P2.
7) REFER TO THE CITY OF DENTON'S DRAINAGE CRITERIA MANUAL FOR DRAINAGE STANDARDS FOR ROADWAY DESIGNS.
8) A MAXIMUM OF 25% FLY ASH MAY BE USED.
9) ALL DIMENSIONS PROVIDED ARE MINIMUM.
10) ALTERNATE DESIGN OF STREET SECTION MAY BE CONSIDERED BY THE CITY UPON SUBMITTAL OF SEALED DESIGN PLANS AND A WRITTEN EXPLANATION FOR THE DESIGN VARIANCE FOR APPROVAL BY THE CITY ENGINEER.
11) STANDARD PARKING ANGLE IS PARALLEL. PARKING BAYS ARE REQUIRED WHEN PARKING IS NOT PARALLEL. ANGLE PARKING SHALL NOT EXCEED 60°.
12) WHEN PARKING BAYS ARE PROVIDED A MINIMUM UNOBSTRUCTED TRAVEL LANE WIDTH SHALL BE PROVIDED AND, UNLESS OTHERWISE NOTED FOR THE STREET TYPE, SHALL BE IN ACCORDANCE WITH THE DRIVE AISLE REQUIREMENT OF THE PARKING DESIGN SECTION OF THE CURRENT TRANSPORTATION DESIGN CRITERIA MANUAL. APPROPRIATE ADDITIONAL ROW IS REQUIRED TO PROVIDE THE MINIMUM PARKWAY WIDTH INDICATED FOR THE STREET TYPE.
13) SEE OTHER STANDARD DETAIL SHEETS FOR APPROPRIATE APPURTENANCES.
14) IF LAND CONTOURS REQUIRE ALTERNATE SLOPE DESIGN, ENGINEER OF RECORD SHALL SUBMIT INFORMATION SUFFICIENT FOR REVIEW AND APPROVAL BY CITY ENGINEER PRIOR TO FINAL DESIGN SUBMITTAL.
15) PAVEMENT MARKINGS SHALL BE IN ACCORDANCE WITH THE CITY OF DENTON'S SCHEMATICS M&S 004 AND/OR 005 SERIES.
16) ALL CONCRETE SHALL BE MACHINE PLACED UNLESS APPROVED BY CITY ENGINEER.
17) ONE WAY COUPLET SECTION WILL BE CONSISTENT WITH RESIDENTIAL STREET COLLECTOR. WIDTH AND DEPTH OF PAVEMENT SHALL BE IN ACCORDANCE WITH STREET CLASSIFICATION ON THIS DETAIL SHEET.

ENTERED BY	PROJECT #	
DESIGNED BY	DATE	REVISION
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CITY OF DENTON
ENGINEERING SERVICES

STANDARD DETAILS

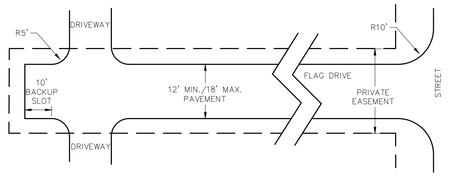
CONCRETE PAVING CROSS SECTION DETAILS

DATE
JAN. 2021

SHEET No.
13 OF 20

SCALE
HOR 1"= N.T.S.
VER 1"= N.T.S.

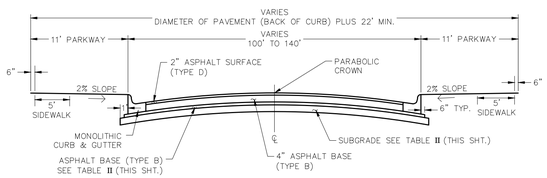
CERTIFICATION:
THIS CITY OF DENTON STANDARD DETAIL SHEET IS AUTHORIZED FOR USE IN THIS PROJECT BY THE ENGINEER WHOSE SEAL APPEARS HEREON, AND WHO CERTIFIES THE CONTENT OF THE DETAILS AND NOTES HEREIN HAVE NOT BEEN ALTERED AND ASSUMES RESPONSIBILITY FOR APPROPRIATE USE OF THE STANDARDS WITHIN THIS SHEET.



A) EASEMENT WIDTH IS TO BE AT LEAST 4 FT. WIDE ON EACH SIDE OF THE PAVEMENT.
B) PARKING ALONG THE EDGE OF A FLAG DRIVE WILL NOT BE COUNTED TOWARD REQUIRED ON-STREET PARKING.
C) PAVEMENT DEPTH MINIMUM IS 6"- TOP 2" TYPE D; BOTTOM 4" TYPE B WITH 6" MIN. LIME STABILIZED SUBGRADE
D) MUST MEET FIRE SPECS AND SECTION 03 00 00 AND 32 16 00.

FLAG DRIVE PLAN VIEW

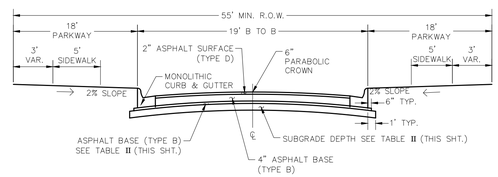
T101A



A) CROWN SHALL BE A MINIMUM OF 8 IN. ABOVE THE HIGHEST GUTTER ELEVATION AND SHALL ENSURE THAT DRAINAGE FROM CENTER COLLECTS TO NEAREST GUTTER.
B) 30 FT. RADIUS WILL BE PROVIDED AT THE JUNCTION OF THE STREET WITH THE CUL-DE-SAC.

CUL-DE-SAC SECTION

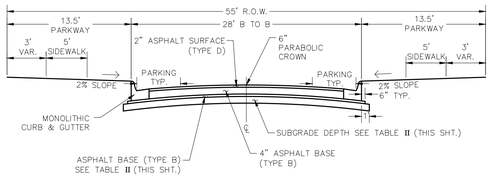
T102A



A) STANDARD PARKING IS ALLOWED ON ONE SIDE OF THE STREET FOR CROSS-SECTION SHOWN.
B) A NO PARKING RESTRICTION IS REQUIRED OPPOSITE THE SIDE OF THE STREET WHERE PARKING IS ALLOWED, UNLESS PARKING BAYS ARE PROVIDED WHERE THE NO PARKING RESTRICTION WOULD BE.
C) ANGLE PARKING BAYS ARE PERMITTED.
D) A MINIMUM 10 FT. WIDE UNOBSTRUCTED TRAVEL LANE SHALL BE PROVIDED.

RESIDENTIAL LANE SECTION

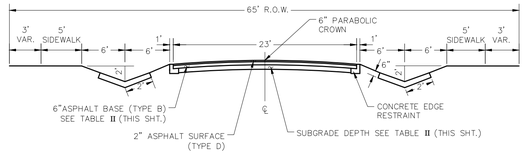
T104A



A) ANGLE PARKING BAYS ARE PERMITTED.
B) A MINIMUM 11 FT. WIDE UNOBSTRUCTED TRAVEL LANE SHALL BE PROVIDED.

RESIDENTIAL STREET SECTION

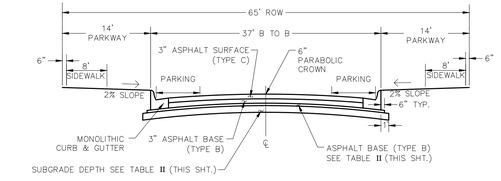
T105A



A) PILOT CHANNEL TO BE INSTALLED AT BOTTOM OF DITCH LINE.
B) PILOT CHANNEL CONCRETE SHALL BE CLASS A CONCRETE AND SHALL USE CITY APPROVED REINFORCEMENT.
C) REFER TO DENTON DEVELOPMENT CODE (DDC) FOR SIDEWALK REQUIREMENTS. IF SIDEWALK IS NOT REQUIRED, R.O.W. MAY BE REDUCED BY THE APPLICABLE AMOUNT UPON APPROVAL BY THE CITY ENGINEER.
D) ALL BORROW DITCH SLOPES 4:1 MINIMUM.
E) DITCH SHALL FULLY CONTAIN 100 YR. FLOOD. R.O.W. WIDTH SHALL BE INCREASED ACCORDINGLY TO ACCOMMODATE ANY ADDITIONAL DITCH CAPACITY WIDTH REQUIREMENTS.
F) AN UNDERGROUND DRAINAGE SYSTEM MAY BE USED IN LIEU OF LARGE BORROW DITCHES.
G) CONCRETE EDGE RESTRAINTS ARE REQUIRED.
H) NO PARKING RESTRICTION IS REQUIRED ON BOTH SIDES.

RURAL/SUBURBAN RESIDENTIAL STREET SECTION

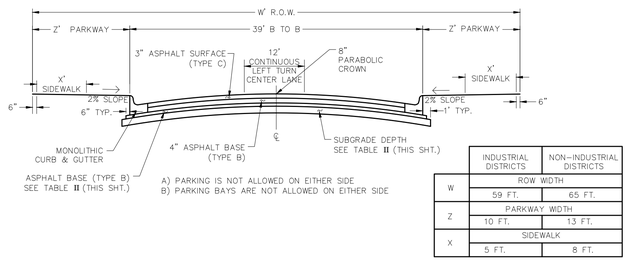
T106A



A) ANGLE PARKING BAYS ARE PERMITTED.
B) A MINIMUM 20 FT. WIDE UNOBSTRUCTED TRAVEL LANE SHALL BE PROVIDED.
C) ON-STREET PARKING CAN BE REMOVED IF LEFT TURN POCKETS ARE REQUIRED.

RESIDENTIAL STREET COLLECTOR SECTION

T107A

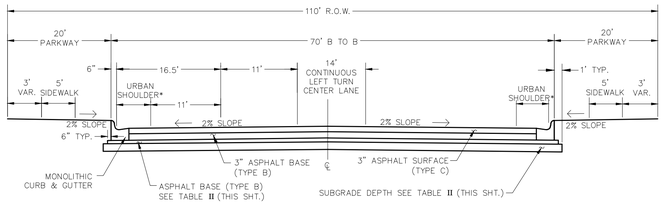


	INDUSTRIAL DISTRICTS	NON-INDUSTRIAL DISTRICTS
W	ROW WIDTH	
	59 FT.	65 FT.
Z	PARKWAY WIDTH	
	10 FT.	13 FT.
X	SIDEWALK	
	5 FT.	8 FT.

