CITY OF DETROIT

Mike Duggan, Mayor

STANDARD DETAILS

May 2023

City of Detroit
Water and Sewerage Department - Engineering Division
Standard Details

015713-01	Drain Guard
015713-02	Erosion Control, Silt Fence
015713-03	Mulch Blankets / High Velocity Blankets
015713-04	Ditch Sediment Trap
015713-05	Inlet Protection Fabric Drop
015713-06	Check Dams
015713-07	Gravel Access Approach
015713-08	Sod Filter
015713-09	Vegetative Buffer Strip
015713-10	Soil Erosion and Sedimentation Control, Temporary Facilities
015713-11	Soil Erosion and Sedimentation Control, Maintenance Notes
015713-12	Soil Erosion and Sedimentation Control, General Notes
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015713-14	Soil Erosion and Sedimentation Control, Measures (From 6-10)
015713-15	Soil Erosion and Sedimentation Control, Measures (From 11-15)
015713-16	Soil Erosion and Sedimentation Control, Measures (From 16-20)
015713-17	Soil Erosion and Sedimentation Control, Measures (From 21-25)
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312333-01	Sanitary Sewer, Trench Detail (1 of 3)
312333-02	Sanitary Sewer, Trench Detail (2 of 3)
312333-03	Sanitary Sewer, Trench Detail (3 of 3)
312333-04	Utility Trench, Watermain (1 of 3)
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312333-06	Utility Trench, Watermain (3 of 3)
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330507-01	Casing Pipe Section for Watermain
330561-02	Standard Manhole, Precast

330561-03	MH frame and cover with logo – Sewer
330561-04	Manhole, Water Cushions
330561-05	Manhole, Assembly
330561-06	Manhole, Exterior Drop
330561-07	Manhole, Interior Drop
330561-08	Manhole, Over Existing Sewer
330561-09	Gate Well, Precast (1 of 2)
330561-10	Gate Well, Precast (2 of 2)
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331413-01	Thrust Block, Horizontal Bend (Traditional DWSD Sizing)
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331413-03	Thrust Block, Plugs and Caps (Traditional DWSD Sizing)
331413-04	Thrust Block, Vertical Bend (Traditional DWSD Sizing, 1of 2)
331413-05	Thrust Block, Vertical Bend (Traditional DWSD Sizing, 2 of 2)
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333111-06	Sewer Pipe Joint Detail
333111-07	Sewer Pipe Connection with Manhole

*G/01	Permeable Concrete Pavement (Roadway, Parking Lot, and Alley)
*G/01a	Permeable Concrete Pavement (Roadway, Parking Lot, and Alley)
*G/02	Permeable Concrete Sidewalk
*G/03	Permeable Concrete Pavement (Roadway, Parking Lot, and Alley)
*G/04	Permeable Asphalt Sidewalk
*G/05	Permeable Interlocking Unit Pavers (Roadway, Parking Lots, and Alley)
*G/07	Permeable Unit Pavers (Sidewalk)
*G/10	Permeable Pavement with Continuous Bottom Slope <2%
*G/13	Permeable Pavement Edge Restraints
*G/20	Bioretention in Open Area
G/21	Linear Bioretention Adjacent to Roadway No Step Out Zone
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*G/43 page 1	Curb Opening Inlet Type C with Trench Drain Cover (1 of 2)
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G/44	Area Inlet Type 1
G/45	Stone Splash Pad
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*G/50	Overflow Riser with Beehive Grate
G/51	Stormwater Facility Underdrain Pipe Risers in Permeable Pavements
G/52	Stormwater Facility Underdrain Pipe Risers in Bioretention
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G/56	Stormwater Facility Anti-Seep Collar
G/60	Concrete Check Dam
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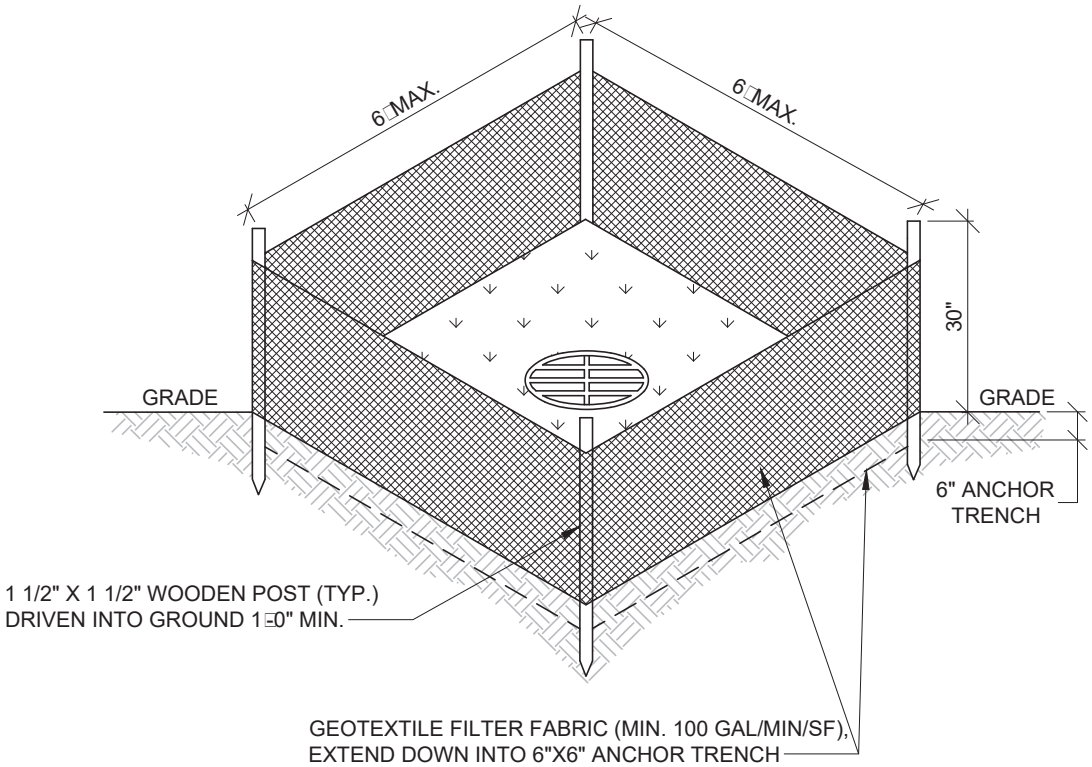
G/65 page 1	Structural Cells for Urban Tree Planting (1 of 5)
G/65 page 2	Structural Cells for Urban Tree Planting (2 of 5)
G/65 page 3	Structural Cells for Urban Tree Planting (3 of 5)
G/65 page 4	Structural Cells for Urban Tree Planting (4 of 5)
G/65 page 5	Structural Cells for Urban Tree Planting (5 of 5)
G/70	Tree Planting
G/73	Object Marker for Obstruction Within Roadway

The following Standard Details are under development by DWSD-SMG. Until these details are finalized, proposers shall make their own details for DWSD-SMG review and approval prior to installation.

G/OCS1	Surface Practice Outlet Control Structure	A perforated standpipe structure over a precast concrete cookie. The structure restricts flow and provides for an engineered overflow.
G/OCS2	Underground Practice Outlet Control Structure	A large diameter precast concrete manhole with an orifice and weir wall to restrict flow from underground detention systems.
G/CB	Catch Basins	A precast concrete, 48-inch diameter manhole with a sump for parking lot and site drainage.
G/IN	Inlet	A precast concrete 24-inch diameter structure with a sump to collect road or street drainage.
G/YD	Yard Basin	A shallow precast concrete structure to collect runoff from green spaces.
G/SMC	Storm Manhole cover	A DWSD branded manhole cover with holes for drainage. Include references to river drainage for MS4 areas.
G/CBC	Catch Basin Cover	A DWSD branded rectangular catch basin or inlet cover. A version with and without restrictions can be developed.
G/TD	Trench Drain	An iron catch basin cover and trench for use in parking areas. A standards detail is proposed to ensure minimum standards for construction.
G/TAP1	Large Diameter Sewer Tap	Offset Manhole arrangement for large diameter brick sewer taps.
G/TAP2	Sewer Connection Large Diameter Manhole	For instances where manholes must be placed over existing sewers. For use on concrete sewer pipe only.
G/ES	End Section with Footing	Concrete end section details with footings, animal grates, and riprap aprons.



GENERAL NOTES:

1. REFER TO SILT FENCE DETAIL 015□13-02 FOR INSTALLATION PROCEDURES.
2. WEEKLY INSPECTION AND MAINTENANCE MUST BE PROVIDED TO INSURE THAT THE DRAIN GUARD OPERATES EFFICIENTLY.
3. SOD INTERIOR OF DRAIN GUARD UNLESS INDICATED OTHERWISE.
4. REMOVE AND DISPOSE OF ACCUMULATED SEDIMENT AS NECESSARY, PER SPECIFICATION SECTION 015□13.

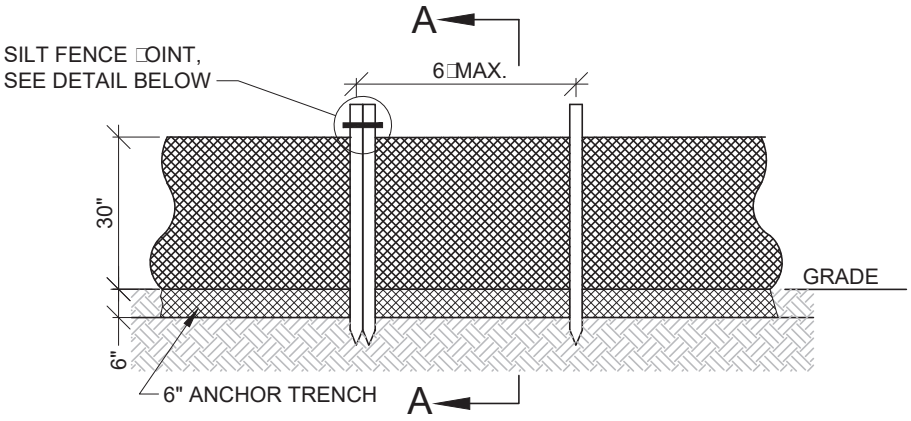
REV	DESCRIPTION	DATE

REVISIONS

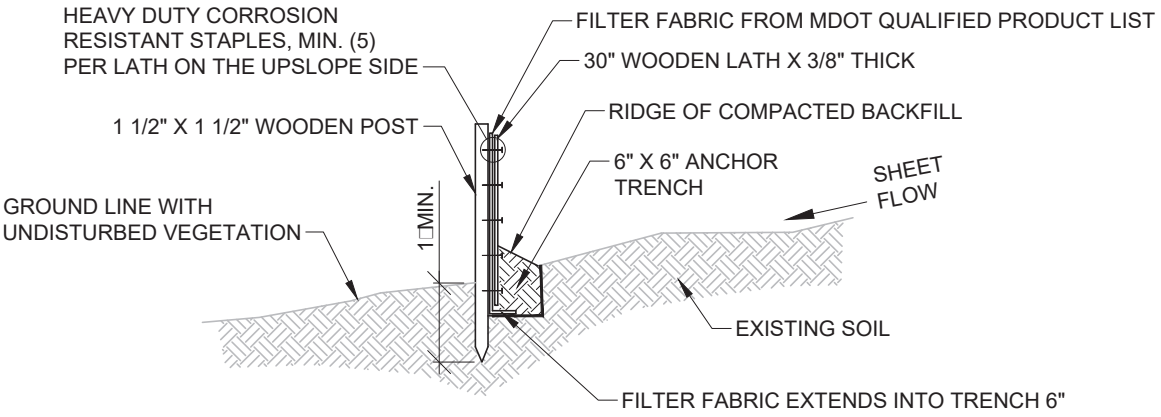
DRAIN GUARD

CITY OF DETROIT
WATER AND SEWERAGE DEPARTMENT
ENGINEERING DIVISION

SCALE NONE	1 OF 1 SHEET
DATE 09/2018	015□13-01 DWG. No.

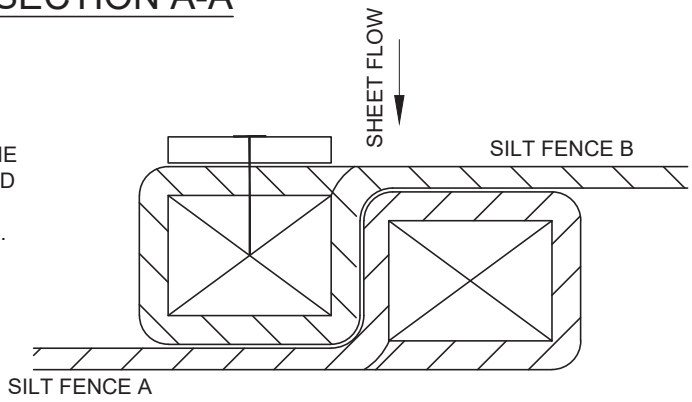


ELEVATION



SECTION A-A

GENERAL NOTE:
SILT FENCE MATERIAL SHALL MEET THE REQUIREMENTS IN SECTION 910.04 AND TABLE 910-1 IN MDOT STANDARD SPECIFICATIONS FOR CONSTRUCTION.



NOTE:

FABRIC TO BE WRAPPED AROUND FENCE POST.

SILT FENCE □OINT - TOP VIEW

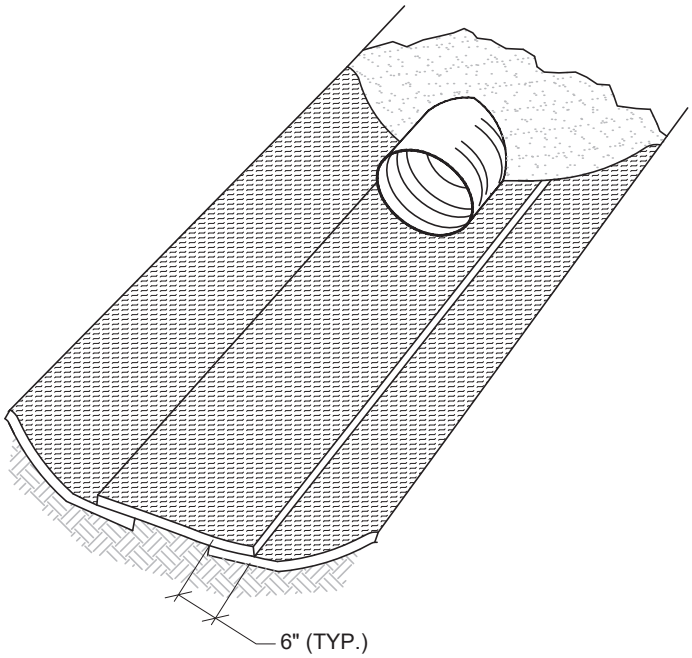
REV	DESCRIPTION	DATE

REVISIONS

EROSION CONTROL, SILT FENCE

CITY OF DETROIT
WATER AND SEWERAGE DEPARTMENT
ENGINEERING DIVISION

SCALE NONE	SHEET 1 OF 1
DATE 09/2018	DWG. No. 015□13-02



TYPICAL DITCH LINING

GENERAL NOTES: (FROM MDOT DRAINAGE MANUAL)

1. EROSION CONTROL BLANKETS PROTECT DENUDED SURFACES AGAINST WIND AND WATER EROSION, AND STABILI□E SOIL SURFACES WHILE VEGETATION IS BEING ESTABLISHED.
2. BLANKETS ARE PLACED IN DITCHES AND ON STEEP SLOPES USUALLY WITH RIP-RAP WHERE INDICATED ON THE DRAWINGS OR AS DIRECTED BY THE ENGINEER.
3. EXTEND BLANKETS UNDER PIPE THREE (3) INCHES. ANCHOR BLANKETS IN ACCORDANCE WITH MDOT STANDARD SPECIFICATIONS FOR CONSTRUCTION, SECTION 816 TURF ESTABLISHMENT.
4. PROVIDE MULCH BLANKETS/HIGH VELOCITY BLANKETS SELECTED FROM THE MDOT QUALIFIED PRODUCTS LIST.
5. USE MULCH BLANKETS WITH NETTING ON TOP SIDE ON SLOPES FLATTER THAN 1:2.
6. USE HIGH VELOCITY BLANKETS WITH NETTING ON TOP AND FIBERS IN CONTACT WITH SOIL ON SLOPES 1:2 OR GREATER.
7. USE MULCH BLANKET AS PERMANENT STABILI□ATION TREATMENT FOR DITCHES WITH SLOPES BETWEEN 0.5□ AND 1.5□ .
8. USE HIGH VELOCITY MULCH BLANKET AS PERMANENT STABILI□ATION TREATMENT FOR DITCHES WITH SLOPES BETWEEN 1.5□ AND 3.0□ .
9. USE ANCHOR TRENCH AT TOP OF SLOPE (SEE DETAIL 01014.02, SECTION A, FOR DETAILS ON TRENCH).

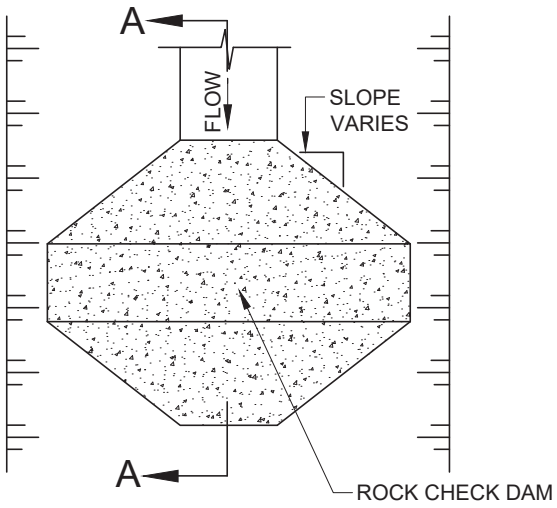
REV	DESCRIPTION	DATE

REVISIONS

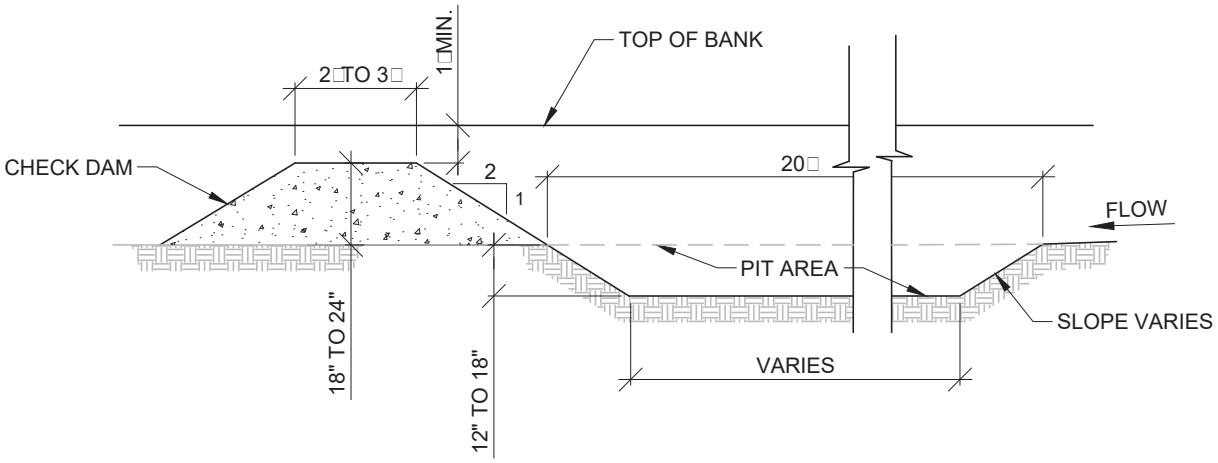
MULCH BLANKETS AND HIGH VELOCITY BLANKETS

CITY OF DETROIT
WATER AND SEWERAGE DEPARTMENT
ENGINEERING DIVISION

SCALE NONE	SHEET 1 OF 1
DATE 09/2018	DWG. No. 015□13-03



PLAN VIEW



SECTION A-A

GENERAL NOTES:

1. THE DITCH CROSS-SECTION SHOULD ONLY BE PARTIALLY BLOCKED, IN ORDER TO MINIMI□E THE LOSS IN DITCH FLOW CAPACITY.

2. CHECK DAM SHOULD BE REMOVED AND THE SEDIMENT PIT FILLED AS SOON AS THE UPSTREAM AREAS CONTRIBUTING TO IT ARE STABILI□ED. THIS WILL ALLOW THE DITCH TO FUNCTION AS DESIGNED.