A) PARKING IS NOT ALLOWED ON EITHER SIDE
B) PARKING BAYS ARE NOT ALLOWED ON EITHER SIDE

COMMERCIAL STREET COLLECTOR SECTION

T108A

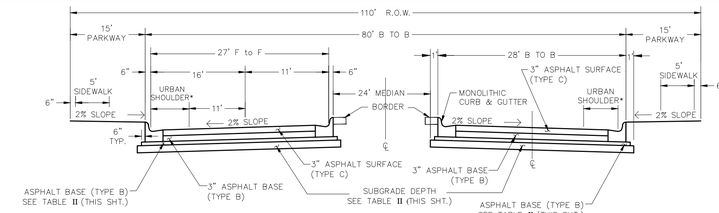


A) FOR USE IN INFILL AREAS ONLY AND UPON WRITTEN APPROVAL BY THE CITY ENGINEER
B) AN ADDITIONAL 10 FT. OF ROW SHALL BE DEDICATED FOR A RIGHT TURN BAY/LANE OR BUS BAY, WHERE REQUIRED
C) URBAN SHOULDER SHALL BE DESIGNATED BY USING A 4" WHITE PAVEMENT MARKING

* IF STREET IS DESIGNATED ON BIKE PLAN, ADD 1' FOOT TO URBAN SHOULDER FROM PARKWAY WIDTH AS NEEDED TO CREATE A 5.5 MIN. BIKE LANE.

MODIFIED SECONDARY ARTERIAL SECTION

T109A

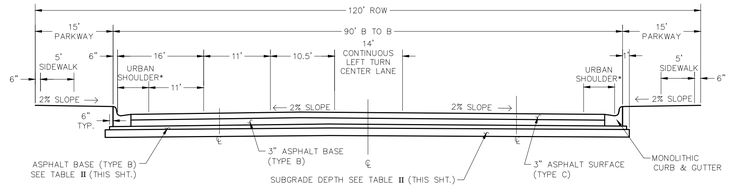


A) AN ADDITIONAL 10 FT. OF R.O.W. SHALL BE DEDICATED FOR A RIGHT TURN BAY/LANE OR BUS BAY, WHERE REQUIRED.
B) URBAN SHOULDER SHALL BE DESIGNATED BY USING A 4" WIDE WHITE PAVEMENT MARKING.
C) ROW AT THE INTERSECTION WITH ANOTHER ARTERIAL SHALL BE A MIN. OF 112 FT. IN WIDTH FOR A MIN. DISTANCE OF 150 FT PRIOR TO THE CROSS-STREET'S R.O.W. TO ACCOMMODATE A RIGHT TURN BAY/LANE AND A MIN. 6 FT WIDE PEDESTRIAN REFUGE ISLAND. THE TAPER PRIOR TO THIS WIDENING SHALL BE A MIN. OF 10:1 TO MATCH THE 100 FT ROW. ALL ADDITIONAL ROW AND PAVEMENT SHALL BE ON THE APPROACH SIDE (OF THE STREET) TO THE INTERSECTION.
D) BORDER SHALL BE A MIN. OF 18" IN WIDTH, PATTERNED CLASS P2 CONCRETE, COLORED TERRA COTTA RED; AND MIN. 4" DEEP. PATTERN SHALL BE APPROVED BY CITY ENGINEER PRIOR TO INSTALLATION.

* IF STREET IS DESIGNATED ON BIKE PLAN, ADD 1' FOOT TO URBAN SHOULDER FROM PARKWAY WIDTH AS NEEDED TO CREATE A 5.5 MIN. BIKE LANE.

SECONDARY ARTERIAL SECTION

T110A

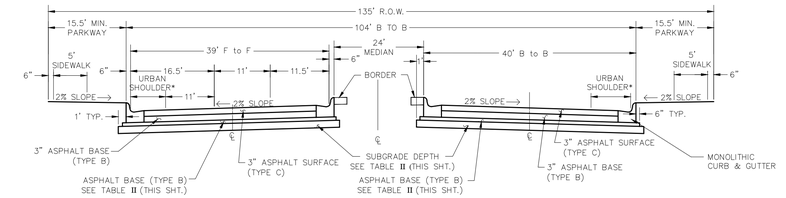


A) AN ADDITIONAL 10 FT. OF R.O.W. SHALL BE DEDICATED FOR A RIGHT TURN BAY/LANE OR BUS BAY, WHERE REQUIRED.
B) FOR USE IN INFILL AREAS ONLY AND UPON WRITTEN APPROVAL BY THE CITY ENGINEER
C) URBAN SHOULDER SHALL BE DESIGNATED BY USING A 4" WIDE WHITE PAVEMENT MARKING

* IF STREET IS DESIGNATED ON BIKE PLAN, ADD 1' FOOT TO URBAN SHOULDER FROM PARKWAY WIDTH AS NEEDED TO CREATE A 5.5 MIN. BIKE LANE.

MODIFIED PRIMARY ARTERIAL SECTION

T111A



A) AN ADDITIONAL 10 FT. OF ROW SHALL BE DEDICATED FOR A RIGHT TURN BAY/LANE OR BUS BAY, WHERE REQUIRED.
B) URBAN SHOULDER SHALL BE DESIGNATED BY USING A 4" WIDE WHITE PAVEMENT MARKING.
C) ROW AT THE INTERSECTION WITH ANOTHER ARTERIAL SHALL BE A MIN. OF 134 FT. FOR A MIN. DISTANCE OF 150 FT PRIOR TO THE CROSS-STREET'S ROW TO ACCOMMODATE A RIGHT-TURN BAY LANE AND A MIN. 6 FT WIDE PEDESTRIAN REFUGE ISLAND. THE TAPER PRIOR TO THIS WIDENING SHALL BE A MIN. OF 10:1 TO MATCH THE 122 FT ROW. ALL ADDITIONAL ROW AND PAVEMENT SHALL BE ON THE APPROACH SIDE (OF THE STREET) TO THE INTERSECTION.
D) BORDER SHALL BE A MIN. OF 18" IN WIDTH, PATTERNED CLASS P2 CONCRETE, COLORED TERRA COTTA RED; AND MIN. 4" DEEP. PATTERN SHALL BE APPROVED BY CITY ENGINEER PRIOR TO INSTALLATION.

* IF STREET IS DESIGNATED ON BIKE PLAN, ADD 1' FOOT TO URBAN SHOULDER FROM PARKWAY WIDTH AS NEEDED TO CREATE A 5.5 MIN. BIKE LANE.

PRIMARY ARTERIAL SECTION

T112A

TABLE II

PAVEMENT SECTION	ASPHALTIC CONCRETE (FLEXIBLE) PAVEMENT SECTION			
	DESIGN VALUE			
	ARTERIAL	COMMERCIAL COLLECTOR	RESIDENTIAL COLLECTOR	ALL RESIDENTIAL
ASPHALT SURFACE (INCHES)	3	3	3	2
ASPHALT BASE BETWEEN CURBS (INCHES)	3	4	3	4
ASPHALT BASE DEPTH EXTENDING BENEATH & UNDER CURB (INCHES)	6	5	3	2
STABILIZED SUBGRADE DEPTH (INCHES)	12	12	12	12

A) DEPTHS PROVIDED ARE MIN. CITY REQUIREMENTS. ENGINEER OF RECORD IS RESPONSIBLE FOR ENSURING THIS MIN. DESIGN MEETS DESIGN REQUIREMENTS FOR THE SPECIFIC PROJECT AND MAY BE REQUIRED TO PROVIDE ADDITIONAL ANALYSIS DEPENDING ON LOCAL SOIL AND MOISTURE CONDITIONS AS WELL AS HIGHER THAN EXPECTED TRAFFIC VOLUMES AND/OR TRUCK MIX.

GENERAL NOTES:

1) SEE "ASPHALT/CONCRETE STANDARD DETAILS" SHEET FOR APPROPRIATE APPURTENANCES.
2) IF LAND CONTOURS REQUIRE ALTERNATE SLOPE DESIGN, ENGINEER OF RECORD SHALL SUBMIT INFORMATION SUFFICIENT FOR REVIEW AND APPROVAL BY CITY ENGINEER PRIOR TO FINAL DESIGN SUBMITTAL INFORMATION.
3) REFER TO THE CITY OF DENTON'S DRAINAGE CRITERIA MANUAL FOR DRAINAGE STANDARDS FOR ROADWAY DESIGN.
4) ALL DIMENSIONS PROVIDED ARE MINIMUM.
5) ALTERNATE DESIGNS OF STREET SECTIONS MAY BE CONSIDERED BY THE CITY UPON SUBMITTAL OF DESIGN PLANS AND A WRITTEN EXPLANATION FOR THE DESIGN VARIANCE FOR APPROVAL BY THE CITY ENGINEER.
6) THE STANDARD PARKING ANGLE IS PARALLEL. PARKING BAYS ARE REQUIRED WHEN PARKING IS NOT PARALLEL. ANGLE PARKING SHALL NOT EXCEED 60°.
7) WHEN PARKING BAYS ARE PROVIDED, A MINIMUM UNOBSTRUCTED TRAVEL LANE WIDTH SHALL BE PROVIDED AND, UNLESS OTHERWISE NOTED FOR THE STREET TYPE, SHALL BE IN ACCORDANCE WITH THE DRIVE AISLE REQUIREMENT OF THE PARKING DESIGN SECTION OF THE CURRENT TRANSPORTATION DESIGN CRITERIA MANUAL. APPROPRIATE ADDITIONAL ROW IS REQUIRED TO PROVIDE THE MINIMUM PARKWAY WIDTH INDICATED FOR THE STREET TYPE.
8) STANDARD DIVIDED STREET CROSS SLOPE (2% AVERAGE) MAY VARY UPON CITY ENGINEER'S APPROVAL.
9) PAVEMENT MARKINGS SHALL BE IN ACCORDANCE WITH THE CITY OF DENTON'S SCHEMATICS M & S 004 AND/OR 005 SERIES, AS MAY APPLY.
10) ONE WAY COUPLET SECTION WILL BE CONSISTENT WITH RESIDENTIAL STREET COLLECTOR. WIDTH AND DEPTH OF PAVEMENT SHALL BE IN ACCORDANCE WITH STREET CLASSIFICATION ON THIS DETAIL SHEET.

ENTERED BY	PROJECT #	
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CITY OF DENTON
ENGINEERING SERVICES

STANDARD DETAILS

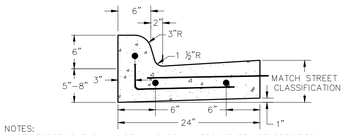
ASPHALT PAVING CROSS SECTION DETAILS

DATE
JAN. 2021

SHEET No.
14 OF 20

SCALE
HOR 1"= N.T.S.
VER 1"= N.T.S.

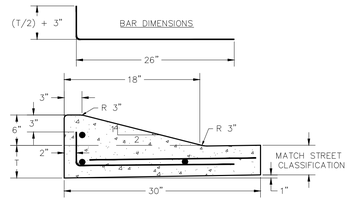
CERTIFICATION:
THIS CITY OF DENTON STANDARD DETAIL SHEET IS AUTHORIZED FOR USE IN THIS PROJECT BY THE ENGINEER WHOSE SEAL APPEARS HEREON, AND WHO CERTIFIES THE CONTENT OF THE DETAILS AND NOTES HEREIN HAVE NOT BEEN ALTERED AND ASSUMES RESPONSIBILITY FOR APPROPRIATE USE OF THE STANDARDS WITHIN THIS SHEET.



NOTES:
1. REINFORCEMENT SHALL BE #4 BARS UNLESS OTHERWISE SPECIFIED
2. USE MINIMUM CLASS P1 CONCRETE

STANDARD CURB AND GUTTER SECTION
WITH ASPHALT PAVING

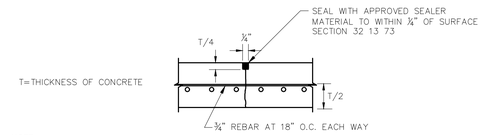
T201A



NOTES:
1. REINFORCEMENT SHALL BE #4 BARS UNLESS OTHERWISE SPECIFIED
2. USE MINIMUM CLASS P1 CONCRETE

SURMOUNTABLE CURB AND GUTTER SECTION
WITH ASPHALT PAVING

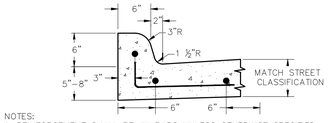
T204A



NOTE:
1. FOR PAVEMENT OUTSIDE AN INTERSECTION'S PCs
(a) TRANVERSE/LATERAL SAWED JOINT SHALL BE PLACED EVERY 20' EXCEPT AT EXPANSION JOINT OR CONSTRUCTION JOINT.
(b) LONGITUDINAL SAWED JOINT SHALL BE PLACED AT CENTER OF PAVEMENT WHEN THERE IS NO CONSTRUCTION JOINT.
2. FOR PAVEMENT INSIDE AN INTERSECTION'S PCs, BOTH TRANSVERSE/LATERAL AS WELL AS LONGITUDINAL SAW JOINTS SHALL BE PLACED EVERY 20' OR AT AN AVERAGE AS CLOSE TO 20' AS REASONABLY POSSIBLE
3. SAW JOINT IS TO BE CONTINUOUS THROUGH CURB, WHEN APPLICABLE.

SAWED JOINT
FOR CONCRETE PAVEMENT

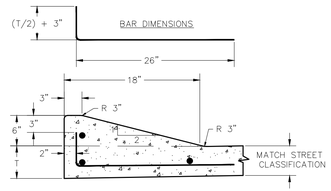
T207



NOTES:
1. REINFORCEMENT SHALL BE #4 BARS UNLESS OTHERWISE SPECIFIED
2. USE MINIMUM CLASS P1 CONCRETE

STANDARD MONOLITHIC CURB AND GUTTER SECTION
WITH CONCRETE PAVING

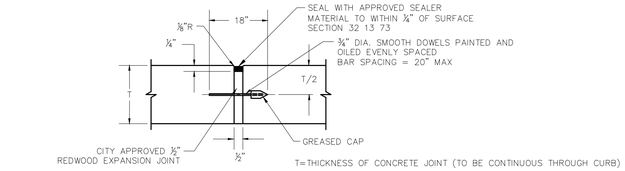
T201C



NOTES:
1. REINFORCEMENT SHALL BE #4 BARS UNLESS OTHERWISE SPECIFIED
2. USE MINIMUM CLASS P1 CONCRETE

SURMOUNTABLE MONOLITHIC CURB AND GUTTER SECTION
WITH CONCRETE PAVING

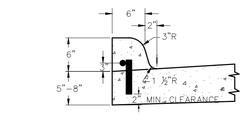
T204C



NOTES:
1. TO BE PLACED AT THE PC'S OF AN INTERSECTION AND THEN EVERY 200' MAXIMUM THEREAFTER AWAY FROM THE INTERSECTION (EXCEPT AS NOTED)
2. IF THE LAST PROPOSED EXPANSION JOINT PRIOR TO THE NEXT INTERSECTION'S PC'S EXPANSION JOINT IS LESS THAN 50', THEN NO EXPANSION JOINT (THE LAST PANEL WILL BE GREATER THAN 200' BUT LESS THAN 250')
3. IF THE LAST PROPOSED EXPANSION JOINT PRIOR TO THE NEXT INTERSECTION'S PC'S EXPANSION JOINT IS 50' OR GREATER BUT LESS THAN 200', THEN PLACE THE LAST EXPANSION JOINT SUCH THAT EACH CONCRETE PANEL (ON EACH SIDE OF SAID EXPANSION JOINT) ARE EQUAL TO EACH OTHER (AND EACH IS LESS THAN 200')

EXPANSION JOINT
FOR CONCRETE PAVEMENT

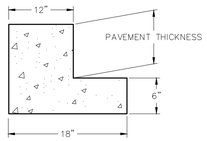
T208



NOTES:
1. #4 STEEL BARS ON HORIZONTAL
2. 6" LONG ½" STEEL BARS ON VERTICAL 24" CENTERS
3. USE MINIMUM CLASS P1 CONCRETE
4. WHEN ATTACHING NEW CURB TO EXISTING CONCRETE, DRILL ¾" DIA. HOLES INTO EXISITNG CONCRETE. BLOW HOLES CLEAN AND SECURE REBAR OF CORRECT SIZE AS REQUIRED FOR PAVEMENT WITH EPOXY GROUT

CONCRETE PAVEMENT ALTERNATE CURB DOWELED CURB SECTION
(UPON APPROVAL BY CITY ENGINEER)

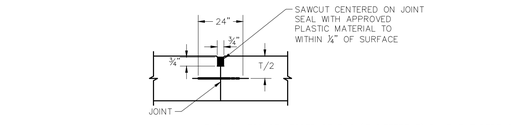
T202



NOTES:
1. USE MINIMUM CLASS P1 CONCRETE
2. PAVEMENT THICKNESS SHALL BE IN ACCORDANCE WITH TABLE ON "ASPHALT CONCRETE PAVING" STANDARD DETAIL SHEET PER STREET TYPE

PORTLAND CEMENT CONCRETE EDGE RESTRAINT
FOR RURAL/SUBURBAN ASPHALT STREET

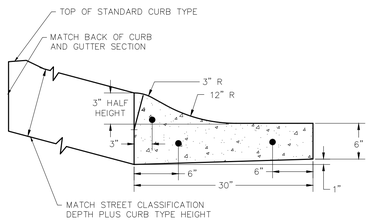
T205



NOTES:
1. FOR NEW ASPHALTIC CONCRETE PAVEMENT TO EXISTING ASPHALTIC CONCRETE PAVEMENT, REBAR IS NOT REQUIRED.
2. FOR NEW PORTLAND CEMENT CONCRETE TO EXISTING PORTLAND CEMENT CONCRETE, REBAR IS REQUIRED.
3. IF REBAR IS REQUIRED AS NOTED ABOVE:
(a) DRILL, DOWEL AND EPOXY #3 REBAR INTO EXISTING PAVEMENT
(b) #3 REBAR TO EXTEND A MINIMUM OF 12" INTO BOTH PAVEMENTS
(c) #3 REBAR TO BE A MAXIMUM OF 18" ON CENTER

CONSTRUCTION JOINT

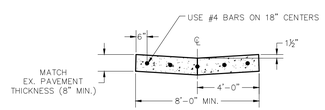
T209



NOTES:
1. REINFORCEMENT SHALL BE #4 BARS UNLESS OTHERWISE SPECIFIED
2. USE MINIMUM CLASS P1 CONCRETE

SURMOUNTABLE TRAFFIC CALMING CURB AND GUTTER
WITH TRANSITION TO FULL HEIGHT CURB

T203



NOTES:
1. REFER TO CONC. PAVEMENT DETAIL SHT. FOR JOINT DETAILS
2. CONCRETE SHALL BE MACHINE PLACED–CLASS P1 OR HAND PLACED–CLASS P2.

VALLEY GUTTER

T206

GENERAL NOTES:

1. PAVEMENT DEPTH(S) INDICATED ARE MINIMUM AND MAY BE INCREASED UPON RECOMMENDATION OF ENGINEER OF RECORD. PAVEMENT DEPTH SHALL BE CONSISTENT FOR ALL APPLICABLE DETAILS.

2. #3 REBAR INDICATED ARE MINIMUM AND MAY BE INCREASED UPON RECOMMENDATION OF ENGINEER OF RECORD. REBAR SIZE SHALL BE CONSISTENT FOR ALL APPLICABLE DETAILS.