3. WEEKLY INSPECTION AND MAINTENANCE MUST BE PROVIDED TO INSURE THAT THE DITCH SEDIMENT TRAP OPERATES EFFICIENTLY.

4. THE PERMISSION OF THE GOVERNMENTAL AGENCY, RESPONSIBLE FOR THE MAINTENANCE OF THE DITCH, MUST BE RECEIVED BEFORE A DITCH SEDIMENT TRAP IS INSTALLED.

5. SEE STANDARD DETAIL 015□13-06 OR DWSD FOR CHECK DAM SPECIFICATIONS FOR CONSTRUCTION.

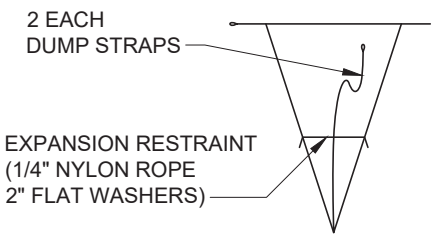
REV	DESCRIPTION	DATE

REVISIONS

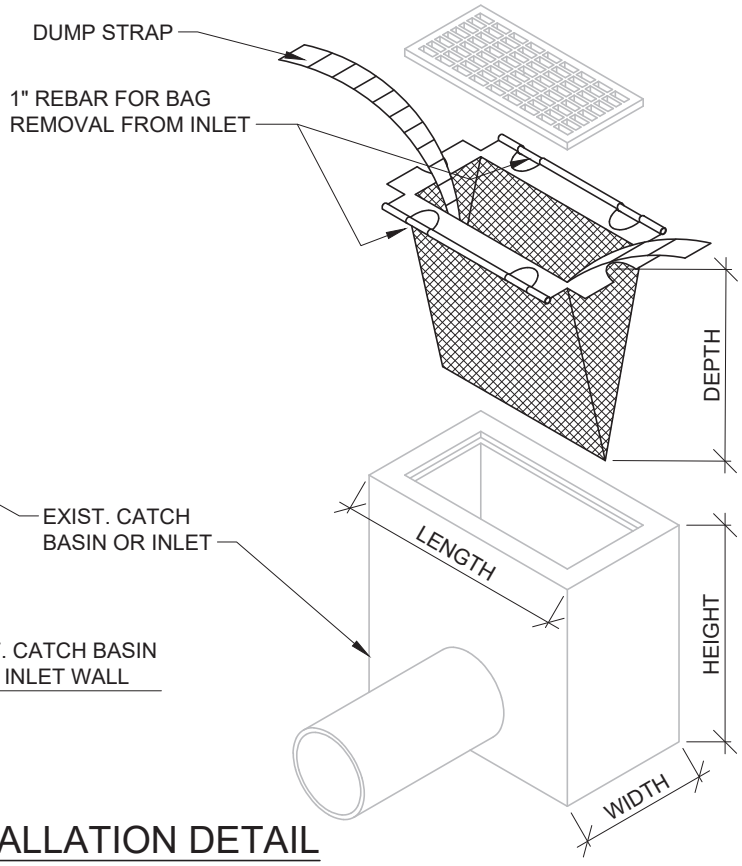
DITCH SEDIMENT TRAP

CITY OF DETROIT
WATER AND SEWERAGE DEPARTMENT
ENGINEERING DIVISION

SCALE NONE	SHEET 1 OF 1
DATE 09/2018	DWG. No. 015□13-04



BAG DETAIL

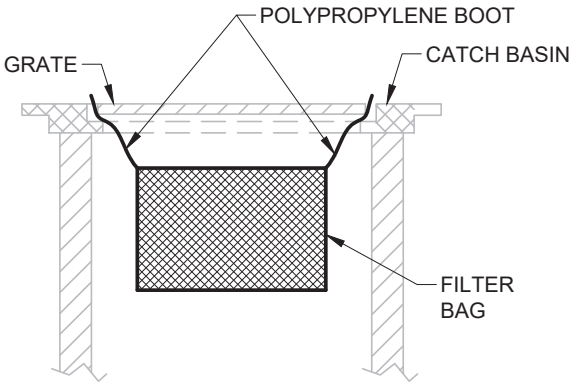


INSTALLATION DETAIL

NOTE:

TEMPORARY INLET SEDIMENT FILTER TO BE INSTALLED ON ALL PAVED CATCH BASINS OR STORM INLETS. SEDIMENT FILTERS TO BE SIMILAR TO:

1. "SILTSACK" TYPE B, REGULAR FLOW, BY ACF ENVIRONMENTAL, INC.
2. "INLET PRO SEDIMENT BAG", STANDARD FLOW, WITH OPTIONAL FOAM DEFLECTOR BY HANES GEO COMPONENTS.
3. "DANDY CURB SACK" BY DANDY PRODUCTS, INC.
4. "BASIN BAG", REGULAR FLOW BY CSI GEOTURF, CLEAN FILTER AS NEEDED.



GENERAL NOTES

1. CONTRACTOR SHALL OBTAIN PERMISSION OF THE ENFORCING ROAD AGENCY BEFORE THIS TYPE OF CONTROL IS CONSTRUCTED IN THE ROAD RIGHT-OF-WAY.
2. CONTRACTOR SHALL KEEP CURBS □ GUTTER INLET FILTERS (AFTER PAVING) IN PLACE UNTIL ALL AREAS CONTRIBUTING TO THEM ARE STABILI□ED WITH VEGETATION.
3. CONTRACTOR SHALL PERFORM WEEKLY INSPECTION AND MAINTENANCE TO ENSURE THAT THE CURB □ GUTTER INLET FILTER (AFTER PAVING) OPERATES EFFICIENTLY.

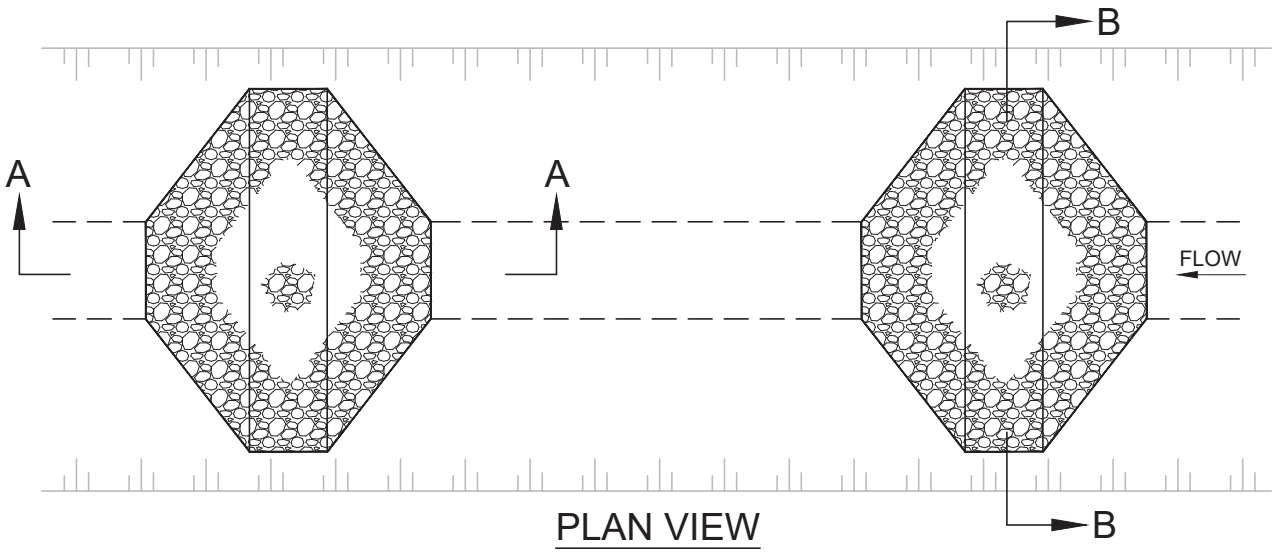
REV	DESCRIPTION	DATE

REVISIONS

INLET PROTECTION FABRIC DROP

CITY OF DETROIT
WATER AND SEWERAGE DEPARTMENT
ENGINEERING DIVISION

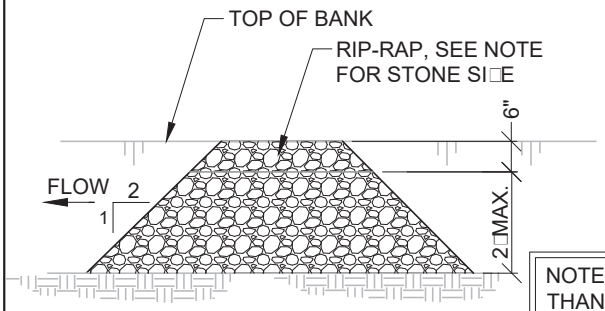
SCALE NONE	SHEET 1 OF 1
DATE 09/2018	DWG. No. 015□13-05



PLAN VIEW

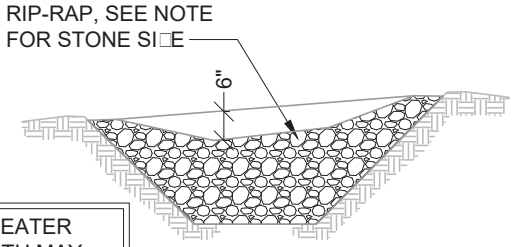
L = DISTANCE BETWEEN CHECK DAMS, SUCH THAT POINTS (A) AND (B) ARE AT EQUAL ELEVATIONS.

LONGITUDINAL SECTION



SECTION A-A

NOTE: CHECK DAMS GREATER THAN TWO FEET IN DEPTH MAY SERIOUSLY IMPACT THE FLOW CHARACTERISTICS OF THE DITCH.



SECTION B-B

GENERAL NOTES:

1. DEPENDING ON THE VELOCITY, SLOPE AND SOILS, USE THE PROPER SIZE RIP-RAP TO HANDLE THE SHEAR STRESS OF THE SLOPE/CHANNEL.
2. FOR SLOPE AND/OR CHANNEL PROTECTION, SEE THE MDOT CONSTRUCTION SITE SOIL EROSION PREVENTION POCKET GUIDE.
3. RIP-RAP SIZE SHOULD BE 2-4 INCHES FOR DITCH GRADES LESS THAN 2% AND 3-12 INCHES FOR DITCH GRADES GREATER THAN 2%.
4. BASE TO BE AT LEAST 2 X HEIGHT.

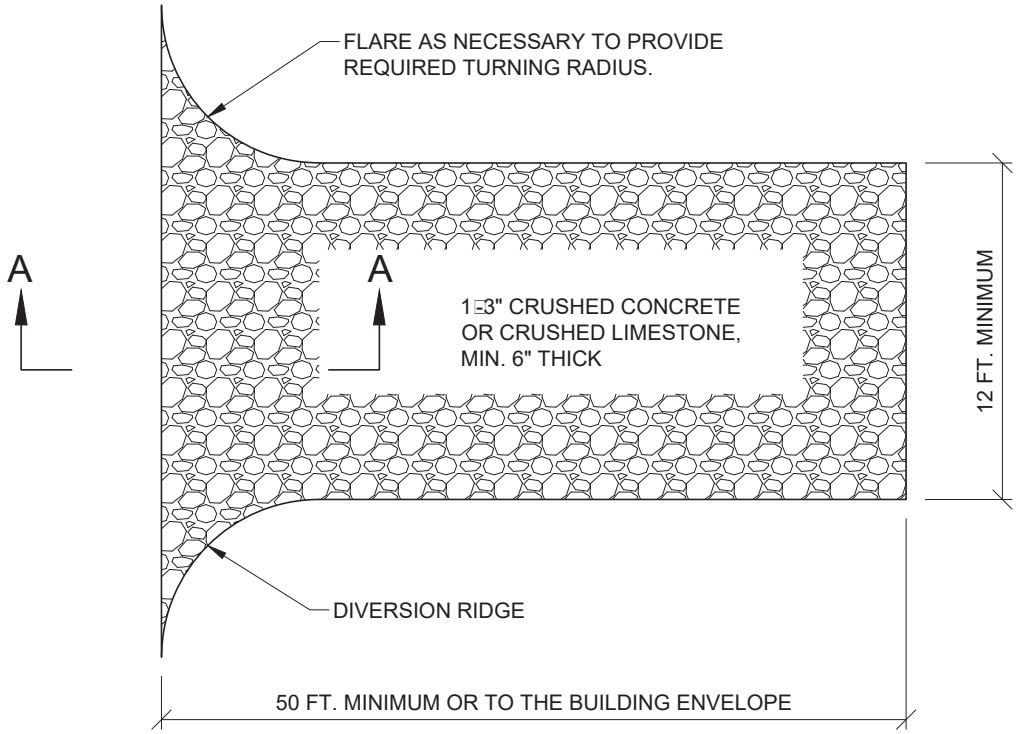
REV	DESCRIPTION	DATE

REVISIONS

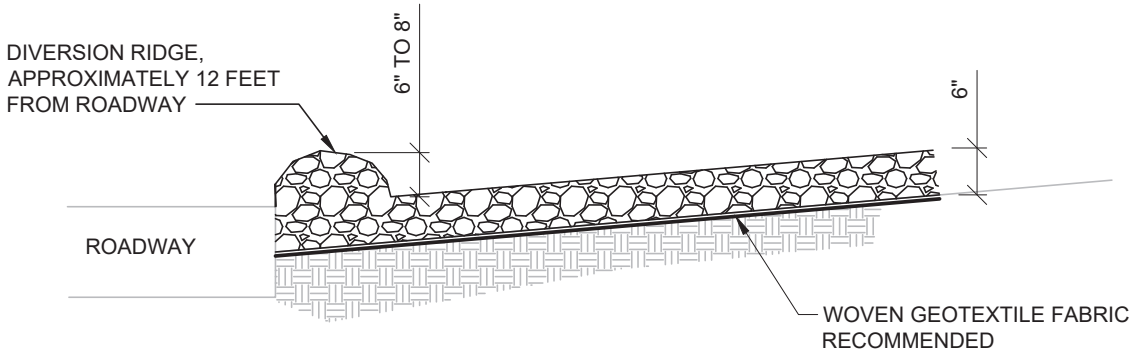
CHECK DAMS

CITY OF DETROIT
WATER AND SEWERAGE DEPARTMENT
ENGINEERING DIVISION

SCALE NONE	SHEET 1 OF 1
DATE 09/2018	DWG. No. 015-13-06



PLAN VIEW



CROSS-SECTION A-A

REV	DESCRIPTION	DATE

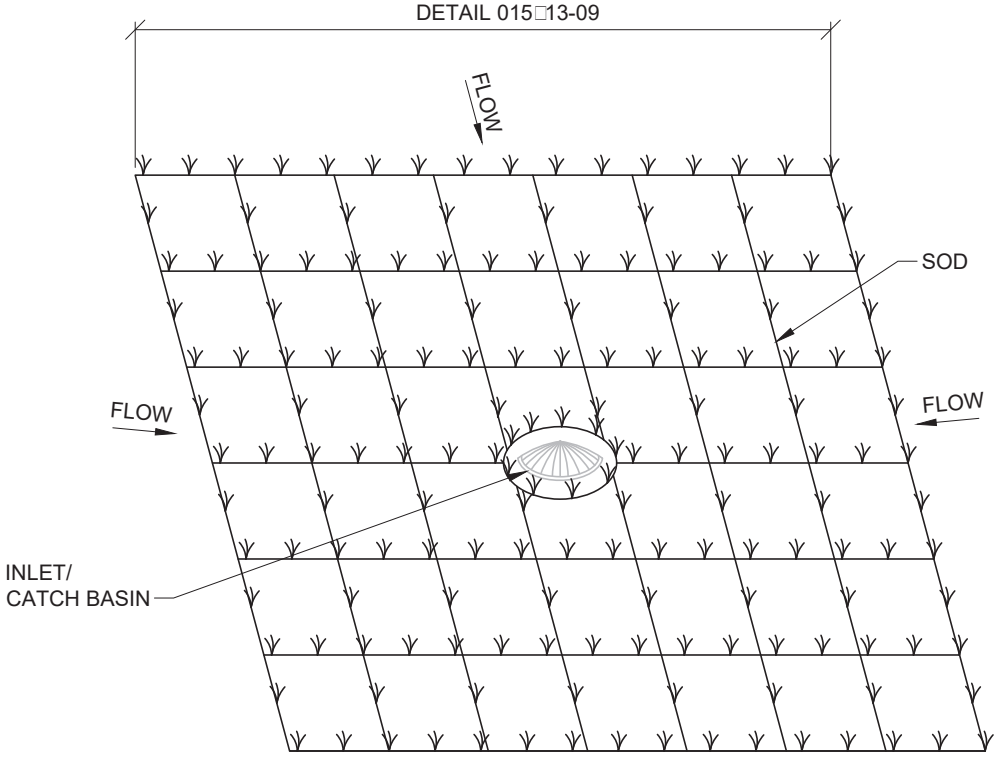
REVISIONS

GRAVEL ACCESS APPROACH

CITY OF DETROIT
WATER AND SEWERAGE DEPARTMENT
ENGINEERING DIVISION

SCALE NONE	1 OF 1 SHEET
DATE 09/2018	015□13-0□ DWG. No.

25□MINIMUM OR USE
VEGETATIVE BUFFER STRIP CHART,
DETAIL 015□13-09



ISOMETRIC VIEW

NOTES:

1. SOD INLET FILTERS ARE PADS OF SOD PLACED AROUND A STORM DRAIN INLET OR CATCH BASIN.
2. SOD INLET FILTERS ARE INSTALLED TO SLOW THE FLOW OF WATER INTO AN INLET OR CATCH BASIN AND FILTER OUT SEDIMENT IN THE PROCESS.
3. SOD INLET FILTERS SHOULD ONLY BE USED TO HANDLE LIGHT CONCENTRATIONS OF SEDIMENT. THEY ARE BEST USED AFTER FINAL GRADING IS COMPLETE AND DURING THE ESTABLISHMENT OF A VEGETATIVE COVER.

REV	DESCRIPTION	DATE

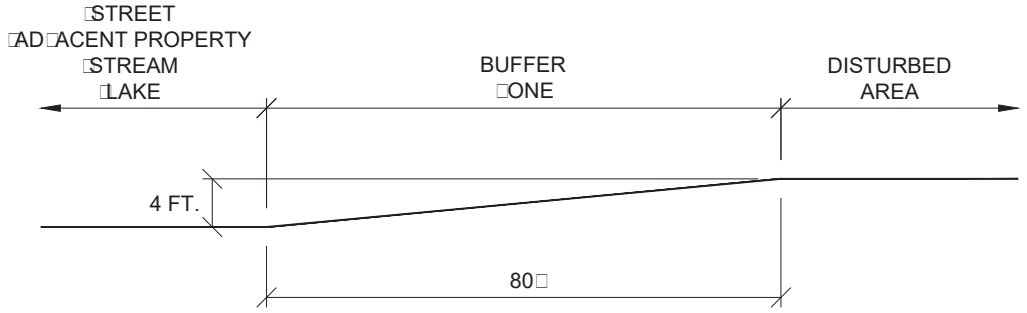
REVISIONS

SOD FILTER

CITY OF DETROIT
WATER AND SEWERAGE DEPARTMENT
ENGINEERING DIVISION

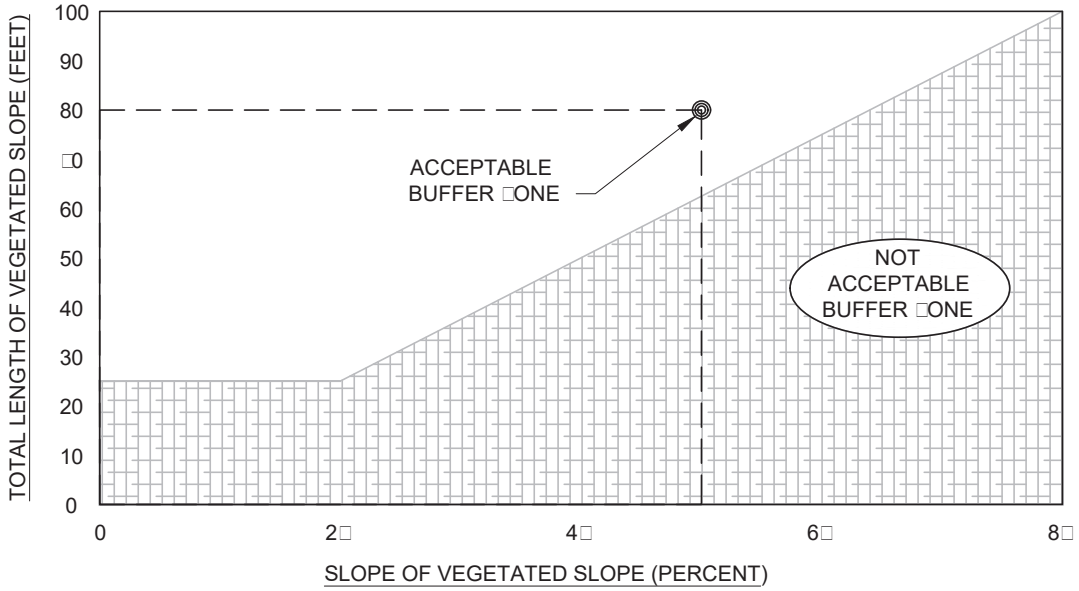
SCALE NONE	SHEET 1 OF 1
DATE 09/2018	DWG. No. 015□13-08

EXAMPLE:
LENGTH OF BUFFER □ONE □ 80□
□ OF SLOPE OF BUFFER □ONE □ 5□



ELEVATION VIEW

THE GRAPH SHOWN BELOW IS USED TO DETERMINE THE ADEQUACY OF AN EXISTING VEGETATIVE BUFFER □ONE FOR USE AS A SEDIMENT FILTER. THIS GRAPH IS ONLY APPLICABLE IF THE VEGETATION IS 90□ DENSE AND AT LEAST 1" IN LENGTH OVER EVERY SQUARE FOOT OF DISTURBED SOIL. AN AREA COVERED WITH WEEDS OR BUSHES AND TREES, WITHOUT A GOOD GROUND COVER, IS NOT ACCEPTABLE.