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DESIGNED BY	DATE	REVISION
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CITY OF DENTON
ENGINEERING SERVICES

STANDARD DETAILS
CURB & GUTTER AND JOINT DETAILS

DATE
JAN. 2021

SHEET No.
15 OF 20

SCALE
HOR 1"= N.T.S.
VER 1"= N.T.S.

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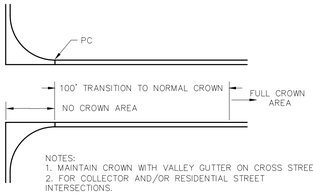
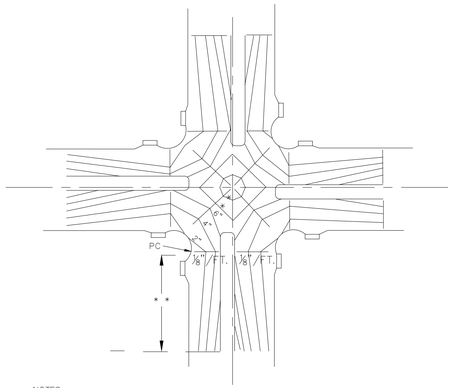


NOTES:
1. MAINTAIN CROWN WITH VALLEY GUTTER ON CROSS STREET.
2. FOR COLLECTOR AND/OR RESIDENTIAL STREET INTERSECTIONS.
3. FOR A COLLECTOR OR A RESIDENTIAL STREET THAT INTERSECTS WITH AN ARTERIAL.

CROWN DETAIL FOR RESIDENTIAL OR COLLECTOR APPROACHES TO AN INTERSECTION

T301

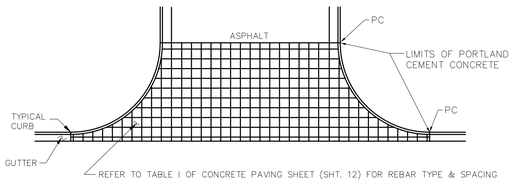


NOTES:
1. INFORMATION PROVIDED IS TYPICAL FOR EACH APPROACH.
2. INLETS REQUIRED WHEN DRAINAGE IS TOWARD INTERSECTION.
3. INTENT OF SLOPE CONFIGURATION TO BE MAINTAINED IF ONE OR BOTH ARTERIAL STREETS ARE UNDIVIDED.

* ADDITIONAL 2 INCH INCREMENT TYPICAL WHEN REQUIRED/APPLICABLE.
* * MINIMUM 130' PER 1/8" REDUCTION IN CROSS-SLOPE.

CROWN DETAIL
TYPICAL CONTOURS FOR INTERSECTION OF ARTERIAL STREETS

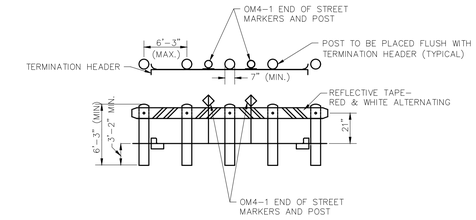
T302



NOTES:
1. PORTLAND CEMENT CONCRETE DEPTH TO MATCH STREET'S FULL DEPTH ASPHALTIC CONCRETE PAVEMENT.
2. SUBBASE DEPTH TO MATCH.
3. USE MINIMUM CLASS P1 CONCRETE WITHIN LIMITS SHOWN.
4. LIMITS SHOWN ARE FOR EACH APPROACH FOR WHICH THE STREETS PAVEMENT IS ASPHALTIC CONCRETE.
5. REBAR GRID/PORTLAND CEMENT CONCRETE TO INCLUDE ALL OF INTERSECTION.

INTERSECTION APPROACH
(FOR ASPHALT STREET)

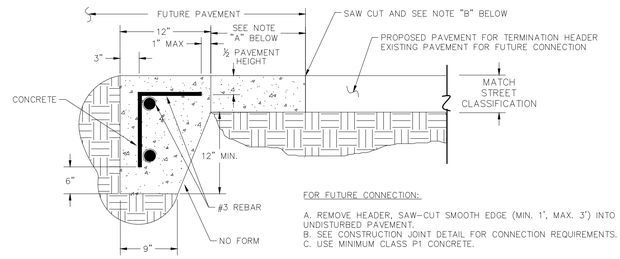
T303



NOTES:
1. REFER TO TMUTCD FIGURE 2C-13 FOR OM4-1 END OF STREET MARKER AND POST.

DEAD END BARRICADE

T304



FOR FUTURE CONNECTION:

A. REMOVE HEADER, SAW-CUT SMOOTH EDGE (MIN. 1", MAX. 3") INTO UNDISTURBED PAVEMENT.
B. SEE CONSTRUCTION JOINT DETAIL FOR CONNECTION REQUIREMENTS.
C. USE MINIMUM CLASS P1 CONCRETE.

STREET TERMINATION HEADER SECTION

T305

GENERAL NOTES:

1. PAVEMENT DEPTH(S) INDICATED ARE MINIMUM AND MAY BE INCREASED UPON RECOMMENDATION OF ENGINEER OF RECORD. PAVEMENT DEPTH SHALL BE CONSISTENT FOR ALL APPLICABLE DETAILS.

2. #3 REBAR INDICATED ARE MINIMUM AND MAY BE INCREASED UPON RECOMMENDATION OF ENGINEER OF RECORD. REBAR SIZE SHALL BE CONSISTENT FOR ALL APPLICABLE DETAILS.

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DESIGNED BY	DATE	REVISION
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CITY OF DENTON
ENGINEERING SERVICES

STANDARD DETAILS

INTERSECTION/HEADER/DEAD END BARRICADE DETAILS

DATE
JAN. 2021

SHEET No.
16 OF 20

SCALE
HOR 1"= N.T.S.
VER 1"= N.T.S.

CERTIFICATION:
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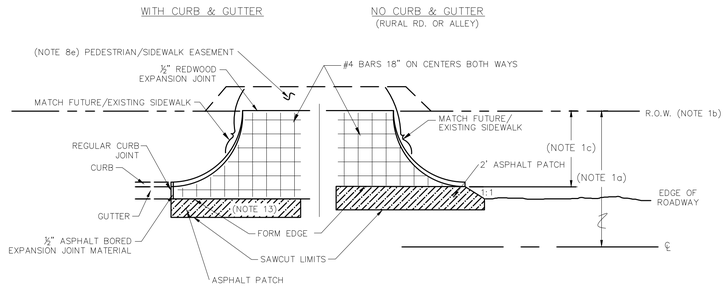
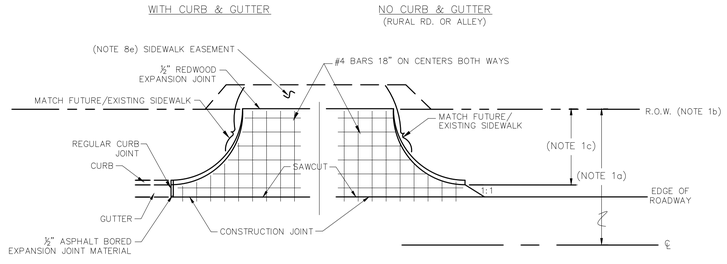


STANDARD DRIVE APPROACH–REINFORCEMENT PLAN
EXISTING ASPHALT STREET

T306A



STANDARD DRIVE APPROACH–REINFORCEMENT PLAN
EXISTING CONCRETE STREET

T306C

STANDARD DRIVE APPROACH–DIMENSION TABLE

DRIVE APPROACH			
USE	WIDTH	RADIUS	MIN. THICKNESS*
SINGLE FAMILY & DUPLEX RESIDENTIAL	MIN. WIDTH = 12 FEET MAX. WIDTH = 20 FEET	5 FEET	6 INCHES
MULTI–FAMILY RESIDENTIAL	MIN. WIDTH = 24 FEET MAX. WIDTH = 38 FEET	10 TO 20 FEET	8 INCHES
COMMERCIAL & INDUSTRIAL	MIN. WIDTH = 30 FEET MAX. WIDTH = 38 FEET	20 TO 25 FEET	8 INCHES

1. THICKNESS AND REINFORCEMENT TO BE DESIGNED BY ENGINEER OF RECORD. MATERIAL TO BE CLASS P2 REINFORCED CONCRETE WITH A MINIMUM OF #4 BARS ON 18" CENTERS BOTH WAYS.
2. ALL DESIGNS MUST MEET THE MINIMUM APPROVED REQUIREMENTS OF THE STANDARD DRIVE APPROACH DIMENSION TABLE.

GENERAL NOTES:

NOTES:
1. IF ROW IS UNDETERMINED OR ULTIMATE STREET ROW HAS NOT BEEN OBTAINED:
 (a) HALF PROPOSED R.O.W. WIDTH FOR "ASPHALT PAVING" OR "CONCRETE PAVING" IN ACCORDANCE WITH CITY DESIGNATION OF STREET CLASSIFICATION.
 (b) R.O.W. LINE AS DETERMINED IN 1a.
 (c) PARKWAY WIDTH IN ACCORDANCE WITH CITY DESIGNATION OF STREET CLASSIFICATION.
2. JOINTS ARE TO BE SAWED AS SOON AS THE SETTING OF THE CONCRETE WILL PERMIT WITHOUT SPALLING OR MARKING THE SLAB. AN APPROVED CURING COMPOUND SHALL BE APPLIED TO THE FINISHED SLAB PRIOR TO THE LOSS OF SURFACE MOISTURE AND NO LATER THAN 30 MIN. AFTER FINISHING OPERATIONS.
3. SUBGRADE FOR DRIVE APPROACH SHALL HAVE 98% COMPACTION. SUBGRADE SHALL HAVE LIME STABILIZATION IN ACCORDANCE WITH CITY STANDARD FOR HEAVY DUTY DRIVE AISLE.
4. DRIVE APPROACH GREATER THAN 12' IN WIDTH SHALL HAVE A TOOLED JOINT PERPENDICULAR TO THE CURB LINE, FROM THE FRONT OF THE GUTTER TO THE BACK OF THE DRIVE APPROACH, AT THE MIDPOINT. DRIVE APPROACHES WITH A WIDTH GREATER THAN 24' SHALL HAVE TWO OR MORE PERPENDICULAR TOOLED JOINTS PLACED AT THE DIRECTION OF THE ENGINEER OF RECORD.
5. DRIVE APPROACHES SHALL END AT THE ROW AND SHALL HAVE A ½" REDWOOD BOARD EXPANSION JOINT.
6. ASPHALT PATCH ONLY WHEN ROADWAY IS ASPHALT.
7. ALL JOINTS SHALL BE SEALED.
8. DRIVE APPROACH SLOPE REQUIREMENTS:
 (a) MAXIMUM SIDEWALK CROSS SLOPE WITHIN THE LIMITS OF THE DRIVE APPROACH SHALL BE 2%
 (b) MINIMUM DRIVE APPROACH SLOPE SHALL BE DETERMINED BY: S=(6+[0.02xWx12])/(Wx12) WHERE W=THE WIDTH OF THE PARKWAY IN FEET.
 (c) MAXIMUM DRIVE APPROACH SLOPE WITHIN THE ROW SHALL BE 8%
 (d) THE DRIVE APPROACH SLOPE FROM THE BOTTOM OF THE GUTTER TO THE NEAREST EDGE OF THE SIDEWALK (WITHIN THE LIMITS OF THE ROW) SHALL NOT EXCEED THE DRIVEWAY/DRIVE AISLE SLOPE BEGINNING AT THE FURTHERMOST EDGE OF THE SIDEWALK (FROM THE BOTTOM OF THE GUTTER). IT SHALL ALSO NOT BE LESS THAN THE MINIMUM SLOPE NOR BE GREATER THAN THE MAXIMUM SLOPE AS NOTED HEREIN.
 (e) WHERE THE PARKWAY WIDTH IS INSUFFICIENT TO PROVIDE APPROPRIATE DRIVE APPROACH SLOPE, THEN A SIDEWALK EASEMENT EQUAL TO THE BALANCE OF THE SIDEWALK WIDTH NEEDED OUTSIDE THE ROW PLUS 2' SHALL BE PROVIDED FOR SIDEWALK INSTALLATION/MAINTENANCE PURPOSES. NOTE: BECAUSE OF BOTH VARIABLE PARKWAY AND SIDEWALK WIDTHS, THE MINIMUM SLOPE IS DETERMINED WITHOUT CONSIDERATION OF ANY SIDEWALK WHICH MIGHT BE PARTIALLY OR ENTIRELY CONTAINED WITHIN THE ROW. THE INCLUSION OF MAX. 2% CROSS–SLOPE REQUIREMENT FOR THE SIDEWALK WIDTH, RELATIVE TO THE PARKWAY'S WIDTH, SHALL BE MANDATORY WHEN DETERMINING THE POTENTIAL SLOPE NEEDS OF ANY DRIVE APPROACH FOR ANY SITE AND THUS ANY NEED FOR A SIDEWALK EASEMENT. CALCULATIONS WILL BE PROVIDED BY THE PERSON IN CHARGE OF THE DESIGN OF THE DRIVE APPROACH CHANGE AT THE TIME OF PLATTING, OR PRIOR TO THE DRIVE APPROACH'S CONSTRUCTION (WHICHEVER IS FIRST) TO DETERMINE THE NEED OF A SIDEWALK EASEMENT. IF NEEDED, THE PERSON IN CHARGE OF THE DESIGN OF THE DRIVE APPROACH CHANGE SHALL INDICATE THE MINIMUM WIDTH OF SAID SIDEWALK EASEMENT'S REQUIREMENTS ON THE APPLICABLE DOCUMENTS IN ACCORDANCE WITH THE REQUIREMENTS OF THIS NOTE (8a–e).
9. REMOVE AND REPLACE ALL CURB AND GUTTER WITHIN THE LIMITS OF CONSTRUCTION.
10. NEW CURB AND GUTTER SHALL BE POURED MONOLITHIC WITH THE DRIVE APPROACH.
11. FOR RESIDENTIAL DRIVE APPROACHES:
 (a) USE MINIMUM CLASS P2 CONCRETE; MIN. 6" DEPTH.
 (b) USE #4 BARS ON 18" CENTERS BOTH WAYS.
12. FOR ALL OTHER DRIVE APPROACHES, INCLUDING APARTMENTS.
 (a) USE MINIMUM CLASS P2 CONCRETE; MIN. 8" DEPTH.
 (b) USE #4 BARS ON 18" CENTERS, BOTH WAYS.
13. SAW–CUT SMOOTH EDGE (1' MIN.–3' MAX.) INTO UNDISTURBED PAVEMENT. THE SAW–CUT IS TO BE CONTINUOUS AND FOLLOW IN A LINEAR MANNER WITHOUT SHARP–CUT ANGLES. THE SAW–CUT SHALL BE FULL PENETRATION OF THE PAVEMENT, FOR THE ENTIRE DEPTH OF THE PAVEMENT. THE SAW–CUT AT THE PAVEMENT'S FACE SHALL BE SMOOTH AND VERTICAL, WITH A MINIMUM OF SPOILS FOR THE ENTIRE DEPTH OF THE SAW–CUT AND SHALL BE SO MAINTAINED UNTIL AT SUCH TIME AS THE JOINING OF THE NEW PAVEMENT TO IT. IF THE EXISTING PAVEMENT'S FACE AT THE SAW–CUT, IS NOT SMOOTH AND VERTICAL AND WITH A MINIMUM OF SPALLS AT THE TIME OF JOINING OF NEW PAVEMENT, ADDITIONAL SAW–CUTTING TO STABLE PAVEMENT AND IN ACCORDANCE WITH THE CONDITIONS NOTED HEREIN CAN BE REQUIRED BY THE CITY INSPECTOR AT SAID INSPECTOR'S DISCRETION. APPROPRIATE JOINTING MATERIAL(S) AND METHODS SHALL BE USED AT THE JUNCTION OF EXISTING AND NEW PAVEMENT, IN ACCORDANCE WITH THE CITY REQUIREMENTS. REMOVE PAVEMENT WITHIN SAW LIMITS. INSTALL SUBBASE AND PAVEMENT IN ACCORDANCE WITH DRIVE APPROACH REQUIREMENTS.
14. THE DRIVE APPROACH SLOPE WITHIN THE SIDEWALK EASEMENT (IF PROVIDED) AND/OR WITHIN THE SITE SHALL NOT CHANGE FROM PLUS TO MINUS WITHOUT HAVING A TRANSITIONAL AREA (NEARLY FLAT) OF NOT LESS THAN 3' OR AS APPROVED BY THE CITY ENGINEER IN WRITING PRIOR TO CONSTRUCTION.
15. DRIVEWAY OR DRIVE AISLE CONSTRUCTION WHICH EXTENDS INTO THE PROPERTY AND/OR PAST THE DRIVE APPROACH RADIUS SHALL HAVE A TRANSVERSE TOOLED JOINT AT THE RADIUS POINT AND A ½" ASPHALT BOARD EXPANSION JOINT AT THE OTHER CONNECTION (PROPERTY LINE, ETC.).
16. PAVEMENT DEPTHS INDICATED ARE MINIMUM AND MAYBE INCREASED UPON RECOMMENDATION OF ENGINEER OF RECORD–PAVEMENT DEPTH SHALL BE CONSISTENT FOR ALL APPLICABLE DETAILS.
17. #4 BARS INDICATED ARE MINIMUM AND MAY BE INCREASED UPON RECOMMENDATION OF ENGINEER OF RECORD–REBAR SIZE SHALL BE CONSISTENT FOR ALL APPLICABLE DETAILS.
18. ALL REBAR TO BE SUPPORTED ON APPROVED PLASTIC CHAIRS.

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CITY OF DENTON
ENGINEERING SERVICES

STANDARD DETAILS

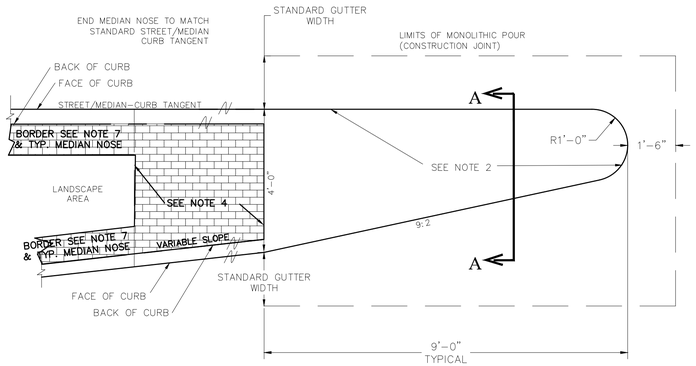
DRIVE APPROACH DETAILS

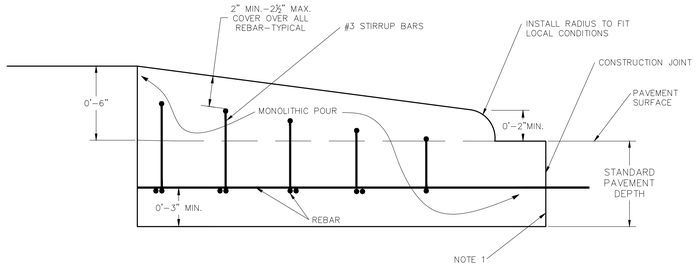
DATE
JAN. 2021

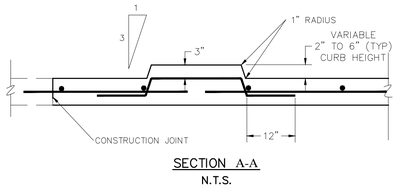
SHEET No.
17 OF 20

SCALE
HOR 1"= N.T.S.
VER 1"= N.T.S.