VEGETATIVE BUFFER STRIP CHART

REV	DESCRIPTION	DATE

REVISIONS

VEGETATIVE BUFFER STRIP

CITY OF DETROIT
WATER AND SEWERAGE DEPARTMENT
ENGINEERING DIVISION

SCALE NONE	SHEET 1 OF 1
DATE 09/2018	DWG. No. 015□13-09

SOIL EROSION AND SEDIMENTATION CONTROL
TEMPORARY FACILITIES

THE CONTRACTOR SHALL CONSTRUCT THIS PRO□ECT IN COMPLIANCE WITH PART 91 OF ACT NO. 451 OF 1994, NATURAL RESOURCES AND ENVIRONMENTAL PROTECTION ACT, OF THE MICHIGAN COMPILED LAWS ENTITLED "SOIL EROSION AND SEDIMENTATION CONTROL" UNDER THE CONTROL OF THE LOCAL PERMIT AGENCY CHARGED WITH ADMINISTERING THE PROVISIONS OF THIS ACT. THE CONTRACTOR SHALL FOLLOW THE PROCEDURES DELINEATED BELOW AND CONSTRUCT AND MAINTAIN THE FACILITIES SHOWN ON THE DRAWINGS TO CONTROL WATER AND WIND EROSION DURING CONSTRUCTION OF THIS PRO□ECT.

ALL DISTURBED SURFACE AREA (INCLUDING UTILITY TRENCHES) SHALL BE TEMPORARILY GRADED AND/OR DITCHED TO DIRECT ALL WATER RUNOFF FROM SUCH AREAS TO SEDIMENTATION CONTROL DEVICES WHICH WILL PREVENT WATER CARRYING ERODED SOIL FROM ENTERING A WATERCOURSE, SEWER, OR AD□ACENT LANDS. SUCH SEDIMENTATION CONTROL DEVICES SHALL INCLUDE BUT NOT BE LIMITED TO PROTECTIVE DITCHES, SEDIMENT TRAPS, SEDIMENT FILTERS, DITCH TRAPS, PIPE BARRIERS, AND FILTERS AS DETAILED AND REQUIRED AND WHERE INDICATED ON THE DRAWINGS. AFTER THE PRO□ECT WORK HAS BEEN COMPLETED, INSPECTED, AND APPROVED, THE CONTRACTOR SHALL REMOVE ALL SEDIMENTATION CONTROL DEVICES, MATERIAL, AND THEIR COLLECTED SILT AND DEBRIS AND RESTORE THE AREA IN ACCORDANCE WITH THE DRAWINGS.

IN ROADWAY AREAS TEMPORARY AGGREGATE SURFACING SHALL BE PLACED IMMEDIATELY AFTER THE BACKFILLING OPERATION HAS BEEN COMPLETED. POSITIVE DUST CONTROL MEASURES SHALL BE TAKEN AT ALL TIMES.

PERMANENT STABILI□ATION SHALL BE COMPLETED WITHIN 5 DAYS OF FINAL EARTH CHANGE. FINAL CLEANUP AND RESTORATION WILL CONSIST OF FINAL GRADING, TOPSOILING, SEEDING AND MULCHING AND/OR SODDING OF ALL DISTURBED AREAS OF THE PRO□ECT.

IF SEASONAL CONDITIONS PREVENT FINAL CLEANING AND RESTORATION, THE CONTRACTOR SHALL PROCEED WITH TEMPORARY STABILI□ATION OF THE DISTURBED AREA. TEMPORARY STABILI□ATION SHALL CONSIST OF ROUGH GRADING THE DISTURBED AREA IN ACCORDANCE WITH THESE SPECIFICATIONS. TEMPORARY STABILI□ATION MATERIALS SHALL BE REMOVED AND DISPOSED OF AND FINAL CLEANUP AND RESTORATION SHALL BE COMPLETED NOT LATER THAN 5 DAYS AFTER SEASONAL CONDITIONS ALLOW PERFORMANCE OF THE REQUIRED WORK.

REV	DESCRIPTION	DATE

REVISIONS

SOIL EROSION SEDIMENTATION CONTROL, TEMPORARY FACILITIES

CITY OF DETROIT
WATER AND SEWERAGE DEPARTMENT
ENGINEERING DIVISION

SCALE NONE	SHEET 1 OF 1
DATE 09/2018	DWG. No. 015□13-10

SOIL EROSION AND SEDIMENTATION CONTROL MAINTENANCE NOTES

THE CONTRACTOR SHALL INSPECT SOIL EROSION AND SEDIMENTATION CONTROL DEVICES WEEKLY AND WITHIN 24 HOURS OF A SIGNIFICANT RAIN EVENT. THE CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTAINING THE SOIL EROSION AND SEDIMENTATION CONTROL DEVICES.

MAINTENANCE INCLUDES ALL WORK NECESSARY FOR PROPER OPERATION OF THE DEVICES. DEVICES WHICH CAN NOT BE REPAIRED MAY NEED TO BE REPLACED. MAINTENANCE OF THE DEVICES SHALL BE PERFORMED WITHIN 24 HOURS OF INSPECTION.

SEDIMENT SHALL BE REMOVED AS NECESSARY TO MAINTAIN THE EFFECTIVENESS OF SOIL EROSION AND SEDIMENTATION CONTROL DEVICES.

SEDIMENT DEPOSITED ALONG SILT FENCE SHALL BE REMOVED WHEN IT REACHES 1/3 TO 1/2 THE HEIGHT OF THE FENCE.

TURF ESTABLISHMENT MEASURES SHALL BE MAINTAINED AS WOULD ANY OTHER DEVICES PRIOR TO ESTABLISHMENT OF PERMANENT TURF.

ALL MUD, DIRT AND DEBRIS TRACKED ONTO EXISTING ROADS FROM THIS SITE SHALL BE PROMPTLY REMOVED BY THE CONTRACTOR.

CONTRACTOR SHALL ENSURE THAT SOIL EROSION AND SEDIMENTATION CONTROL MEASURES PROTECT AGAINST LOSS OF SOIL BY THE ACTION OF WATER, ICE, GRAVITY OR WIND.

REV	DESCRIPTION	DATE

REVISIONS

SOIL EROSION AND SEDIMENTATION CONTROL, MAINTENANCE NOTES

CITY OF DETROIT
WATER AND SEWERAGE DEPARTMENT
ENGINEERING DIVISION

SCALE NONE	SHEET 1 OF 1
DATE 09/2018	DWG. No. 015□13-11

SUMMARY OF BASIC PRINCIPLES:

1. KEEP DISTURBED AREA AS SMALL AS POSSIBLE.

2. STABILI□E AND/OR PROTECT DISTURBED AREAS AS SOON AS POSSIBLE.

3. KEEP STORM WATER RUNOFF VELOCITIES LOW.

4. RETAIN SEDIMENT WITHIN IMMEDIATE CONSTRUCTION AREA.

THE PURPOSE OF THIS PLAN IS TO SPECIFY METHODS FOR TEMPORARY EROSION CONTROL DURING CONSTRUCTION. IT IS INTENDED THAT MEASURES CALLED FOR IN THE SPECIFICATIONS AND SHOWN ON THESE STANDARD DETAILS PLANS BE STRICTLY ADHERED TO. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO ASSURE THAT CONSTRUCTION PROCEDURES UNDERTAKEN BE IN CONFORMANCE WITH THE STATE OF MICHIGAN ACT 451 OF 1994 PART 91, SOIL EROSION AND SEDIMENTATION CONTROL.

ALL SOIL EROSION AND SEDIMENTATION CONTROL DEVICES SHALL BE REGULARLY MAINTAINED BY THE CONTRACTOR THROUGHOUT THE DURATION OF THE PRO□ECT. COLLECTED SILT AND SEDIMENTATION SHALL BE REMOVED PERIODICALLY TO MAINTAIN THE EFFECTIVENESS OF THE SILT TRAPS OR SEDIMENTATION CONTROL DEVICES. WHERE REQUIRED, THE CONTRACTOR SHALL REPLACE FILTER MATERIALS WHICH HAVE BECOME INEFFECTIVE DUE TO CONTAMINATION OR PHYSICAL DETERIORATION.

IF POSSIBLE, NO GRUBBING SHOULD BE DONE WITHIN 30□OF AN ACTIVE WATERCOURSE.

AGGREGATES PLACED IN STREAMS SHOULD CONTAIN A MINIMUM OF FINES. AS A GENERAL RULE FOR DAMS IN SMALL STREAMS, AT LEAST 50 STONE SHOULD BE 6" DIAMETER OR LARGER. 3" OR LARGER STONE SHALL BE USED FOR LINING STREAM BOTTOMS WHERE LINING IS REQUIRED.

ALL TEMPORARY EROSION CONTROL FACILITIES SHOULD BE REMOVED BY THE CONTRACTOR AT THE COMPLETION OF CONSTRUCTION UNLESS ORDERED BY THE ENGINEER TO BE LEFT IN PLACE. CARE SHALL BE TAKEN DURING REMOVAL TO MINIMI□E SILTATION IN NEARBY DRAINAGE COURSES.

SURFACE DISRUPTION IN ADVANCE OF CONSTRUCTION INCLUDING CLEARING, GRADING OR SIGNIFICANT SOD REMOVAL SHALL BE LIMITED AS FOLLOWS, UNLESS PERMISSION IS OTHERWISE OBTAINED FROM THE GOVERNING AGENCY:

A. WET WEATHER SEASON (MARCH, APRIL, MAY) - 5 DAYS PRIOR TO BEGINNING ANY EARTH CHANGE ACTIVITY.

B. DRY WEATHER SEASON (□UNE, □ULY, AUGUST, SEPTEMBER, OCTOBER, NOVEMBER) - 10 DAYS PRIOR TO BEGINNING ANY EARTH CHANGE ACTIVITY.

C. COLD WEATHER SEASON (DECEMBER, □ANUARY, FEBRUARY) - 15 DAYS PRIOR TO BEGINNING ANY EARTH CHANGE ACTIVITY.

REV	DESCRIPTION	DATE
REVISIONS		

SOIL EROSION AND SEDIMENTATION CONTROL, GENERAL NOTES

CITY OF DETROIT
WATER AND SEWERAGE DEPARTMENT
ENGINEERING DIVISION

SCALE NONE	SHEET 1 OF 1
DATE 09/2018	DWG. No. 015□13-12

✱ INDICATES APPLICABILITY OF A SPECIFIC CONTROL MEASURE TO ONE OR MORE OF THE SEVEN PROBLEM AREAS.

KEY	DETAILS	CHARACTERISTICS	SLOPES A	STREAMS AND WATERWAYS B	SURFACE DRAINAGEWAYS C	ENCLOSED DRAINAGE (INLET □ OUTFALL CONTROL) D	LARGE FLAT SURFACE AREAS E	BORROW AND STOCKPILE AREAS F	AD□ACENT PROPERTIES G
1	STRIPPING □ STOCKPILING TOPSOIL	TOPSOIL MAY BE STOCKPILED ABOVE BORROW AREAS TO ACT AS A DIVERSION. STOCKPILE SHOULD BE TEMPORARILY SEEDED. AVOID EXTENSIVE AND UNNECESSARY CLEARING OF TOPSOIL.	✱				✱	✱	
2	GRUBBING OMITTED	SAVES COST OF GRUBBING, PROVIDES NEW SPROUTS. RETAINS EXISTING ROOT MAT SYSTEMS. REDUCES WINDFALL AT NEW FOREST EDGE. REDUCES SHEET FLOW VELOCITIES. DISCOURAGES EQUIPMENT ENTRANCE.	✱				✱		✱
3	PERMANENT / TEMPORARY SEEDING	INEXPENSIVE AND VERY EFFECTIVE. STABILI□ES SOIL, THUS MINIMI□ING EROSION. PERMITS RUNOFF TO INFILTRATE SOIL, REDUCING RUNOFF. VOLUME SHOULD INCLUDE PREPARED TOPSOIL BED. FERTILI□ING MULCHING AND WATERING REQUIRED.	✱		✱		✱	✱	✱
4	MULCH BLANKETS AND HIGH VELOCITY MULCH BLANKETS	MULCH BLANKETS PROVIDE AN IMMEDIATE AND EFFECTIVE COVER OVER RAW ERODIBLE SLOPES AFFORDING EXCELLENT PROTECTION AGAINST RAIN AND WIND EROSION. HIGH VELOCITY MULCH BLANKETS WORK WELL FOR STABILI□ING THE BOTTOM OF DITCHES IN WATERWAYS.	✱		✱		✱	✱	
5	HYDRO-SEEDING	EFFECTIVE ON LARGE AREAS. MULCH TACKING AGENT USED TO PROVIDE IMMEDIATE PROTECTION UNTIL GRASS IS ROOTED. SHOULD INCLUDE PREPARED TOPSOIL BED. FERTILI□ING, MULCHING AND WATERING ARE REQUIRED.	✱				✱	✱	✱

REV	DESCRIPTION	DATE

REVISIONS

SOIL EROSION AND SEDIMENTATION CONTROL MEASURES (FROM 1-5)

CITY OF DETROIT
WATER AND SEWERAGE DEPARTMENT
ENGINEERING DIVISION

SCALE	SHEET
NONE	1 OF □
DATE	DWG. No.
09/2018	015□13-13

✱ INDICATES APPLICABILITY OF A SPECIFIC CONTROL MEASURE TO ONE OR MORE OF THE SEVEN PROBLEM AREAS.

KEY	DETAILS	CHARACTERISTICS	SLOPES A	STREAMS AND WATERWAYS B	SURFACE DRAINAGEWAYS C	ENCLOSED DRAINAGE (INLET □ OUTFALL CONTROL) D	LARGE FLAT SURFACE AREAS E	BORROW AND STOCKPILE AREAS F	AD□ACENT PROPERTIES G
6	SODDING	PROVIDES IMMEDIATE PROTECTION. CAN BE USED ON STEEP SLOPES WHERE SEED MAY BE DIFFICULT TO ESTABLISH. EASY TO PLACE. MAY BE REPAIRED IF DAMAGED. SHOULD INCLUDE PREPARED TOPSOIL BED.	✱				✱	✱	
□	VEGETATIVE BUFFER STRIP	SLOWS RUNOFF VELOCITY. FILTERS SEDIMENT FROM RUNOFF. REDUCES VOLUME OF RUNOFF ON SLOPES. ASSISTS IN ESTABLISHING PERMANENT VEGETATIVE COVER.	✱						✱
8	MULCHING AND MULCH ANCHORING	USED ALONE TO PROTECT EXPOSED AREAS FOR SHORT PERIODS. PROTECTS SOIL FROM IMPACT OF FALLING RAIN. PRESERVES SOIL MOISTURE AND PROTECTS GERMINATING SEED FROM TEMPERATURE EXTREMES. SHOULD BE INSPECTED AFTER EVERY RAINSTORM AND REPAIRED AS NECESSARY UNTIL VEGETATION IS WELL ESTABLISHED.	✱				✱	✱	
9	SLOPE ROUGHENING AND SCARIFICATION	CAN BE ACCOMPLISHED BY HARROWING WITH A DISK, BACK BLADING, OR TRACKING WITH A DO□ER PERPENDICULAR TO THE SLOPE. REDUCES VELOCITY AND INCREASES INFILTRATION RATES. COLLECTS SEDIMENT. HOLDS WATER, SEED, AND MULCH BETTER THAN SMOOTH SURFACES.	✱				✱	✱	✱
10	RIP RAP	USED WHERE VEGETATION IS NOT EASILY ESTABLISHED. EFFECTIVE FOR HIGH VELOCITIES OR HIGH CONCENTRATIONS. PERMITS RUNOFF TO INFILTRATE SOIL. DISSIPATES ENERGY FLOW AT SYSTEM OUTLETS. SHOULD BE PLACED ON A GEOTEXTILE LINER.	✱	✱	✱	✱			

REV	DESCRIPTION	DATE

REVISIONS

SOIL EROSION AND SEDIMENTATION CONTROL MEASURES (FROM 6-10)

CITY OF DETROIT
WATER AND SEWERAGE DEPARTMENT
ENGINEERING DIVISION

SCALE	SHEET
NONE	2 OF □
DATE	DWG. No.
09/2018	015□13-14

✱ INDICATES APPLICABILITY OF A SPECIFIC CONTROL MEASURE TO ONE OR MORE OF THE SEVEN PROBLEM AREAS.

KEY	DETAILS	CHARACTERISTICS	A SLOPES	B STREAMS AND WATERWAYS	C SURFACE DRAINAGEWAYS	D ENCLOSED DRAINAGE (INLET □ OUTFALL CONTROL)	E LARGE FLAT SURFACE AREAS	F BORROW AND STOCKPILE AREAS	G AD□ACENT PROPERTIES
11	AGGREGATE COVER	STABILI□ES SOIL SURFACE, THUS MINIMI□ING EROSION. PERMITS CONSTRUCTION TRAFFIC IN ADVERSE WEATHER. MAY BE USED AS PART OF PERMANENT BASE CONSTRUCTION OF PAVED AREAS. REDUCES POTENTIAL SOIL EROSION AND FUGITIVE DUST BY STABILI□ING RAW AREAS.					✱		
12	BENCHES	REDUCES RUNOFF VELOCITY BY REDUCING EFFECTIVE SLOPE LENGTH. COLLECTS SEDIMENT. PROVIDES ACCESS TO SLOPES FOR SEEDING, MULCHING AND MAINTENANCE.	✱					✱	
13	DIVERSION BERM	DIVERTS WATER FROM VULNERABLE AREAS. COLLECTS AND DIRECTS WATER TO PREPARED DRAINAGEWAYS. MAY BE PLACED AS PART OF NORMAL CONSTRUCTION OPERATION.	✱				✱	✱	✱
14	INTERCEPTING DITCH	COLLECTS AND DIVERTS WATER TO A STABLE OUTLET OR SEDIMENT CONTROL DEVICE TO REDUCE EROSION. POTENTIALLY BE INCORPORATED IN PERMANENT PRO□ECT DRAINAGE SYSTEMS.	✱				✱	✱	✱
15	DIVERSION BERM □ INTERCEPTING DITCH	DIVERTS WATER TO A PREPARED DRAINAGEWAY. MAY BE USED AT INTERVALS ACROSS SLOPE FACE TO REDUCE EFFECTIVE SLOPE LENGTH.	✱				✱	✱	✱

REV	DESCRIPTION	DATE

REVISIONS

SOIL EROSION AND SEDIMENTATION CONTROL MEASURES (FROM 11-15)

CITY OF DETROIT
WATER AND SEWERAGE DEPARTMENT
ENGINEERING DIVISION

SCALE	SHEET
NONE	3 OF □
DATE	DWG. No.
09/2018	015□13-15

KEY	DETAILS	CHARACTERISTICS	A SLOPES	B STREAMS AND WATERWAYS	C SURFACE DRAINAGEWAYS	D ENCLOSED DRAINAGE (INLET □ OUTFALL CONTROL)	E LARGE FLAT SURFACE AREAS	F BORROW AND STOCKPILE AREAS	G AD□ACENT PROPERTIES
16		DUST CONTROL CAN BE ACCOMPLISHED BY WATERING, AND/OR APPLYING CALCIUM CHLORIDE. THE DISTURBED AREAS SHOULD BE KEPT TO A MINIMUM. PERMANENT/TEMPORARY SEEDING SHOULD BE APPLIED AS SOON AS POSSIBLE.	*				*	*	
1□		FILTER FLOW PRIOR TO ENTRY INTO A LAKE, STREAM OR WETLAND. NOT TO BE USED AS A CHECK DAM.	*		*			*	
18		USES SLASH AND LOGS FROM CLEARING OPERATIONS. CAN BE COVERED AND SEEDED RATHER THAN REMOVED. ELIMINATES NEED FOR BURNING OR REMOVAL OF MATERIAL FROM SITE.			*				*
19		LEAST EXPENSIVE FORM OF DRAINAGEWAY. MAY BE USED ONLY WHERE GRADIENT IS VERY LOW AND WITH SOILS OF MINIMUM EROSION POTENTIAL.			*				
20		GRASS TENDS TO SLOW RUNOFF AND FILTER OUT SEDIMENT. USED WHERE BARE CHANNEL WOULD BE ERODED.			*				

* INDICATES APPLICABILITY OF A SPECIFIC CONTROL MEASURE TO ONE OR MORE OF THE SEVEN PROBLEM AREAS.