CERTIFICATION:
THIS CITY OF DENTON STANDARD DETAIL SHEET IS AUTHORIZED FOR USE IN THIS PROJECT BY THE ENGINEER WHOSE SEAL APPEARS HEREON, AND WHO CERTIFIES THE CONTENT OF THE DETAILS AND NOTES HEREIN HAVE NOT BEEN ALTERED AND ASSUMES RESPONSIBILITY FOR APPROPRIATE USE OF THE STANDARDS WITHIN THIS SHEET.



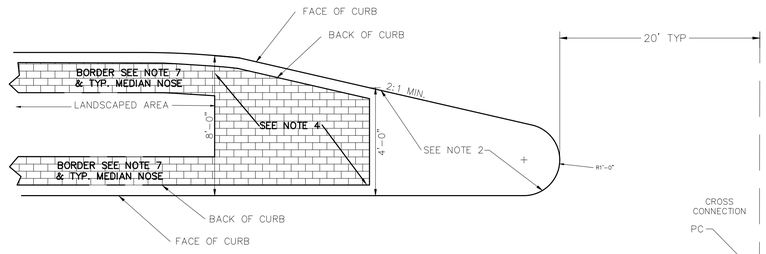




SECTION A-A
N.T.S.

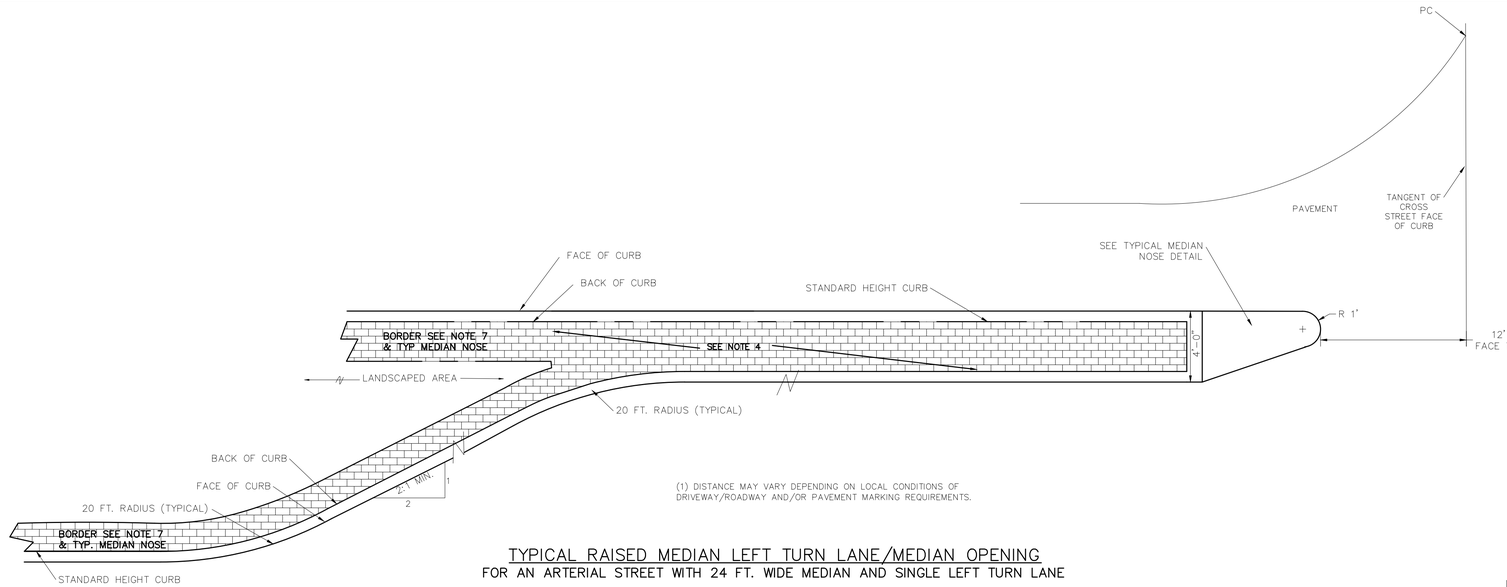
TYPICAL MEDIAN NOSE

T401



TYPICAL RAISED MEDIAN OPPOSITE LEFT TURN POCKET AT A "T" CROSS CONNECTION

T402



(1) DISTANCE MAY VARY DEPENDING ON LOCAL CONDITIONS OF DRIVEWAY/ROADWAY AND/OR PAVEMENT MARKING REQUIREMENTS.

TYPICAL RAISED MEDIAN LEFT TURN LANE/MEDIAN OPENING
FOR AN ARTERIAL STREET WITH 24 FT. WIDE MEDIAN AND SINGLE LEFT TURN LANE

T403

GENERAL MEDIAN NOTES:

1. WHEN MATCHING EXISTING PAVEMENT WITH NEW MEDIAN NOSE
   - A. MATCHING CONCRETE:
     - i. WHEN MEDIAN NOSE IS POURED FIRST AND THEN ADJACENT PAVEMENT: REBAR WITHIN MONOLITHIC POUR AREA SHALL EXTEND A MINIMUM OF 18 IN. BEYOND LIMITS OF MONOLITHIC POUR.
     - ii. WHEN ADJACENT PAVEMENT IS POURED FIRST AND THEN NOSE MEDIAN: REBAR THAT IS WITHIN ADJACENT PAVEMENT SHALL EXTEND A MINIMUM OF 18 INCHES INTO MONOLITHIC POUR AREA.
     - iii. WHEN ATTACHING NEW MEDIAN NOSE TO EXISTING CONCRETE, DRILL ¾ IN. DIAMETER HOLES, A MINIMUM OF 18 INCHES INTO EXISTING PAVEMENT, BLOW HOLES CLEAN AND SECURE REBAR OF SAME SIZE AS REQUIRED FOR PAVEMENT WITH EPOXY GROUT
   - B. MATCHING EXISTING ASPHALT: REBAR WITHIN THE MONOLITHIC POUR AREA TO EXTEND TO FACE OF ASPHALT PAVEMENT
2. CONCRETE FOR MONOLITHIC POUR PORTION TO BE OF SAME DEPTH REQUIREMENT IN ADDITION TO NOTED PORTION ABOVE THE PAVEMENT SURFACE AS ADJOINING PAVEMENT REQUIREMENTS AS IF PAVEMENT WERE CONCRETE. USE MINIMUM CLASS P2 CONCRETE.
3. REINFORCEMENT BARS FOR THE MEDIAN NOSE SHALL MATCH THOSE IN PAVEMENT FOR SIZE AND SEPARATION UNLESS OTHERWISE NOTED HEREIN.
4. PATTERNED CLASS P2 CONCRETE IS REQUIRED FOR THE PORTION OF THE MEDIAN LESS THAN OR EQUAL TO 8 FT. WIDE AND GREATER THAN OR EQUAL TO 4 FT. WIDE. FACE OF CURB TO FACE OF CURB AS DIRECTED BY THE CITY. IT SHALL BE COLORED TERRA COTTA, MINIMUM DEPTH SHALL BE 6 INCHES WITH #3 REBAR ON 18 IN. CENTERS. CONCRETE PATTERN SHALL BE $\frac{1}{10}$th IN. DEEP. THE PATTERN AND COLOR SHALL BE APPROVED BY THE CITY ENGINEER OR THEIR DESIGNEE PRIOR TO INSTALLATION.
5. FOR THE MEDIAN NOSE, STIRRUP BARS SHALL MATCH THOSE IN PAVEMENT FOR SIZE AND SEPARATION.
6. FOR THE MEDIAN NOSE, STIRRUP BARS SHALL EXTEND WITHIN 1 FT. OF LIMITS OF MONOLITHIC POUR.
7. MEDIAN BORDER SHALL BE 18 IN. MIN. IN WIDTH PATTERNED CLASS P2 CONCRETE, COLORED TERRA COTTA RED, MINIMUM 4 IN. DEPTH WITH APPROVED REINFORCEMENT. CONCRETE PATTERN SHALL BE 1/10TH INCH DEEP AND THE STYLE SHALL BE APPROVED BY CITY PRIOR TO INSTALLATION. THE PATTERN AND COLOR SHALL BE APPROVED BY THE CITY ENGINEER OR THEIR DESIGNEE.
8. PAVEMENT MARKINGS IN OR DOWNSTREAM OF INTERSECTION:
   - A. IMMEDIATELY DOWNSTREAM OF THE INTERSECTION, THE LANE CONFIGURATION WILL BE: INSIDE VEHICLE LANE=13 FEET WIDE; MIDDLE VEHICLE LANE=11 FEET WIDE (FOR A 6-LANE DIVIDED ARTERIAL); OUTSIDE LANE-FOR A PORTLAND CEMENT CONCRETE PAVEMENT STREET WITH INTEGRAL CURB AND GUTTER=11 FEET WIDE VEHICLE LANE WITH BALANCE BEING A MARKED URBAN SHOULDER OR FOR A ASPHALTIC CONCRETE PAVEMENT STREET WITH SEPARATE PORTLAND CEMENT CONCRETE PAVEMENT CURB AND GUTTER=THE BALANCE OF THE WIDTH OF PAVEMENT BEING THE VEHICLE LANE WITH NO MARKED URBAN SHOULDER. THE VEHICLE LANES SHALL BE DEFINED BY THE INSTALLATION OF A TYPE **II**A(3.A) PAVEMENT MARKING; THE URBAN SHOULDER (WHEN INSTALLED) SHALL BE A TYPE **I**A(2.A) PAVEMENT MARKING. SAID LANE CONFIGURATION/PAVEMENT MARKINGS SHALL CONTINUE, AS NOTED, TO (AND THEN BE SUSPENDED AT) THE UPSTREAM EDGE OF THE TYPE **V**A(14.) PEDESTRIAN CROSSWALK PAVEMENT MARKING. SAID TYPE **I**A(3.A) PAVEMENT MARKINGS SHALL THEN CONTINUE AS NOTED, BEGINNING AT THE DOWNSTREAM EDGE OF THE TYPE **V**A(14.) PEDESTRIAN CROSSWALK PAVEMENT MARKING AND IMMEDIATELY BEGIN A TAPER OF 40:1 FOR 80 FEET SUCH THAT THE INSIDE LANE=11 FEET; MIDDLE VEHICLE LANE=11 FEET WIDE; OUTSIDE VEHICLE LANE=11 FEET WIDE, WITH THE BALANCE BEING A MARKED URBAN SHOULDER. THIS CONFIGURATION WILL CONTINUE FOR 40 FEET AT WHICH TIME THE NOTED VEHICLE TYPE **I**A(3.A) PAVEMENT MARKING SHALL END AND TYPE **I**A(5.A) PAVEMENT MARKINGS SHALL BEGIN.
   - B. OR USE TYPE **I**A(6.a.) PAVEMENT MARKINGS TO CONNECT UPSTREAM WITH DOWN STEAM LANE LINES. THE AMOUNT OF THIS TYPE OF PAVEMENT MARKING SHOULD BE USED SPARINGLY SO AS TO NOT COMPLICATE THE VISUAL EFFECTS IN THE INTERSECTION
   - C. OR USE A COMBINATION OF "A" AND "B" ABOVE
   - D. OTHER CONFIGURATIONS AS APPROVED, BY THE CITY
9. GLUE DOWN WHITE CHANNELIZING DEVICES ARE TO BE A MINIMUM OF 2⅛ IN. IN DIAMETER, A MINIMUM OF 30 IN. IN HEIGHT, AND HAVE A MINIMUM OF 2 WHITE REFLECTOR BANDS NEAR THE TOP. THEY ARE TO BE APPROVED BY CITY ENGINEER PRIOR TO PURCHASE.
10. PAVEMENT MARKING TYPE AND (CODE): REFERENCE M&S 004 AND 005 SERIES.

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CITY OF DENTON
ENGINEERING SERVICES

STANDARD DETAILS

MEDIAN DETAILS

DATE
JAN. 2021

SHEET No.
18 OF 20

SCALE
HOR 1"= N.T.S.
VER 1"= N.T.S.

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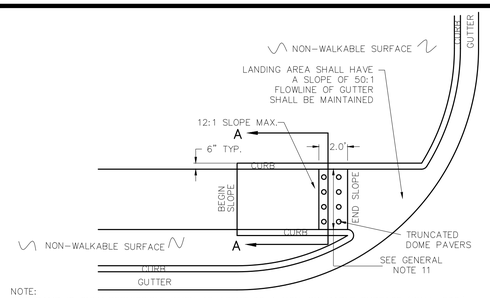
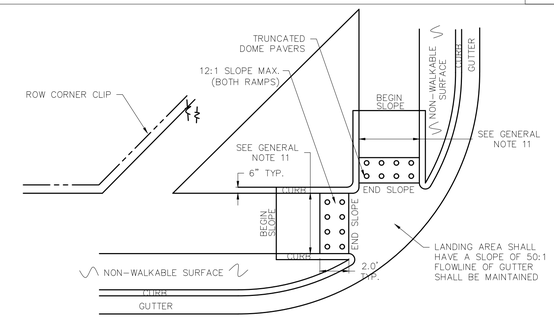


NOTE:
THIS RAMP IS ONLY PERMISSIBLE WHEN ADJACENT TO A NON-WALKABLE SURFACE (WALL, ETC.) THAT PROHIBITS THE CONCURRENT (2ND) RAMP/SIDEWALK OF RAMP TYPE 1B

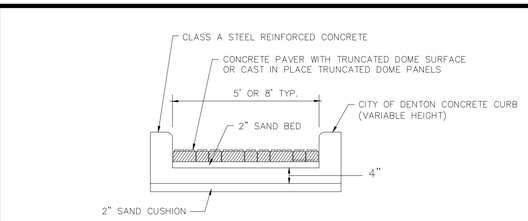
RAMP TYPE IA

P101A



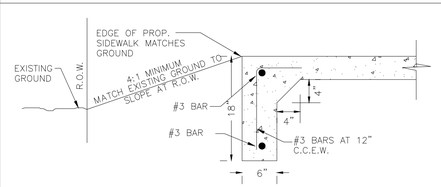
RAMP TYPE IB

P101B



RAMP – SECTION A–A

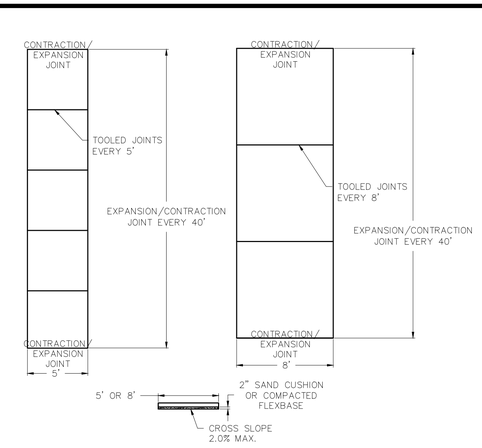
P100



NOTES
A. FOR USE ONLY UPON WRITTEN APPROVAL BY CITY ENGINEER
B. FOR USE WHEN GROUND SLOPES AWAY FROM SIDEWALK

TURNED DOWN FOOTING AT EDGE OF PROPOSED SIDEWALK

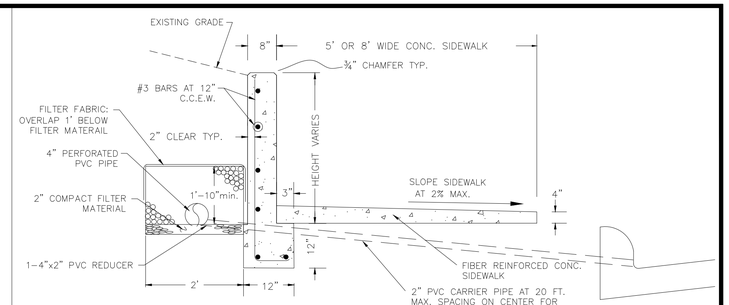
P201



NOTES:
1. NOT SUBJECT TO VEHICLE LOADS
a) IF 5' WIDE, THEN 5" DEPTH–FIBER REINFORCED CLASS A CONCRETE
b) IF 8'–10' WIDE, THEN 6" DEPTH–FIBER REINFORCED CLASS P1 CONCRETE
c) IF GREATER THAN 10' WIDE, THEN 6" DEPTH–FIBER REINFORCED CLASS P2 CONCRETE
2. IF SUBJECTED TO VEHICLE LOAD FOR EITHER WIDTH OF SIDEWALK NOTED ABOVE: 6" DEPTH–CLASS A CONCRETE, REINFORCED WITH #3 BARS ON 18" CENTERS.

SIDEWALK FACILITY FOR NON–COLLECTOR STREETS & BIKE/PEDESTRIAN FACILITY FOR COLLECTOR STREETS

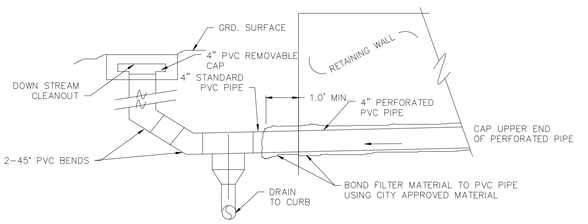
P300



NOTES:
1. CONSTRUCT CONTINUOUS POUR/MONOLITHIC STANDARD CONCRETE CURB CENTERED ON FOOTING AS SHOWN AND AT EDGE OF SEPARATELY POURED SIDEWALK IN LIEU OF RETAINING WALL IF WALL HEIGHT IS LESS THAN 7'. CONCRETE CURB SHALL BE CLASS S CONCRETE WITH REINFORCEMENT AS SHOWN.
2. IF HEIGHT OF WALL IS GREATER THAN 30", THEN PROVIDE ENGINEERING SEALED PLANS FOR WALL DESIGN. DESIGN WILL NOT CONTAIN WEEP HOLES BUT WILL CONTAIN A DRAIN SYSTEM SIMILAR TO THAT SHOWN ON THIS SHEET
3. WALL TO BE CENTERED ON 12"x12" FOOTING
4. WALL AND FOOTING TO BE POURED CONTINUOUS (MONOLITHIC)
5. SIDEWALK TO BE POURED SEPARATE FROM WALL AND/OR FOOTING
6. PIPE SIZING SHOWN IS MINIMUM, DEPENDING ON WALL LENGTH AND/OR WALL HEIGHT, PIPE SIZE TO BE DESIGNED ACCORDINGLY
7. MINIMUM SLOPE OF CARRIER PIPE IS 2%, MAXIMUM SLOPE IS 4%
8. MINIMUM SLOPE OF PERFORATED PIPE IS 2%
9. AT JUNCTION OF CARRIER PIPE WITH PERFORATED PIPE THE BOTTOM OF THE PERFORATED PIPE SHALL BE AS CLOSE TO THE BOTTOM OF THE FOOTING AS POSSIBLE WITHOUT VIOLATING THE SLOPE REQUIREMENTS OF THE CARRIER PIPE
10. DEPENDING ON THE FINAL ELEVATION OF THE PERFORATED PIPE AT THE CARRIER PIPE, WITHOUT VIOLATING THE SLOPE REQUIREMENTS OF THE CARRIER PIPE, ADDITIONAL BENDS WILL BE INSTALLED SO THAT THE 4"X2" REDUCER IS AS CLOSE TO VERTICAL AS POSSIBLE IN ORDER FOR THE PERFORATED PIPE TO DRAIN AND/OR FOR THE CARRIER PIPE TO NOT NEEDLESSLY ENCROACH INTO THE BOTTOM OF THE SIDEWALK

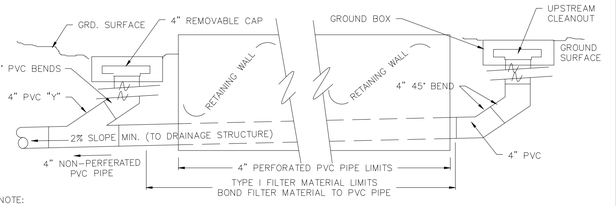
SIDEWALK WITH RETAINING WALL AND/OR CONCRETE CURB

P400



DRAINAGE TO CURB

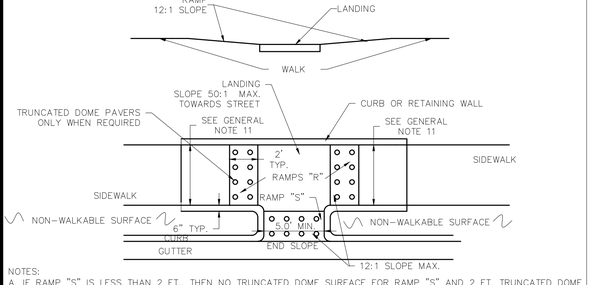
P401



NOTE:
ATTACH 4" NON–PERFORATED PIPE TO DRAINAGE STRUCTURE USING CITY APPROVED CONSTRUCTION TECHNIQUES AND REPAIR MATERIALS.