REV	DESCRIPTION	DATE

REVISIONS

SOIL EROSION AND SEDIMENTATION CONTROL MEASURES (FROM 16-20)

CITY OF DETROIT
WATER AND SEWERAGE DEPARTMENT
ENGINEERING DIVISION

SCALE NONE	4 OF □ SHEET
DATE 09/2018	015□13-16 DWG. No.

* INDICATES APPLICABILITY OF A SPECIFIC CONTROL MEASURE TO ONE OR MORE OF THE SEVEN PROBLEM AREAS.

KEY	DETAILS	CHARACTERISTICS	A SLOPES	B STREAMS AND WATERWAYS	C SURFACE DRAINAGEWAYS	D ENCLOSED DRAINAGE (INLET □ OUTFALL CONTROL)	E LARGE FLAT SURFACE AREAS	F BORROW AND STOCKPILE AREAS	G AD□ACENT PROPERTIES
21		PREVENTS EROSION ON SLOPES WHEN RUNOFF CANNOT BE DIVERTED TO EDGE OF SLOPE AREA. USUALLY PERMANENT. CAN BE CONSTRUCTED OR EXTENDED AS GRADING PROGRESSES.	*		*				
22		REDUCES RUNOFF VELOCITY. REMOVES SEDIMENT AND TURBIDITY. CAN BE DESIGNED TO HANDLE LARGE VOLUMES OF FLOW. ALLOWS WATER TO DROP RAPIDLY IN ELEVATION WITHOUT CAUSING EXCESSIVE EROSION.	*		*				
23		INEXPENSIVE TO CONSTRUCT. PROVIDES IMMEDIATE PROTECTION. PROTECTS AREAS AROUND INLETS FROM EROSION.				*			
24		INEXPENSIVE AND EASY TO CONSTRUCT. CAN BE LOCATED AS NECESSARY TO COLLECT SEDIMENT. MAY BE USED IN CON□UNCTION WITH SNOW FENCE FOR ADDED STABILITY.				*			*
25		CAN BE CONSTRUCTED ACROSS DITCHED OR ANY AREA OF CONCENTRATED FLOW. PROTECTS VEGETATION IN EARLY STAGES OF GROWTH. A CHECK DAM IS INTENDED TO REDUCE WATER VELOCITIES AND CAPTURE SEDIMENT. A CHECK DAM IS NOT A FILTERING DEVICE	*		*			*	

REV	DESCRIPTION	DATE

REVISIONS

SOIL EROSION AND SEDIMENTATION CONTROL MEASURES (FROM 21-25)

CITY OF DETROIT
WATER AND SEWERAGE DEPARTMENT
ENGINEERING DIVISION

SCALE	SHEET
NONE	5 OF □
DATE	DWG. No.
09/2018	015□13-1□

✱ INDICATES APPLICABILITY OF A SPECIFIC CONTROL MEASURE TO ONE OR MORE OF THE SEVEN PROBLEM AREAS.

KEY	DETAILS	CHARACTERISTICS	SLOPES A	STREAMS AND WATERWAYS B	SURFACE DRAINAGEWAYS C	ENCLOSED DRAINAGE (INLET □ OUTFALL CONTROL) D	LARGE FLAT SURFACE AREAS E	BORROW AND STOCKPILE AREAS F	AD□ACENT PROPERTIES G
26		PROVIDES SETTLING AND FILTERING OF SILT LADEN WATER PRIOR TO ITS ENTRY INTO THE DRAINAGE SYSTEM. CAN BE USED IN MEDIAN AND SIDE DITCHES WHERE VEGETATION WILL BE DISTURBED. ALLOWS FOR EARLY USE OF DRAINAGE SYSTEMS PRIOR TO PRO□ECT COMPLETION.			✱		✱		
2□		CAN UTILI□E MATERIAL FOUND ON SITE. EASY TO CONSTRUCT. FILTERS SEDIMENT FROM RUNOFF.				✱			✱
28		EASY TO SHAPE. COLLECTS SEDIMENT. MAY BE CLEANED AND EXPANDED AS NEEDED. CAN BE USED WHERE MEDIUM FLOWS ARE ANTICIPATED.				✱			
29		MAY BE ROCK OR CLEAN RUBBLE MINIMI□ES STREAM TURBIDITY. INEXPENSIVE. MAY ALSO SERVE AS DITCH CHECK OR SEDIMENT TRAP.		✱					
30		A PERMEABLE BARRIER ERECTED BELOW DISTURBED AREAS TO CAPTURE SEDIMENTS FROM SHEET FLOW. CAN BE USED TO DIVERT SMALL VOLUMES OF WATER TO STABLE OUTLETS. INEFFECTIVE AS A FILTER AND SHOULD NEVER BE PLACED ACROSS STREAMS OR DITCHES WHERE FLOW IS CONCENTRATED.	✱					✱	✱

REV	DESCRIPTION	DATE
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-	-	-
-	-	-
-	-	-
-	-	-
-	-	-

REVISIONS

SOIL EROSION AND SEDIMENTATION CONTROL MEASURES (FROM 26-30)

CITY OF DETROIT
WATER AND SEWERAGE DEPARTMENT
ENGINEERING DIVISION

SCALE NONE	SHEET 6 OF □
DATE 09/2018	DWG. No. 015□13-18

KEY	DETAILS	CHARACTERISTICS	A SLOPES	B STREAMS AND WATERWAYS	C SURFACE DRAINAGEWAYS	D ENCLOSED DRAINAGE (INLET □ OUTFALL CONTROL)	E LARGE FLAT SURFACE AREAS	F BORROW AND STOCKPILE AREAS	G AD□ACENT PROPERTIES
31		PERMEABLE BARRIER ERECTED AROUND AN INLET TO CAPTURE SEDIMENTS.				*			
32		MINIMI□ES WIND EROSION. MAY BE SNOW FENCE.					*		
33		PROVIDES A STABLE ACCESS TO ROADWAYS MINIMI□ING FUGITIVE DUST AND TRACKING OF MATERIALS ONTO PUBLIC STREETS AND HIGHWAYS.					*	*	

* INDICATES APPLICABILITY OF A SPECIFIC CONTROL MEASURE TO ONE OR MORE OF THE SEVEN PROBLEM AREAS.

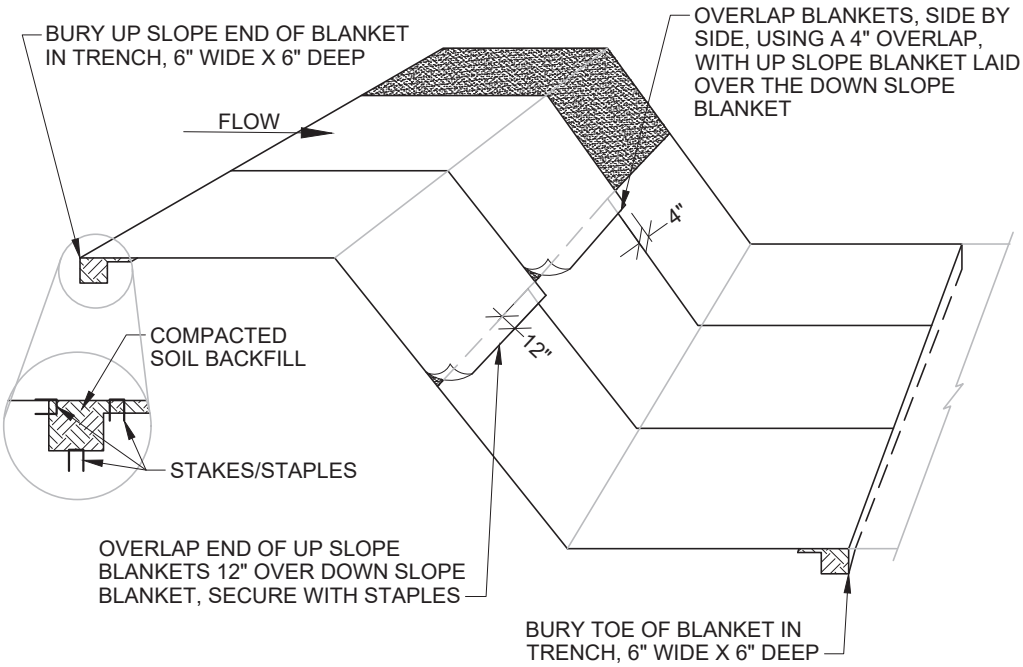
REV	DESCRIPTION	DATE

REVISIONS

SOIL EROSION AND SEDIMENTATION CONTROL MEASURES (FROM 31-33)

CITY OF DETROIT
WATER AND SEWERAGE DEPARTMENT
ENGINEERING DIVISION

SCALE NONE	□ OF □ SHEET
DATE 09/2018	015□13-19 DWG. No.



NOTES:

1. PLACE MULCH BLANKET PARALLEL TO FLOW AND ANCHOR SECURELY.
2. WHEN BLANKETS ARE USED IN FLOWING DITCH, BLANKETS SHOULD NOT OVERLAP IN DITCH CENTER, PARALLEL TO FLOW.
3. STAPLES INSTALLED/SECURED ACCORDING TO MANUFACTURER□S SPECIFICATIONS.
4. WHERE POSSIBLE, CONSTRUCT WITH BIODEGRADABLE MATERIAL.

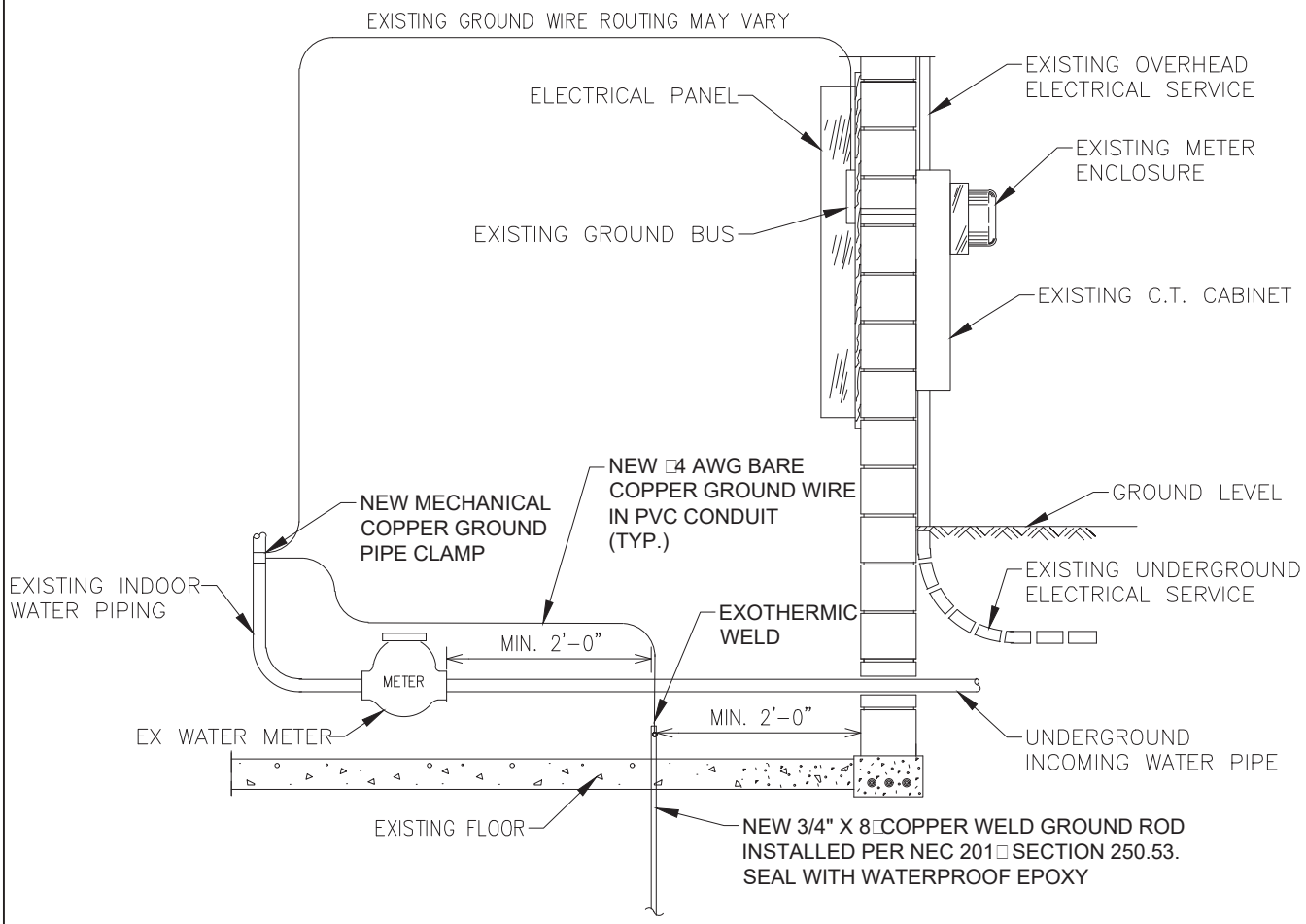
REV	DESCRIPTION	DATE

REVISIONS

MULCH BLANKETS

CITY OF DETROIT
WATER AND SEWERAGE DEPARTMENT
ENGINEERING DIVISION

SCALE NONE	SHEET 1 OF 1
DATE 09/2018	DWG. No. 015□13-20



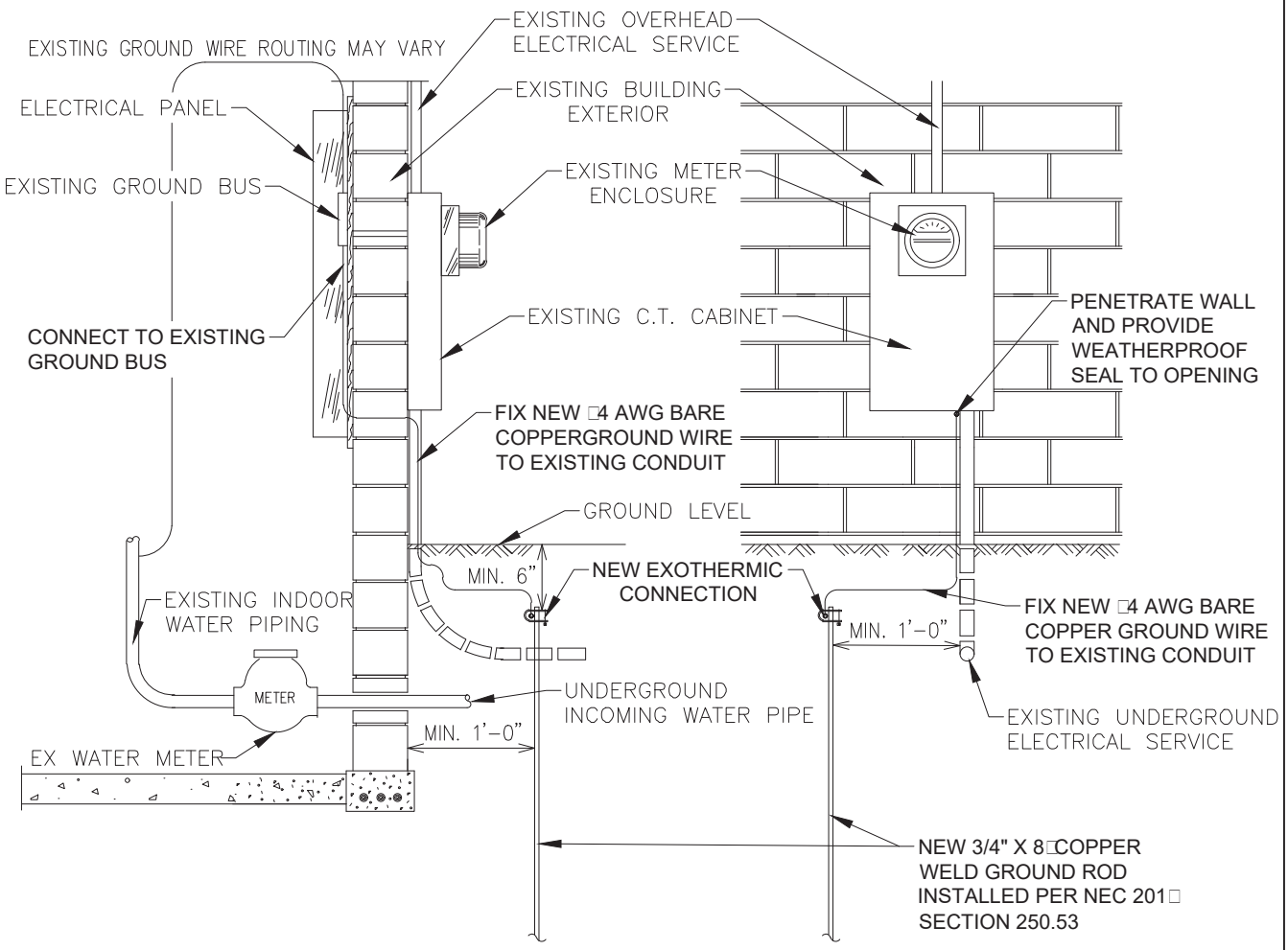
REV	DESCRIPTION	DATE

REVISIONS

WATER SERVICE GROUNDING, INDOOR INSTALLATION

CITY OF DETROIT
WATER AND SEWERAGE DEPARTMENT
ENGINEERING DIVISION

SCALE NONE	SHEET 1 OF 1
DATE 5/2020	DWG. No. 260526-01



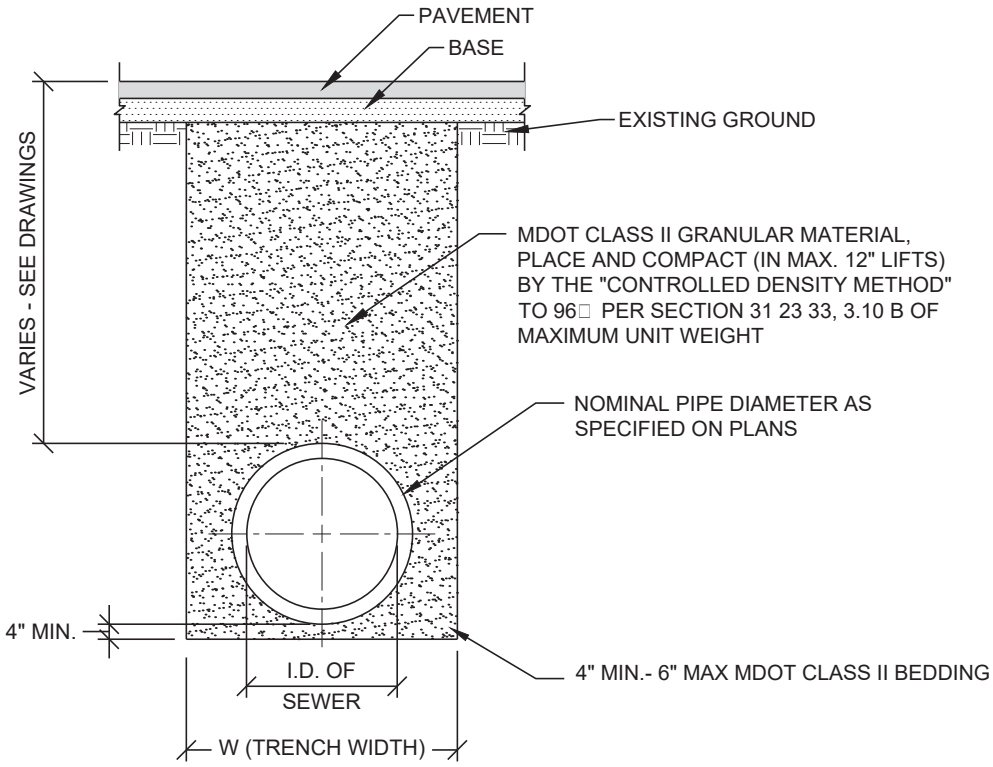
REV	DESCRIPTION	DATE

REVISIONS

WATER SERVICE GROUNDING, OUTDOOR INSTALLATION

CITY OF DETROIT
WATER AND SEWERAGE DEPARTMENT
ENGINEERING DIVISION

SCALE NONE	SHEET 1 OF 1
DATE 5/2020	DWG. No. 260526-02



I.D. PIPE SI□E (INCHES)	18 OR LESS	21	24	30	36	42	48	54	60	66	□2
MAXIMUM TRENCH WIDTH (FEET)	5.00	5.□5	6.00	6.50	□.00	□.50	8.00	8.50	9.00	9.50	10.00

W (TRENCH WIDTH) □ 5 FEET, WHEN PIPE I.D. IS 18" OR LESS
W (TRENCH WIDTH) □ I.D. □4 FEET, WHEN PIPE I.D. IS GREATER THAN 18"

NOTES:

1. NO EXTRA PAYMENT WILL BE MADE FOR BASE AND PAVEMENT RESTORATION ITEMS DUE TO ADDITIONAL EXCAVATION BEYOND THE MAXIMUM TRENCH WIDTH LISTED ABOVE.
2. REFER TO PAVEMENT RESTORATION DETAILS FOR BASE AND PAVEMENT WIDTH.
3. TRENCHING SHALL BE PER OSHA 29 CFR, SUBPART P AND SHALL BE PERFORMED TO MINIMI□E THE SURFACE DISRUPTION.

STANDARD TRENCH DETAIL FOR SEWER UNDER ROAD BED, PARKING LOTS, SIDEWALKS, DRIVEWAYS, CURBS, GRAVEL ROADS AND ALLEYS

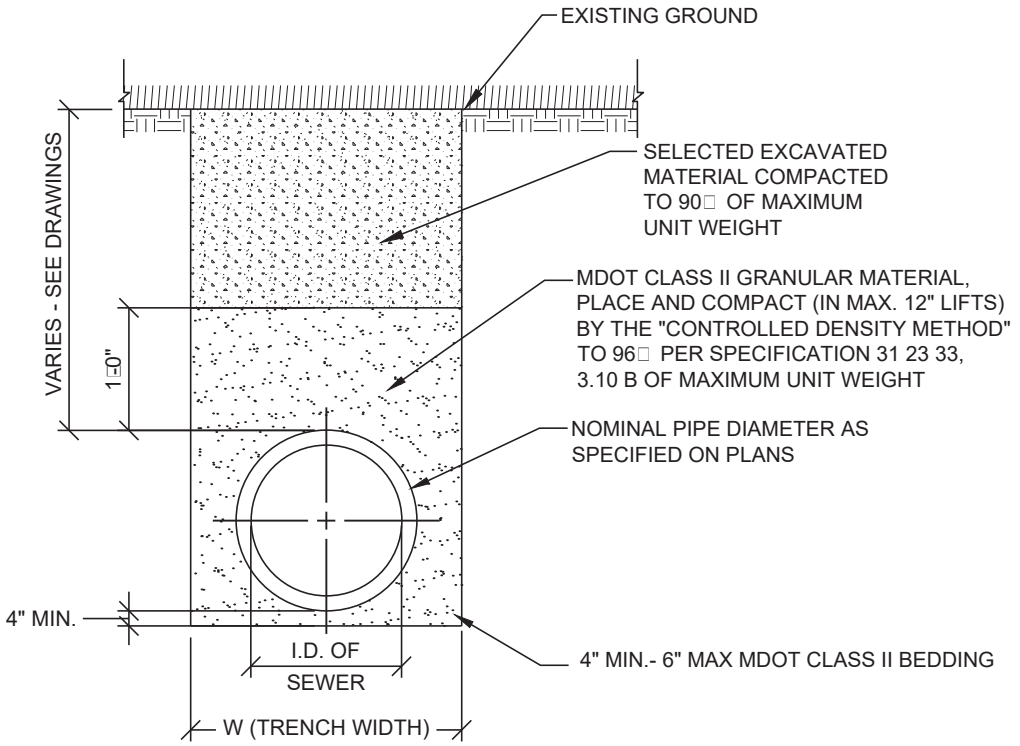
REV	DESCRIPTION	DATE
1	UPDATED	06/2020

REVISIONS

SANITARY SEWER TRENCH DETAIL

CITY OF DETROIT
WATER AND SEWERAGE DEPARTMENT
ENGINEERING DIVISION

SCALE NONE	SHEET 1 OF 3
DATE 09/2018	DWG. No. 312333-01



I.D. PIPE SI□E (INCHES)	18 OR LESS	21	24	30	36	42	48	54	60	66	□2
MAXIMUM TRENCH WIDTH (FEET)	5.00	5.□5	6.00	6.50	□.00	□.50	8.00	8.50	9.00	9.50	10.00

W (TRENCH WIDTH) □ 5 FEET, WHEN PIPE I.D. IS 18" OR LESS
W (TRENCH WIDTH) □ I.D. □4 FEET, WHEN PIPE I.D. IS GREATER THAN 18"

NOTES:

1. NO EXTRA PAYMENT WILL BE MADE FOR BASE AND PAVEMENT RESTORATION ITEMS DUE TO ADDITIONAL EXCAVATION BEYOND THE MAXIMUM TRENCH WIDTH LISTED ABOVE.
2. TRENCHING SHALL BE PER OSHA 29 CFR, SUBPART P AND SHALL BE PERFORMED TO MINIMI□E THE SURFACE DISRUPTION.

STANDARD TRENCH DETAIL FOR SEWER UNDER BERMS, LAWNS, GRASSY AREAS, (OUTSIDE PAVEMENT INFLUENCE)

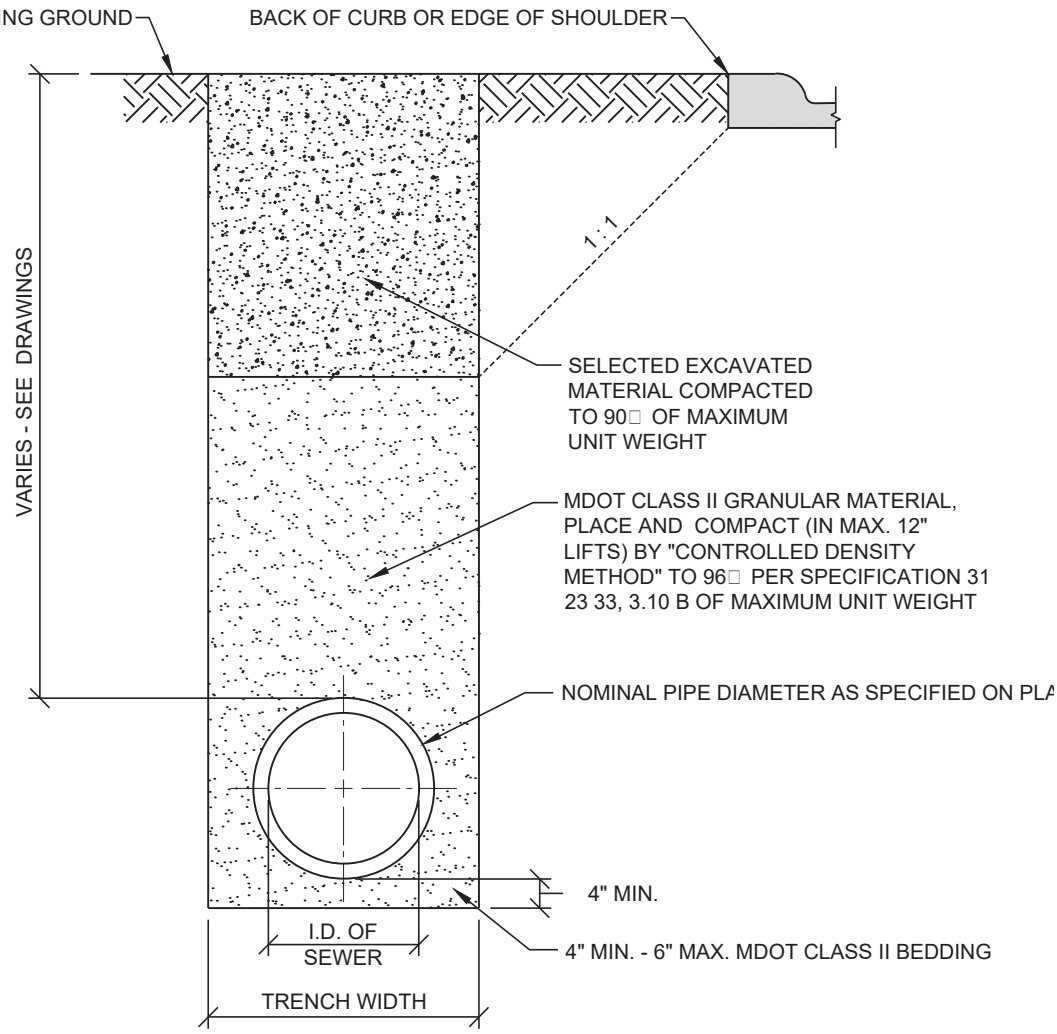
REV	DESCRIPTION	DATE
1	UPDATED	06/2020

REVISIONS

SANITARY SEWER TRENCH DETAIL

CITY OF DETROIT
WATER AND SEWERAGE DEPARTMENT
ENGINEERING DIVISION

SCALE NONE	SHEET 2 OF 3
DATE 09/2018	DWG. No. 312333-02



I.D. PIPE SI□E (INCHES)	18 OR LESS	21	24	30	36	42	48	54	60	66	□
MAXIMUM TRENCH WIDTH (FEET)	5.00	5.□5	6.00	6.50	□.00	□.50	8.00	8.50	9.00	9.50	10.

W (TRENCH WIDTH) □ 5 FEET, WHEN PIPE I.D. IS 18" OR LESS
W (TRENCH WIDTH) □ I.D. □4 FEET, WHEN PIPE I.D. IS GREATER THAN 18"

NOTES:

1. NO EXTRA PAYMENT WILL BE MADE FOR BASE AND PAVEMENT RESTORATION ITEMS DUE TO ADDITIONAL EXCAVATION BEYOND THE MAXIMUM TRENCH WIDTH LISTED ABOVE.
2. TRENCHING SHALL BE PER OSHA 29 CFR, SUBPART P AND SHALL BE PERFORMED TO MINIMI□E THE SURFACE DISRUPTION.

STANDARD TRENCH DETAIL FOR SEWER WITHIN INFLUENCE OF ROAD BED

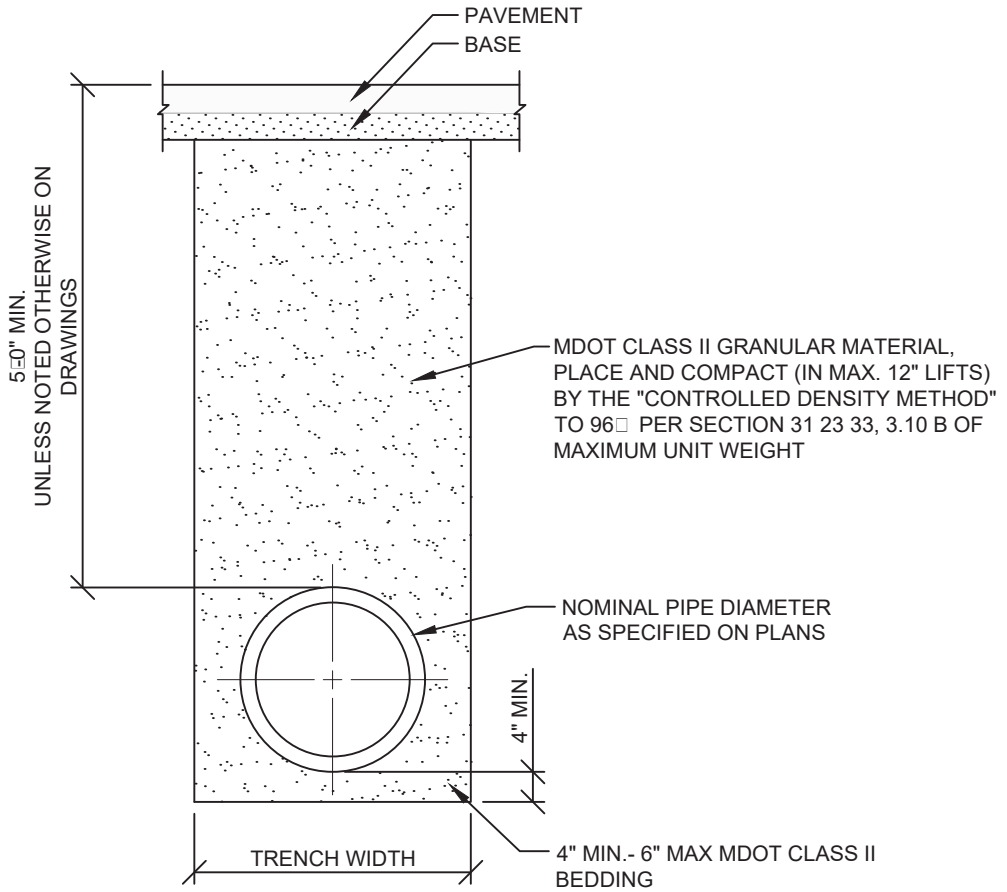
REV	DESCRIPTION	DATE
1	UPDATED	06/2020

REVISIONS

SANITARY SEWER TRENCH DETAIL

CITY OF DETROIT
WATER AND SEWERAGE DEPARTMENT
ENGINEERING DIVISION

SCALE NONE	SHEET 3 OF 3
DATE 9/2018	DWG. No. 312333-03



NOMINAL PIPE DIAMETER	MAXIMUM TRENCH WIDTH
LESS THAN 18"	30"
18" TO 24"	PIPE DIAMETER PLUS 18"
GREATER THAN 24"	PIPE DIAMETER PLUS 24"

NOTES:

1. NO EXTRA PAYMENT WILL BE MADE FOR BASE AND PAVEMENT RESTORATION ITEMS DUE TO ADDITIONAL EXCAVATION BEYOND THE MAXIMUM TRENCH WIDTH LISTED ABOVE.
2. REFER TO PAVEMENT RESTORATION DETAILS FOR BASE AND PAVEMENT WIDTH.
3. TRENCHING SHALL BE PER OSHA 29 CFR, SUBPART P AND SHALL BE PERFORMED TO MINIMI□E THE SURFACE DISRUPTION.

STANDARD TRENCH DETAIL FOR WATER MAIN UNDER ROAD BED, PARKING LOTS, SIDEWALKS, DRIVEWAYS, CURBS, GRAVEL ROADS AND ALLEYS

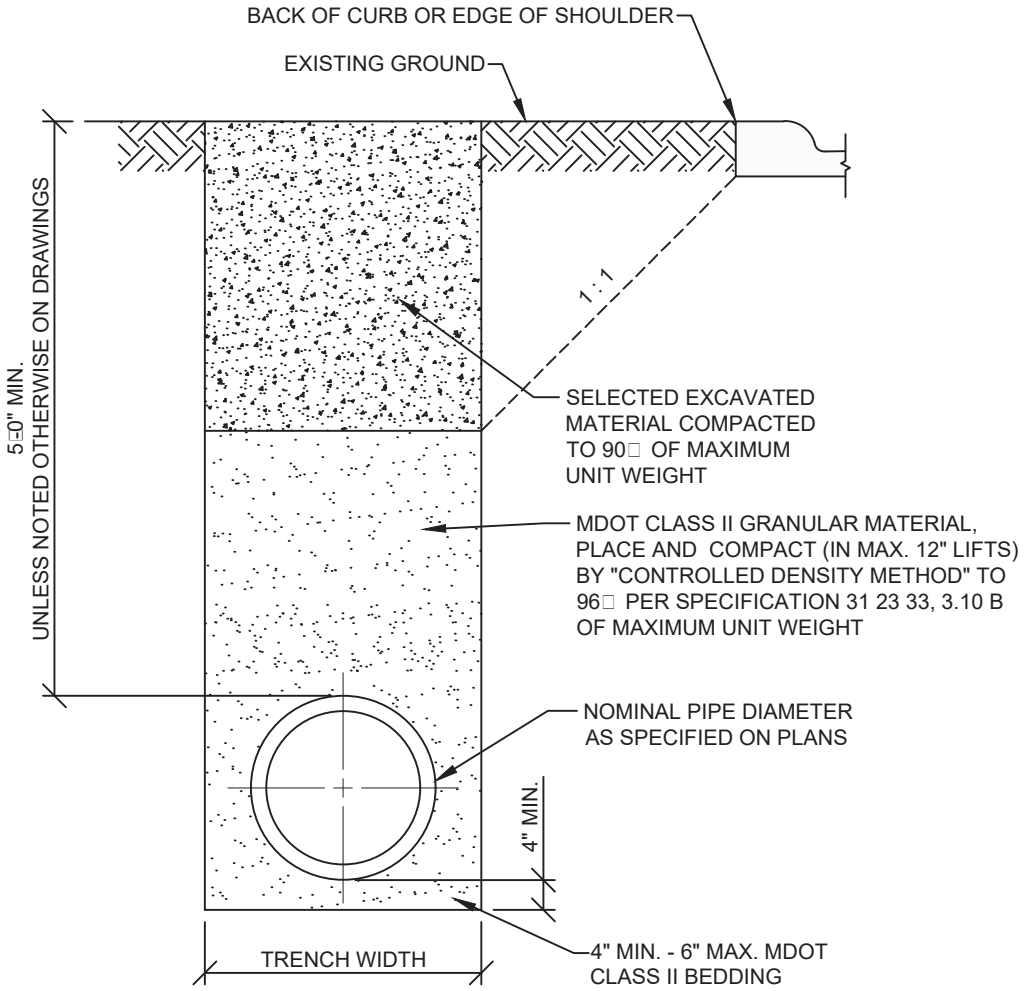
REV	DESCRIPTION	DATE
-	-	-
-	-	-
-	-	-
-	-	-
-	-	-
1	UPDATED	5/2020

REVISIONS

UTILITY TRENCH, WATER MAIN

CITY OF DETROIT
WATER AND SEWERAGE DEPARTMENT
ENGINEERING DIVISION

SCALE NONE	SHEET 1 OF 3
DATE 9/2018	DWG. No. 312333-04



NOMINAL PIPE DIAMETER	MAXIMUM TRENCH WIDTH
LESS THAN 18"	30"
18" TO 24"	PIPE DIAMETER PLUS 18"
GREATER THAN 24"	PIPE DIAMETER PLUS 24"

NOTES:

1. NO EXTRA PAYMENT WILL BE MADE FOR BASE AND PAVEMENT RESTORATION ITEMS DUE TO ADDITIONAL EXCAVATION BEYOND THE MAXIMUM TRENCH WIDTH LISTED ABOVE.
2. TRENCHING SHALL BE PER OSHA 29 CFR, SUBPART P AND SHALL BE PERFORMED TO MINIMI□E THE SURFACE DISRUPTION.