DRAINAGE TO EXISTING DRAINAGE STRUCTURE

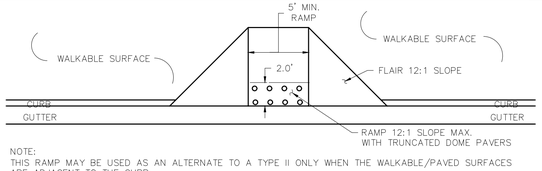
P402



NOTES:
A. IF RAMP "S" IS LESS THAN 2 FT., THEN NO TRUNCATED DOME SURFACE FOR RAMP "S" AND 2 FT. TRUNCATED DOME SURFACE IS REQUIRED ON EACH RAMP "R" AND "R"+"S"=6 FT. WHEN CURB HEIGHT IS 6 IN. IF CURB IS OTHER THAN 6 IN., USE 12(H):1(V) RATIO TO DETERMINE MINIMUM RAMP LENGTH.
B. IF RAMP "S" IS 2 FT. OR GREATER BUT LESS THAN 6 FT., INSTALL TRUNCATED DOMES ONLY ON RAMP "S" AND "S"+"R"=6 FT. WHEN CURB HEIGHT IS 6 IN. IF CURB HEIGHT IS OTHER THAN 6 IN., USE 12(H):1(V) RATIO TO DETERMINE RAMP LENGTH.
C. IF LENGTH OF RAMP "S" IS 6 FT. OR GREATER AND CURB HEIGHT IS 6 IN., THEN USE FULL, STANDARD "S" RAMP WITH TRUNCATED DOME PAVERS IN LIEU OF LANDING AND WITH NO "R" RAMPS. IF CURB HEIGHT IS OTHER THAN 6 IN., USE 12(H):1(V) RATIO TO DETERMINE RAMP LENGTH AND THE NEED FOR "R" RAMPS AND A LANDING.

RAMP TYPE II

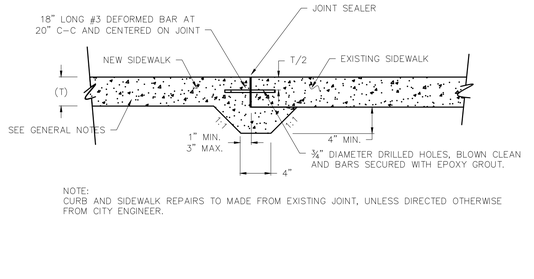
P102



NOTE:
THIS RAMP MAY BE USED AS AN ALTERNATE TO A TYPE II ONLY WHEN THE WALKABLE/PAVED SURFACES ARE ADJACENT TO THE CURB.

RAMP TYPE III

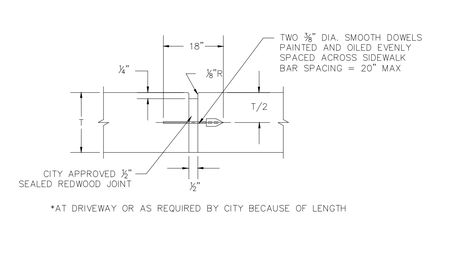
P103



NOTE:
CURB AND SIDEWALK REPAIRS TO MADE FROM EXISTING JOINT, UNLESS DIRECTED OTHERWISE FROM CITY ENGINEER.

NEW TO EXISTING SIDEWALK CONNECTION

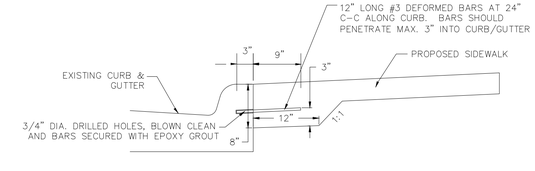
P202



*AT DRIVEWAY OR AS REQUIRED BY CITY BECAUSE OF LENGTH

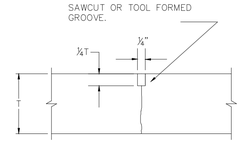
CONTRACTION/EXPANSION JOINT

P301



SIDEWALK ALONG EXISTING BACK OF CURB

P203



SAWED JOINT

P302

GENERAL NOTES:

1. CONCRETE PAVER UNITS FOR TYPICAL SIDEWALKS OR BIKE/PEDESTRIAN FACILITIES SHALL MEET ALL REQUIREMENTS OF ASTM C–936, C–33, AND SHALL BE LAID IN A TWO BY TWO UNIT BASKET WEAVE PATTERN, UNLESS SHOWN OTHERWISE IN THE PLANS.
2. IF CONCRETE PAVERS ARE NOT USED, ANY PROPOSED ALTERNATE SHALL ONLY BE PER THE CITY APPROVED LISTING AND THEN ONLY UPON WRITTEN APPROVAL BY THE CITY ENGINEER PRIOR TO INSTALLATION FOR EACH LOCATION.
3. PARTIAL PAVERS OR ACCEPTABLE EQUIVALENT SHALL BE SAW–CUT ONLY WITH SMOOTH, VERTICAL FACE AND WITHOUT SPALLS AND BE NO LESS THAN 25% OF A FULL UNIT.
4. PAVERS SHALL BE INSTALLED TO BE EDGE TO EDGE OF EACH PAVER. VIBRATED SAND TO BE USED TO FILL VOIDS.
5. THE RAMP AREA SHALL HAVE A UNIFORMLY FLAT CROSS SLOPE
6. STANDARD CONCRETE SIDEWALK SHALL RECEIVE AN APPROVED WHITE PIGMENTED CURING COMPOUND AND A LIGHT BROOM FINISH.
7. COLOR OF WARNING DEVICES SHALL CONTRAST WITH ADJACENT WALKABLE PATH. WARNING DEVICE COLOR SHALL BE TERRA COTTA RED. THE PATTERN AND COLOR SHALL BE APPROVED BY THE CITY ENGINEER OR THEIR DESIGNEE. LANDINGS SHALL NOT BE COLORED OR TEXTURED.
8. DIRECTION OF THE RAMP SHOULD PROJECT TO AND IN THE SAME DIRECTION AS THE CROSS WALK.
9. UNLESS OTHERWISE NOTED HEREIN, ALL RAMPS, LANDINGS, FLAIRS AND SIDEWALKS SHALL COMPLY WITH LATEST TEXAS ACCESSIBILITY STANDARDS (TAS). ANY PROPOSED ALTERNATE SHALL COMPLY WITH U.S. ARCHITECTURAL AND TRANSPORTATION BARRIERS COMPLIANCE BOARD; AMERICANS WITH DISABILITIES ACCESSIBILITY GUIDELINES; PROWAG; AND ALL OTHER APPLICABLE LOCAL, STATE AND FEDERAL REQUIREMENTS GOVERNING ACCESSIBILITY.
10. CROSS SLOPE OF RAMP SHALL BE SAME AS SIDEWALK.
11. RAMP SHALL BE 5' OR 8' WIDE TO MATCH APPLICABLE SIDEWALK FOR STREET TYPE. IF EXISTING SIDEWALK IS MORE OR LESS THAN RAMP WIDTH, A TRANSITIONAL SECTION (TYPICALLY THE PANEL PRIOR TO THE ADA RAMP) SHALL BE INSTALLED TO MATCH THE SIDEWALK'S WIDTH TO THE RAMP'S WIDTH.
12. HANDRAILS REQUIRED ON SIDEWALK OR RAMP RISES OVER 6" PER PROWAG.

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CITY OF DENTON
ENGINEERING SERVICES

STANDARD DETAILS

SIDEWALK DETAILS

DATE
JAN. 2021

SHEET No.
19 OF 20

SCALE
HOR 1"= N.T.S.
VER 1"= N.T.S.

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DIVISION 1000 EROSION & SEDIMENT CONTROL

TABLE OF CONTENTS

NOTES:

1. The City is adopting use of the NCTCOG Erosion and Sedimentation Standard Detail Drawings referenced in the table above. The drawings can be found in the 4th Edition of the NCTCOG specifications, October 2004.
2. Modifications to the above referenced drawings may be considered for individual projects upon submittal by a registered Professional Engineer in the State of Texas and supporting documentation as to why the modification is being requested.

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CITY OF DENTON
ENGINEERING SERVICES

STANDARD DETAILS

EROSION & SEDIMENTATION CONTROL DETAILS

DATE
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SHEET No.
20 OF 20

SCALE
HOR 1"= N.T.S.
VER 1"= N.T.S.

CERTIFICATION:
THIS CITY OF DENTON STANDARD DETAIL SHEET IS AUTHORIZED FOR USE IN THIS PROJECT BY THE ENGINEER WHOSE SEAL APPEARS HEREON, AND WHO CERTIFIES THE CONTENT OF THE DETAILS AND NOTES HEREIN HAVE NOT BEEN ALTERED AND ASSUMES RESPONSIBILITY FOR APPROPRIATE USE OF THE STANDARDS WITHIN THIS SHEET.