STANDARD TRENCH DETAIL FOR WATER MAIN WITHIN INFLUENCE OF ROAD BED

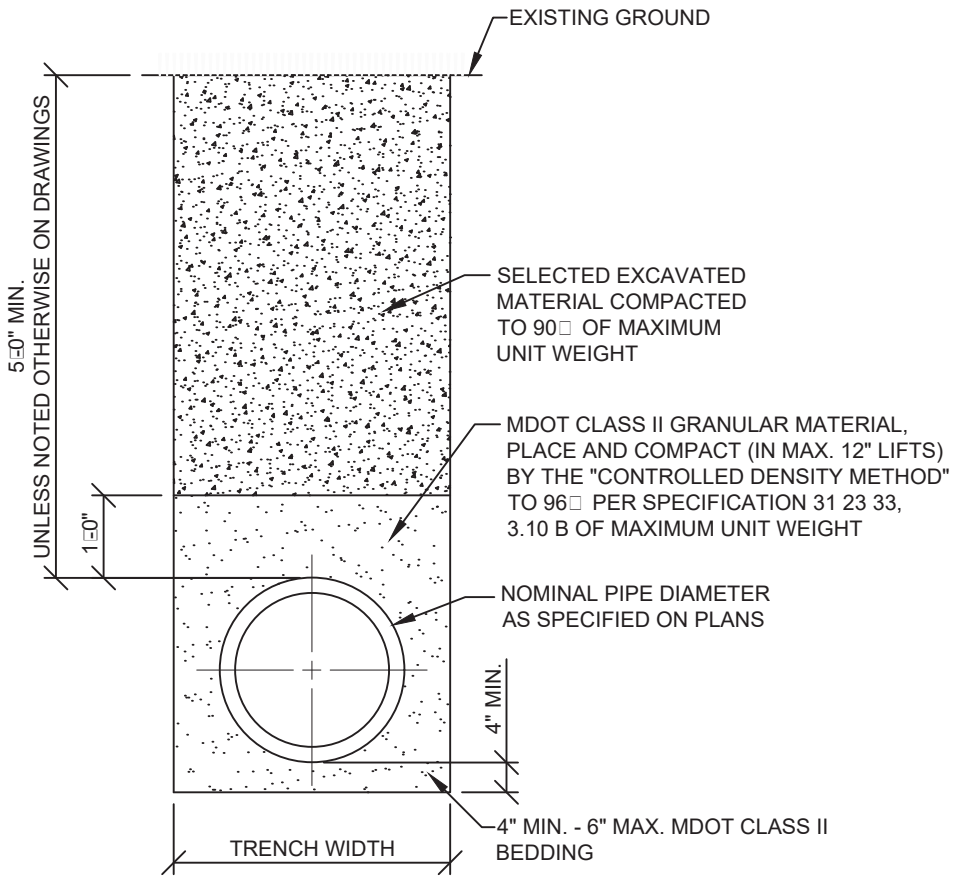
REV	DESCRIPTION	DATE
-	-	-
-	-	-
-	-	-
-	-	-
-	-	-
1	UPDATED	5/2020

REVISIONS

UTILITY TRENCH, WATER MAIN

CITY OF DETROIT
WATER AND SEWERAGE DEPARTMENT
ENGINEERING DIVISION

SCALE NONE	SHEET 2 OF 3
DATE 9/2018	DWG. No. 312333-05



NOMINAL PIPE DIAMETER	MAXIMUM TRENCH WIDTH
LESS THAN 18"	30"
18" TO 24"	PIPE DIAMETER PLUS 18"
GREATER THAN 24"	PIPE DIAMETER PLUS 24"

NOTES:

1. NO EXTRA PAYMENT WILL BE MADE FOR BASE AND PAVEMENT RESTORATION ITEMS DUE TO ADDITIONAL EXCAVATION BEYOND THE MAXIMUM TRENCH WIDTH LISTED ABOVE.
2. TRENCHING SHALL BE PER OSHA 29 CFR, SUBPART P AND SHALL BE PERFORMED TO MINIMI□E THE SURFACE DISRUPTION.

STANDARD TRENCH DETAIL FOR WATER MAIN UNDER BERMS, LAWNS, GRASSY AREAS, (OUTSIDE PAVEMENT INFLUENCE)

REV	DESCRIPTION	DATE
-	-	-
-	-	-
-	-	-
-	-	-
-	-	-
1	UPDATED	5/2020
REVISIONS		

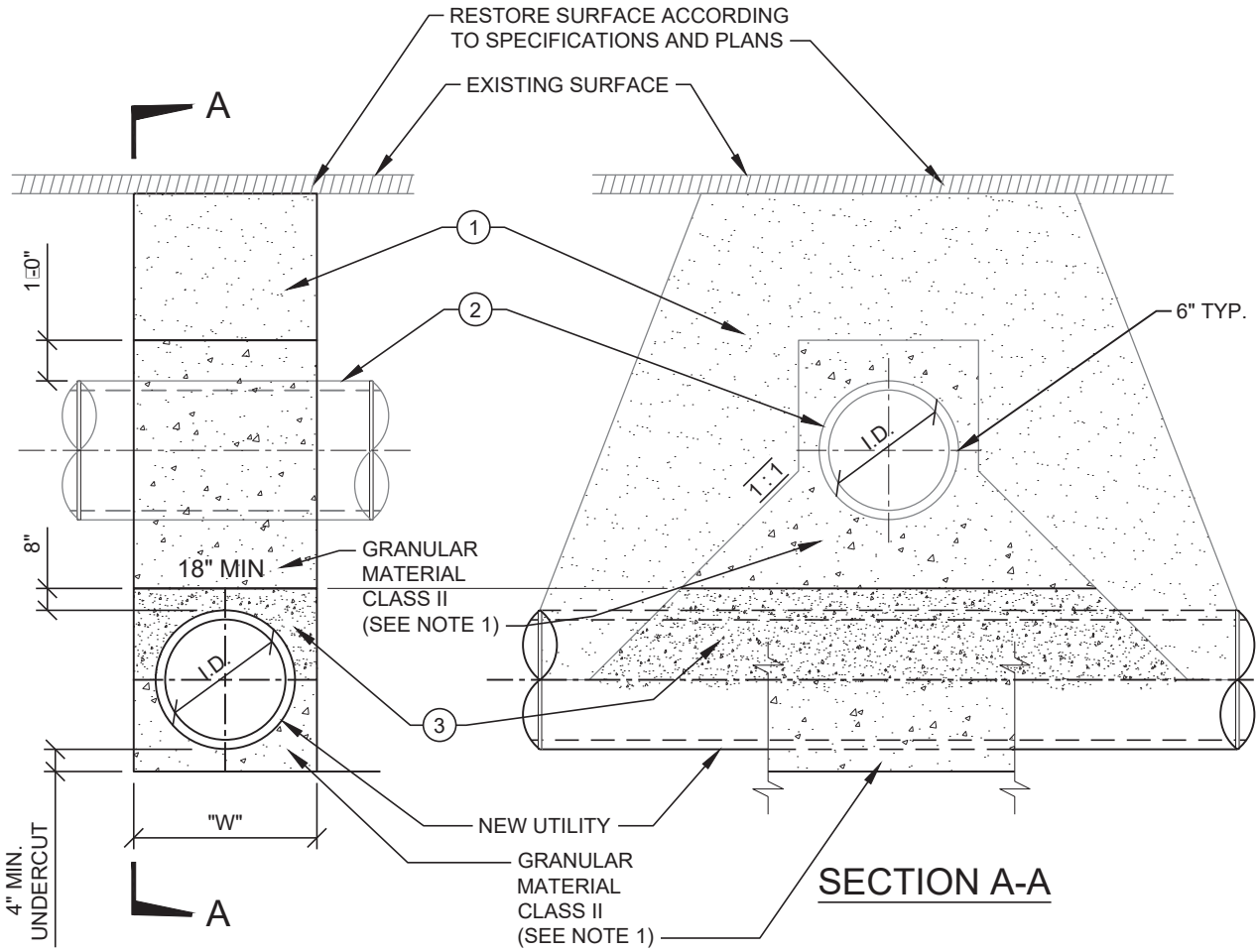
UTILITY TRENCH, WATER MAIN

CITY OF DETROIT
WATER AND SEWERAGE DEPARTMENT
ENGINEERING DIVISION

SCALE NONE	SHEET 3 OF 3
DATE 9/2018	DWG. No. 312333-06

CODED NOTES:

1. BACKFILL ACCORDING TO SPECIFICATIONS AND TYPICAL TRENCH SECTION.
2. EXISTING CATCH BASIN DRAIN, SEWER OR OTHER UNDERGROUND UTILITY CROSSING NEW OPEN CUT CONSTRUCTION.
3. BACKFILL WITH A DRY MIX OF ONE BAG CEMENT PER ONE BAG OF GRANULAR MATERIAL CLASS II.



SECTION A-A

NOTES:

1. ALL MDOT CLASS II GRANULAR MATERIAL, PLACE AND COMPACT (IN MAX. 12" LIFTS) BY "CONTROLLED DENSITY METHOD" TO 96□ PER SPECIFICATION 31 23 33, 3.10 B OF MAXIMUM UNIT WEIGHT.
2. WATERMAINS CROSSING UNDER SEWERS - WHEN IT IS IMPOSSIBLE TO OBTAIN THE MINIMUM 18-INCH CLEARANCE. REPLACE THE SEWER PIPE (MINIMUM OF 10 FT. ON BOTH SIDES OF WATERMAIN) WITH WATER WORKS GRADE 150PSI PRESSURE TESTED TO ENSURE WATER TIGHTNESS.
3. "W" - SEE TRENCH DETAILS FOR TRENCH WIDTH.
4. TRENCHING SHALL BE PER OSHA 29 CFR, SUBPART P

TYPICAL DETAIL AT CROSSING UNDER EXISTING UTILITIES

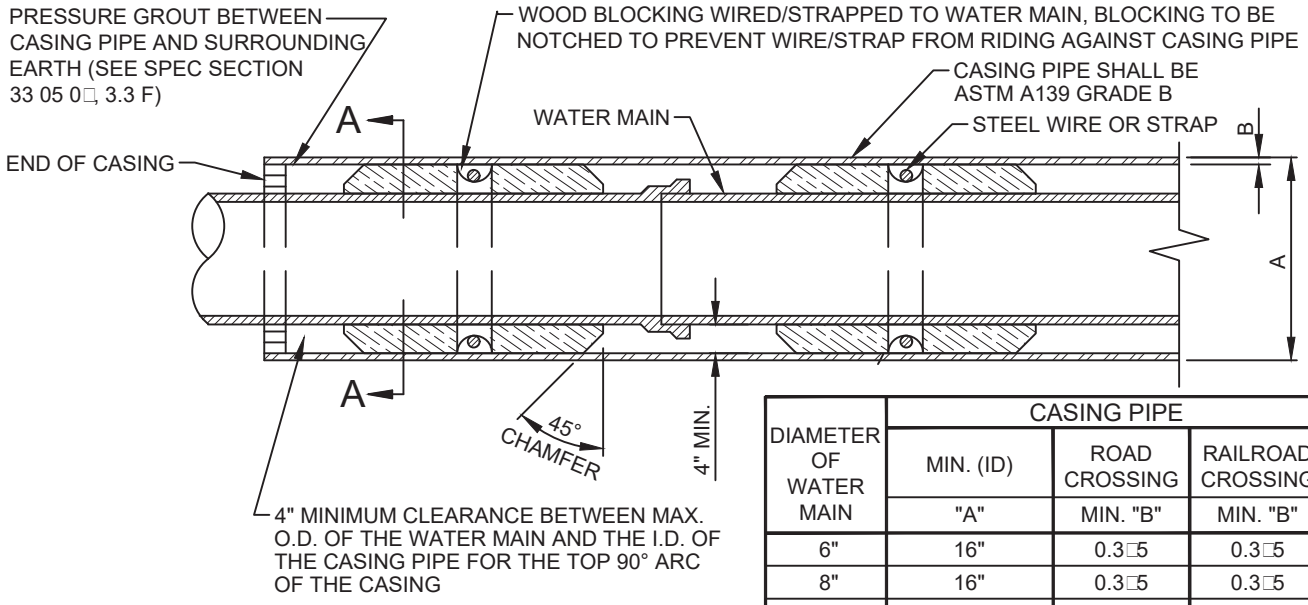
REV	DESCRIPTION	DATE
1	UPDATED	06/2020

REVISIONS

UTILITY CROSSING

CITY OF DETROIT
WATER AND SEWERAGE DEPARTMENT
ENGINEERING DIVISION

SCALE NONE	SHEET 1 OF 1
DATE 09/2018	DWG. No. 312333-0□

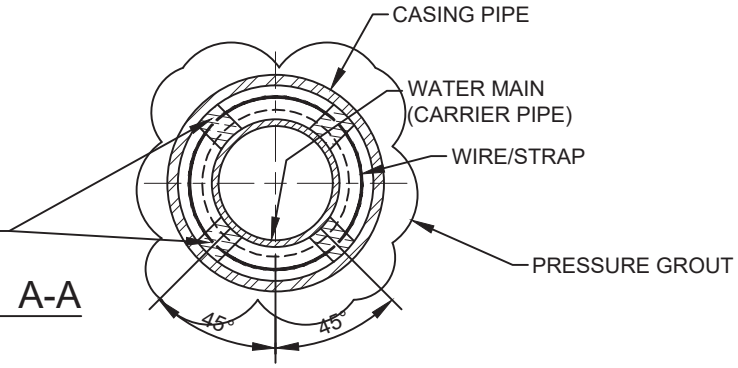


DIAMETER OF WATER MAIN	CASING PIPE		
	MIN. (ID)	ROAD CROSSING	RAILROAD CROSSING
	"A"	MIN. "B"	MIN. "B"
6"	16"	0.3□5	0.3□5
8"	16"	0.3□5	0.3□5
12"	20"	0.3□5	0.500
16"	24"	0.3□5	0.500
20"	30"	0.3□5	0.500
24"	36"	0.3□5	0.500

A □ PIPE INSIDE DIAMETER
B □ PIPE WALL THICKNESS

PIPE BARREL SUPPORT FOR WATER MAIN CONSTRUCTED IN CASING PIPE

WATER MAIN SHALL BE WIRED/STRAPPED TO THE (4) WOLMANI□ED WOOD SKID BLOCKS. 85□ OF PIPE WITHIN CASING PIPE SHALL BE SUPPORTED. TERMINATE BLOCKS 12" FROM END OF CASING PIPE TO ALLOW BULKHEAD OF ENTIRE PIPE CIRCUMFERENCE. REFERENCE SPEC SECTION 33 05 0□, 2.5 FOR ALTERNATE PIPE SUPPORT AND INSULATOR DETAILS.



SECTION A-A

NOTES:

1. CONTRACTOR SHALL SUBMIT IN WRITING THE DETAILS OF THE APPROPRIATE PIPE CASING INSTALLATION FOR REVIEW AND APPROVAL BY THE ENGINEER BEFORE INSTALLATION OF ANY CASING STARTS. ALTERNATE METHODS OF SUPPORTING AND MAINTAINING THE POSITION OF THE CARRIER PIPE WITH RESPECT TO THE CASING PIPE (IN LIEU OF THE USE OF TIMBERS) WILL BE CONSIDERED.
2. IN CASE OF RAILROAD OR BRIDGE FOUNDATION CROSSINGS, SPECIFICATIONS AND REQUIREMENTS OF THE RESPECTIVE RIGHT-OF-WAY AUTHORITY WILL BE CONSIDERED PRIORITY.
3. CARRIER PIPE WITHIN CASING PIPE SHALL HAVE BOLTLESS RESTRAINED □OINTS.
4. THE OUTSIDE DIAMETER OF BELL OF BOLTLESS RESTRAINED PIPE MAY VARY WITH THE SAME MANUFACTURER. THEREFORE, CONTRACTOR SHALL VERIFY O.D. OF BELL AND INCREASE SI□E OF STEEL CASING PIPE AS REQUIRED.
5. DUCTILE IRON CARRIER PIPE SHALL BE POLYWRAPPED AND PIPE SHALL NOT REST ON BELLS.
6. CASING CLOSURE SHALL BE IN ACCORDANCE WITH SPECIFICATION 33 05 0□- TRENCHLESS INSTALLATION OF UTILITY PIPING.

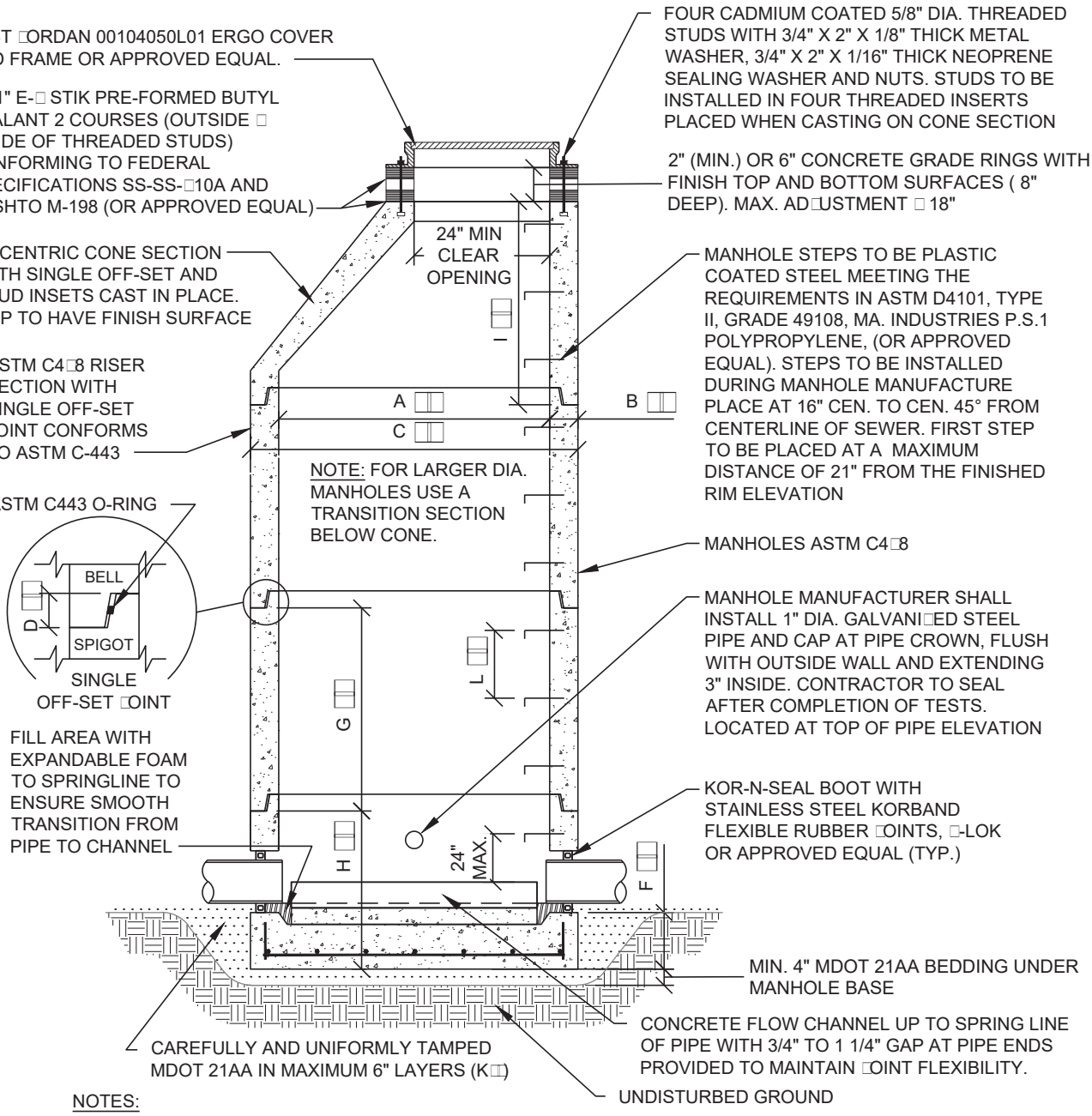
REV	DESCRIPTION	DATE
1	UPDATED	5/2020

REVISIONS

CASING PIPE SECTION FOR WATER MAIN

CITY OF DETROIT
WATER AND SEWERAGE DEPARTMENT
ENGINEERING DIVISION

SCALE NONE	SHEET 1 OF 1
DATE 9/2018	DWG. No. 33050□-01



NOTES:

1. REFER TO DETAIL SHEET 330561-05 FOR MANHOLE ASSEMBLY TABLE □□

2. PRECAST CONCRETE MANHOLE SECTIONS SHALL CONFORM TO ALL THE REQUIREMENTS OF "SPECIFICATIONS FOR PRECAST REINFORCED CONCRETE MANHOLE RISERS AND TOPS" ASTM C-4□8 WITH SINGLE OFF-SET □OINT CONFORMS TO ASTM C-443.

3. EACH SECTION SHALL HAVE NOT MORE THAN TWO HOLES FOR HANDLING PURPOSES. THESE HOLES SHALL BE SATISFACTORILY PLUGGED WITH GROUT AFTER INSTALLATION.

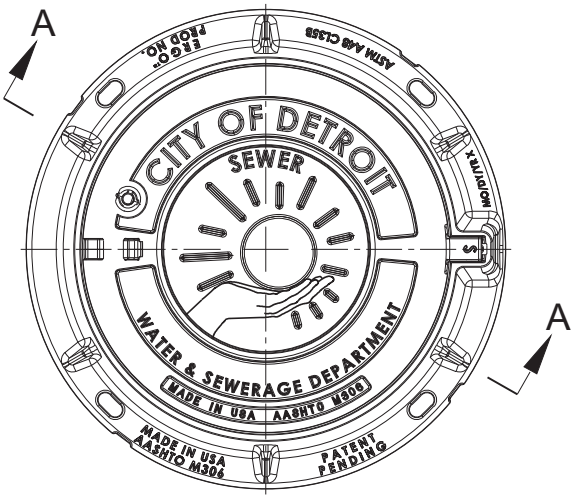
REV	DESCRIPTION	DATE
1	UPDATED	06/2020

REVISIONS

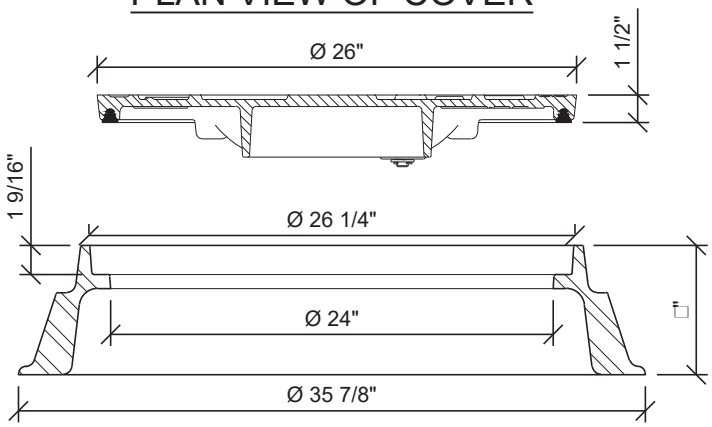
STANDARD MANHOLE PRECAST

CITY OF DETROIT
WATER AND SEWERAGE DEPARTMENT
ENGINEERING DIVISION

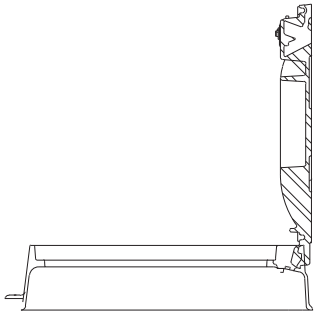
SCALE NONE	SHEET 1 OF 1
DATE 09/2018	DWG. No. 330561-02



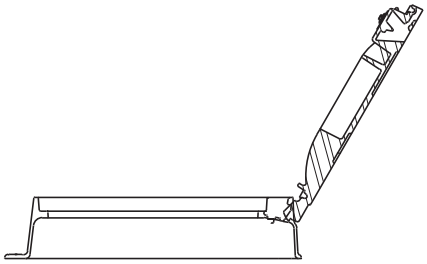
PLAN VIEW OF COVER



SECTION A-A



SAFETY LOCK @ 90°



FULLY OPENED □
REMOVAL POSITION @ 120°

NOTE:

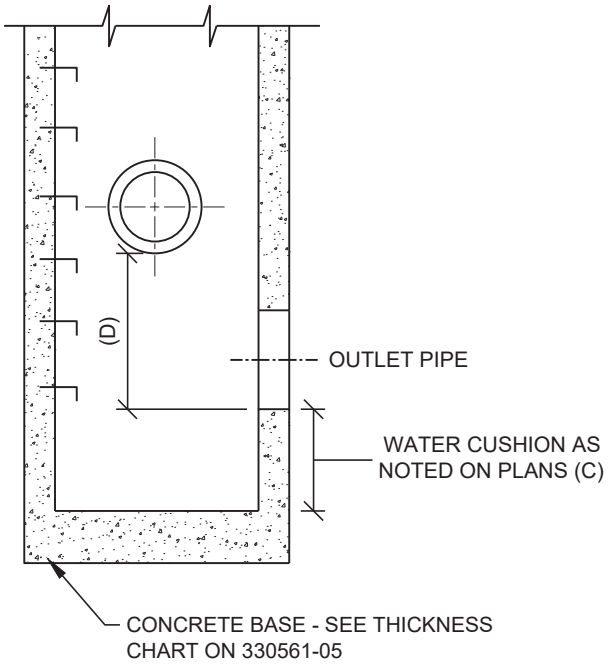
EAST □ORDAN 00104050L01 ERGO COVER AND FRAME OR APPROVED EQUAL.

1	UPDATED	06/2020
REV	DESCRIPTION	DATE
REVISIONS		

MANHOLE FRAME AND COVER WITH LOGO - SEWER

CITY OF DETROIT
WATER AND SEWERAGE DEPARTMENT
ENGINEERING DIVISION

SCALE NONE	SHEET 1 OF 1
DATE 9/2018	DWG. No. 330561-03



DIFFERENCE BETWEEN HIGHEST INLET AND OUTLET INVERTS (D)	DEPTH OF CUSHION (C)
2□6" TO 3□11"	12"
4□0" TO 5□5"	18"
5□6" TO □□11"	24"
8□0" TO 9□11"	30"
10□0" OR MORE	36"

NOTES:

1. ALL OTHER REQUIREMENTS, SAME AS FOR PRECAST MANHOLE BASE SECTIONS.

2. FOR PIPE SI□E AND INVERT SEE PLAN AND PROFILE.

1	UPDATED	06/2020
REV	DESCRIPTION	DATE
REVISIONS		

MANHOLE WATER CUSHION

CITY OF DETROIT
WATER AND SEWERAGE DEPARTMENT
ENGINEERING DIVISION

SCALE NONE	1 OF 1 SHEET
DATE 09/2018	330561-04 DWG. No.

A	RISER DIAMETER	IN	48	60	□2	84	96	108	120
B	WALL THICKNESS	IN	5	6	□	8	9	9	10
C	OUTSIDE DIAMETER	IN	58	□2	86	100	114	126	140
D	□OINT DEPTH	IN	4.25	4.□5	5.0	5.0	5.0	5.0	6.0
E	-	-	-	-	-	-	-	-	-
F	INTEGRAL BASE	IN	8	8	8	8	8	8	8
G	RISER HEIGHTS	FT	1.33	1.42	1.42	1.42	2.0	2.0	2.0
		FT	2.6□	2.60	3.00	2.00	2.00	2.00	2.00
		FT	4	4	4	4	4	4	4
		FT	5.33	6.0	6.0	6.0	6.0	6.0	6.0
		FT	6	8	8	8	8	8	8
H	BASE HEIGHT RISER HEIGHTS CAN ALSO BE USED AS BASE SECTIONS	FT	1.33	1.42	1.42	1.42	2.0	2.0	2.0
		FT	2.6□	2.60	3.00	2.00	2.00	2.00	2.00
		FT	4	4	4	4	4	4	4
		FT	5.33	6.0	6.0	6.0	6.0	6.0	6.0
		FT	6	8	8	8	8	8	8
I	CONE HEIGHT TO 24"	FT	1	□	□	□	□	□	□
		FT	2	□	□	□	□	□	□
		FT	3	□	□	□	□	□	□
		FT	4	□	□	□	□	□	□
	(REDUCING CONE HEIGHT TO 48")	FT	5	2.6□	2.6□	□	□	□	□
	CONE HEIGHT TO 48"	FT	5	□	□	□	□	□	□
K	LOOSE BASE - 6" THK. OUTSIDE DIA.	IN	□2	□	□	□	□	□	□
	8" THK.	IN	□2	84	96	□	□	□	□
	12" THK.	IN	□	84	96	108	120	132	156
L	STEP SPACING	IN	16	16	16	16	16	16	16
	APPROX. WEIGHT / FT.	LB	86□	1295	1811	2409	3090	3865	4200

□N/A NOT AVAILABLE

NOTES:

1. SOME DIMENSIONS MAY VARY BY MANUFACTURER. DESIGN ENGINEER SHALL ENSURE DETAIL MEETS DWSD REQUIREMENTS.
2. SEE DETAIL SHEET 330561-02 FOR STANDARD MANHOLE PRECAST DESIGN.

MANHOLES ASTM C-4□8

WEIGHTS AND DIMENSIONS - US CUSTOMARY

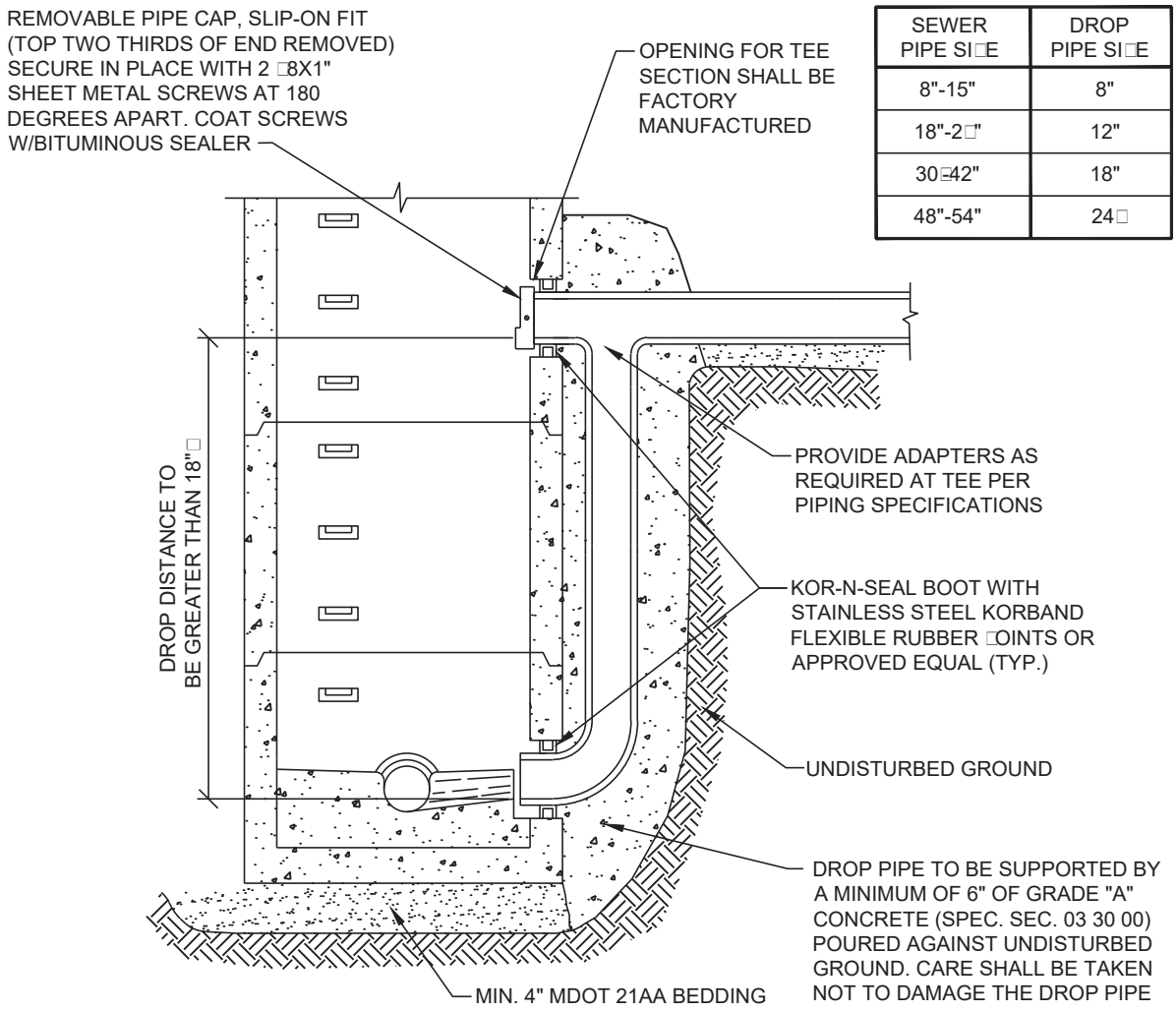
REV	DESCRIPTION	DATE
1	UPDATED	06/2020

REVISIONS

MANHOLE, ASSEMBLY

CITY OF DETROIT
WATER AND SEWERAGE DEPARTMENT
ENGINEERING DIVISION

SCALE NONE	SHEET 1 OF 1
DATE 09/2018	DWG. No. 330561-05



SEWER PIPE SI□E	DROP PIPE SI□E
8"-15"	8"
18"-2□"	12"
30□42"	18"
48"-54"	24□

NOTES:

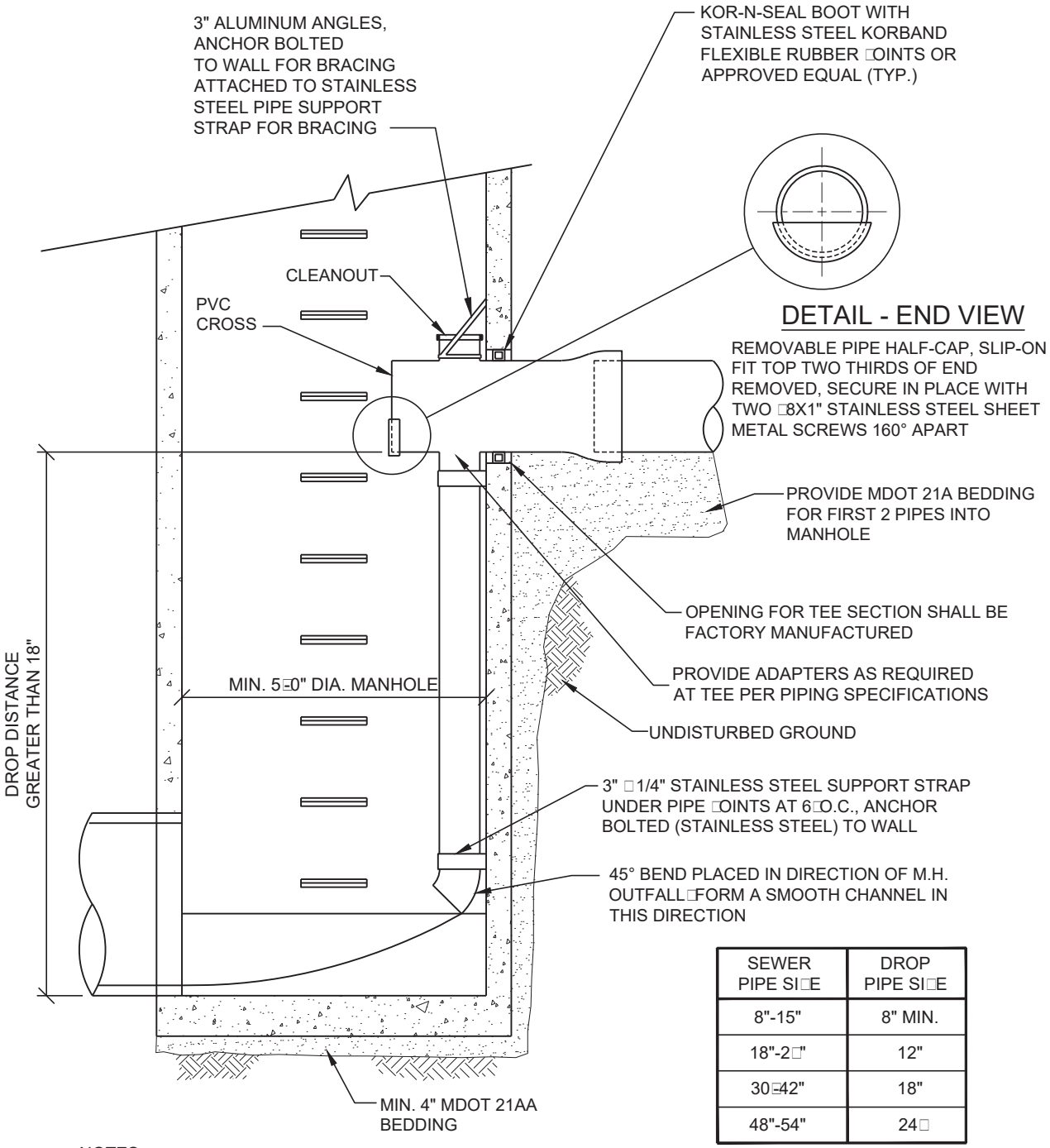
1. DROP PIPE LOCATION SHALL NOT INTERFERE WITH MANHOLE STEPS, OR STEPS AND CONE SHALL BE REPOSITIONED.
2. SEE STANDARD MANHOLE DRAWING FOR OTHER MANHOLE REQUIREMENTS.

REV	DESCRIPTION	DATE
1	UPDATED	06/2020
REVISIONS		

MANHOLE, EXTERIOR DROP

CITY OF DETROIT
WATER AND SEWERAGE DEPARTMENT
ENGINEERING DIVISION

SCALE NONE	1 OF 1 SHEET
DATE 9/2018	330561-06 DWG. No.



SEWER PIPE SI□E	DROP PIPE SI□E
8"-15"	8" MIN.
18"-2□"	12"
30□42"	18"
48"-54"	24□

NOTES:

1. SI□E OF DROP PIPE WILL BE LIMITED BY SI□E OF MANHOLE AND AVAILABLE PVC CROSSES.
2. SEE STANDARD MANHOLE DRAWING FOR OTHER MANHOLE REQUIREMENTS.

REV	DESCRIPTION	DATE
1	UPDATED	06/2020
REVISIONS		

MANHOLE, INTERIOR DROP

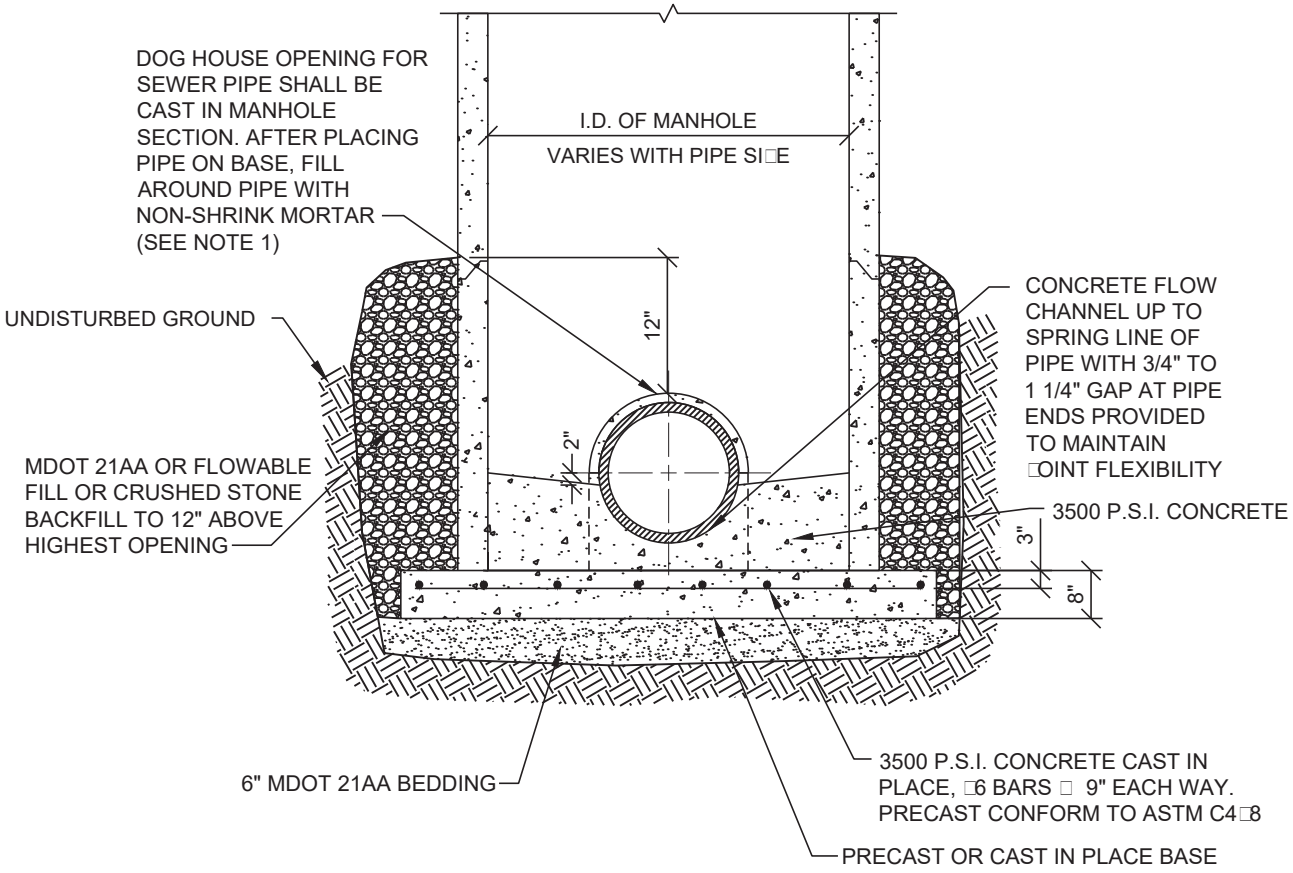
CITY OF DETROIT
WATER AND SEWERAGE DEPARTMENT
ENGINEERING DIVISION

SCALE NONE	1 OF 1 SHEET
DATE 09/2018	330561-0□ DWG. No.

DOG HOUSE OPENING SIZES	
SEWER SIZE	MAX OPENING
8" - 10"	15"
12" - 15"	20"
18" - 24"	30"

FOR OTHER DETAILS OF MANHOLE, SEE STANDARD MANHOLE DETAIL 330561-02

MANHOLE SIZING	
SEWER PIPE SIZE	MANHOLE DIAMETER
24"	4'-0"
30"	5'-0"
42"	6'-0"



NOTE:

1. DOG HOUSE MAY BE USED OVER EXISTING SEWER PIPE. NEW PIPE OPENINGS SHALL BE MANUFACTURED WITH KOR-N-SEAL BOOT AND STAINLESS STEEL KORBAND FLEXIBLE RUBBER JOINTS OR APPROVED EQUAL.

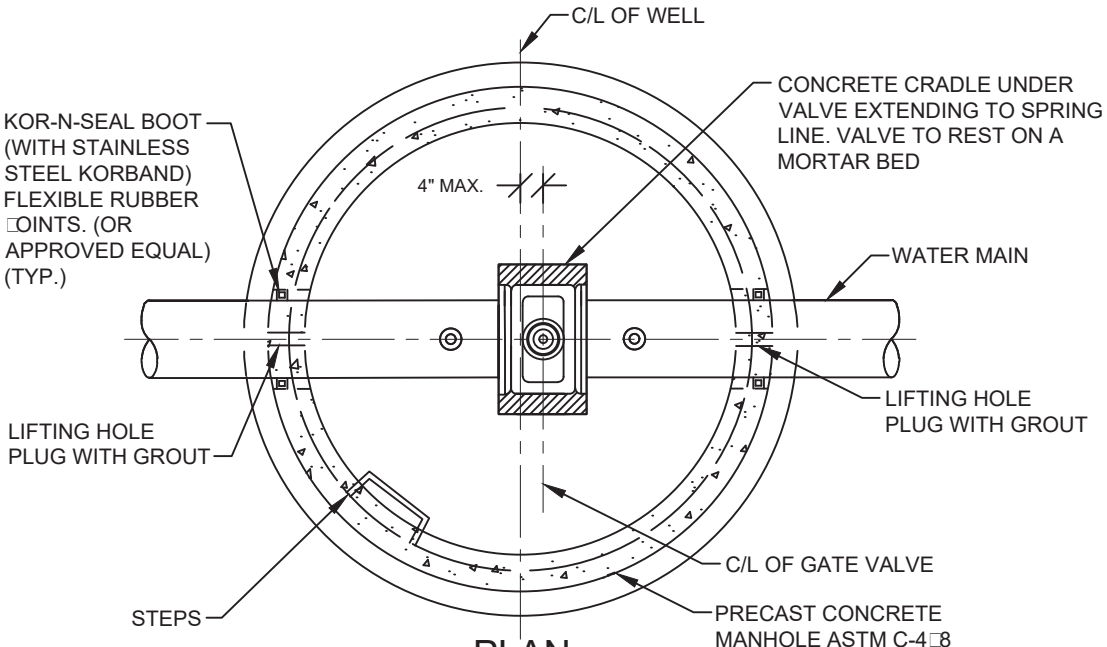
REV	DESCRIPTION	DATE
-	-	-
1	UPDATED	06/2020

REVISIONS

MANHOLE, OVER EXISTING SEWER

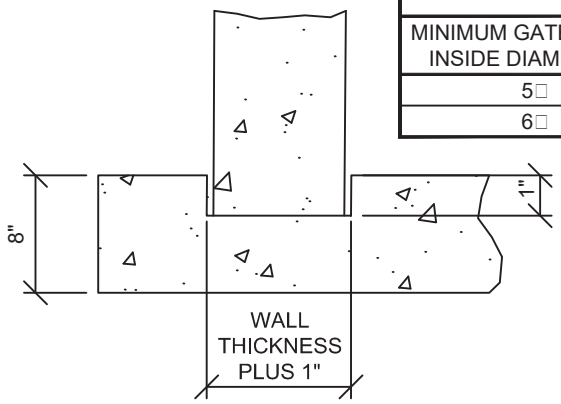
CITY OF DETROIT
WATER AND SEWERAGE DEPARTMENT
ENGINEERING DIVISION

SCALE NONE	SHEET 1 OF 1
DATE 9/2018	DWG. No. 330561-08



PLAN

GATE WELL SI□ING CHART	
MINIMUM GATE WELL INSIDE DIAMETER	WATER MAIN DIAMETER
5□	6" - 8"
6□	12" - 16"



GROOVED BASE - DETAIL

NOTES:

1. MANHOLE STEPS SHALL BE INSTALLED IN WELL WALL WHERE HEIGHT FROM TOP OF PIPE TO TOP OF WELL EXCEEDS 5□0".
2. PRECAST CONCRETE MANHOLE SECTIONS SHALL CONFORM TO ALL THE REQUIREMENTS OF "SPECIFICATIONS FOR PRECAST REINFORCED CONCRETE MANHOLE RISERS AND TOPS" ASTM C-4□8 WITH SINGLE OFF-SET □OINT CONFORMS TO ASTM C-443.
3. EACH SECTION SHALL HAVE NOT MORE THAN TWO HOLES FOR HANDLING PURPOSES. THESE HOLES SHALL BE SATISFACTORILY PLUGGED WITH GROUT AFTER INSTALLATION.
4. STEPS TO BE INSTALLED DURING MANHOLE MANUFACTURE. PLACE 16" CEN. ON CEN. 45° FROM CENTERLINE OF WATER MAIN

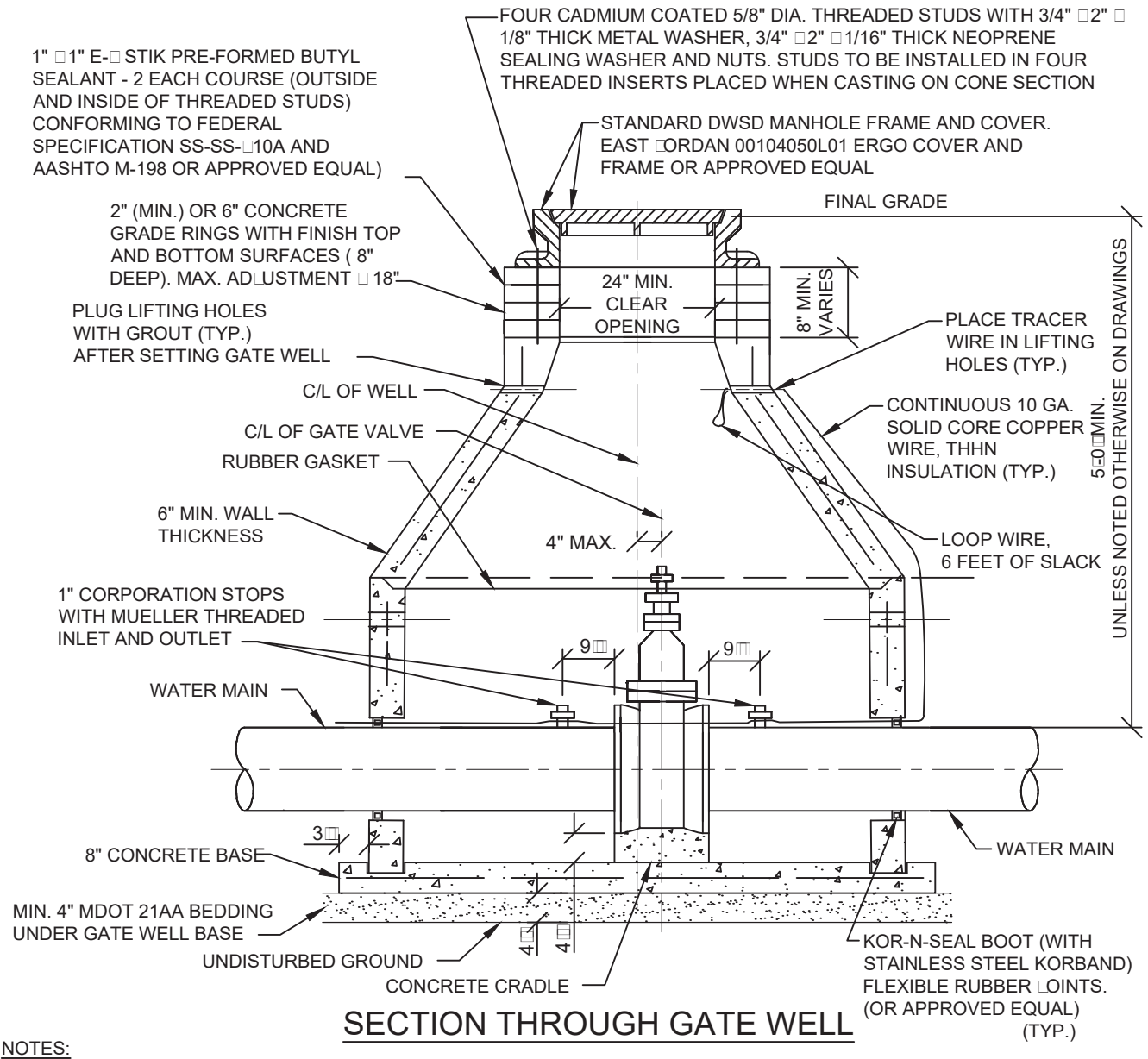
REV	DESCRIPTION	DATE
-	-	-
-	-	-
-	-	-
-	-	-
-	-	-
1	UPDATED	5/2020

REVISIONS

GATE WELL, PRECAST

CITY OF DETROIT
WATER AND SEWERAGE DEPARTMENT
ENGINEERING DIVISION

SCALE NONE	SHEET 1 OF 2
DATE 9/2018	DWG. No. 330561-09



SECTION THROUGH GATE WELL

NOTES:

1. MANHOLE STEPS SHALL BE INSTALLED IN WELL WALL WHERE HEIGHT FROM TOP OF PIPE TO TOP OF WELL EXCEEDS 5□0".TOP STEP SHALL NOT BE MORE THAN 16" BELOW MH COVER OR AS DIRECTED. BOTTOM STEP SHALL NOT BE MORE THAN 18" ABOVE THE BENCH OR FLOOR LEVEL.
2. STEPS TO BE INSTALLED DURING MANHOLE MANUFACTURE. PLACE 16" CEN. ON CEN. 45° FROM CENTERLINE OF WATER MAIN.
3. RUBBER "O" RINGS FOR AD□USTING RINGS NOT USED IN PAVEMENT AREAS.
4. TRACING WIRE ON HDPE PIPE ONLY.

GATE WELL SI□ING CHART	
MINIMUM GATE WELL INSIDE DIAMETER	WATER MAIN DIAMETER
5□	6" - 8"
6□	12" - 16"

REV	DESCRIPTION	DATE
-	-	-
-	-	-
-	-	-
-	-	-
-	-	-
1	UPDATED	5/2020

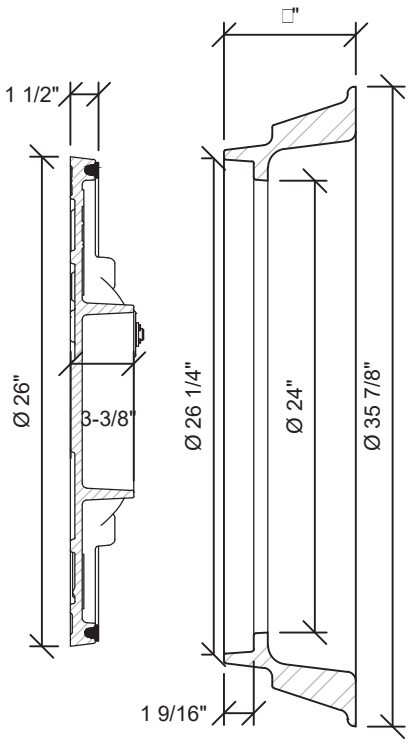
REVISIONS

GATE WELL, PRECAST

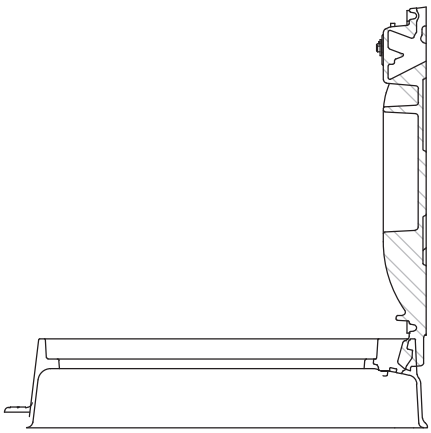
CITY OF DETROIT
WATER AND SEWERAGE DEPARTMENT
ENGINEERING DIVISION

SCALE	SHEET
NONE	2 OF 2
DATE	DWG. No.
9/2018	330561-10

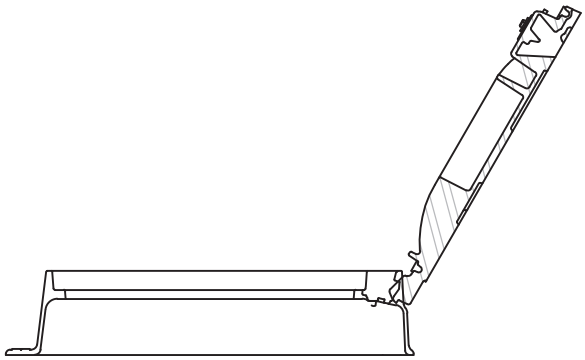
PLAN VIEW OF COVER



SECTION A-A



SAFETY LOCK @ 90°



FULLY OPENED □
REMOVAL POSITION @ 120°

NOTE:

1. EAST □ORDAN 00104050L01 ERGO COVER AND FRAME OR APPROVED EQUAL.

REV	DESCRIPTION	DATE
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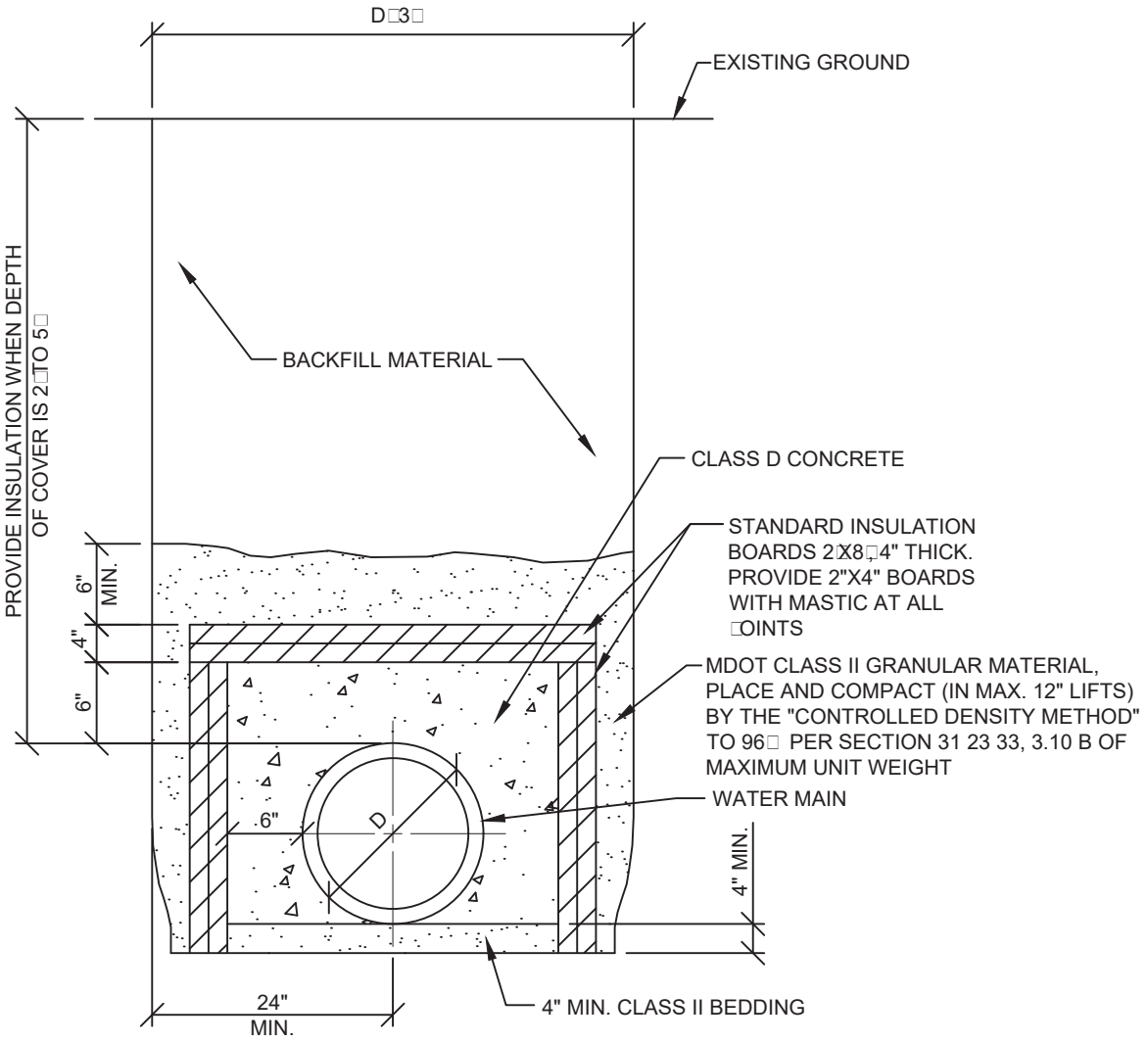
1	UPDATED	5/2020

REVISIONS

GATE WELL FRAME AND COVER WITH LOGO - WATER MAIN

CITY OF DETROIT
WATER AND SEWERAGE DEPARTMENT
ENGINEERING DIVISION

SCALE NONE	SHEET 1 OF 1
DATE 9/2018	DWG. No. 330561-11



NOTES:

1. INSULATION BOARD TO BE CLOSED CELL, EXTRUDED POLYSTYRENE FOAM MEETING ASTM 5□8, TYP VI, 40 PSI COMPERESSING STRENGTH (ASTM D1621) 0.1□ MAX. WATER ABSORPTION (ASTM C2□2).
2. OVERLAP ALL INSULATION BOARD □OINTS. 6" WIDE AND 2" THICK.
3. CLASS B CONCRETE, MINIMUM COMPRESSIVE STRENGTH AT 28 DAYS □ 4,000 PSI.
4. TRENCHING SHALL BE PER OSHA 29 CRF, SUBPART P.
5. ENCASEMENT IS REQUIRED FOR PIPING WITH LESS THAN 5 FT. OF COVER (LENGTH WILL VARY).

REV	DESCRIPTION	DATE
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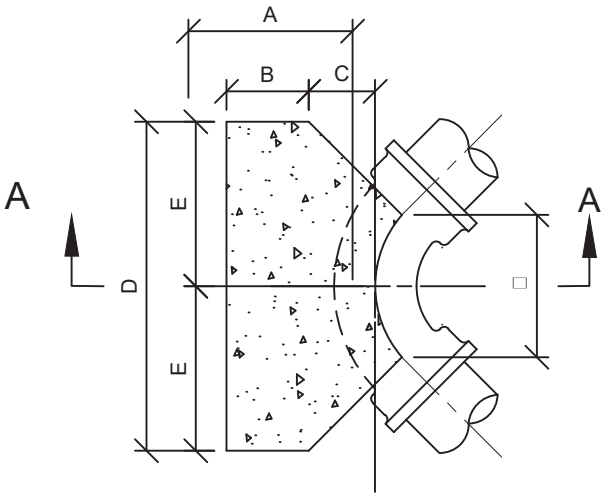
REVISIONS

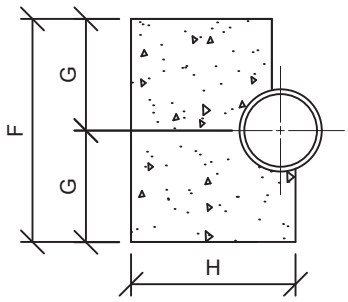
WATER MAIN TRENCH INSULATION DETAIL

CITY OF DETROIT
WATER AND SEWERAGE DEPARTMENT
ENGINEERING DIVISION

SCALE NONE	SHEET 1 OF 1
DATE 5/2020	DWG. No. 330□00-01



PLAN



SECTION A-A

HORI□ONTAL BENDS, 22.5, 45 □ 90 DEGREE TURNS										
SI□E OF PIPE (IN)	DEGREE OF BEND	A (FT)	B MIN. (FT)	C (FT)	D (FT)	E (FT)	F (FT)	G (FT)	H MIN. (FT)	□ (FT)
6	45	1.□5	0.□5	1.00	2.00	1.00	1.50	0.□5	1.92	1.33
6	90	1.□5	0.□5	1.00	2.50	1.25	1.50	0.□5	1.92	1.1□
8	45	1.□5	0.□5	1.00	2.33	1.1□	2.00	1.00	1.92	1.33
8	90	1.□5	0.□5	1.00	3.33	1.6□	2.50	1.25	1.92	1.08
12	22.5	1.□5	0.□5	1.00	2.50	1.25	2.00	1.00	2.00	1.33
12	45	2.08	0.□5	1.33	3.50	1.□5	2.50	1.25	2.33	1.33
12	90	2.08	0.□5	1.33	5.50	2.□5	3.00	1.50	2.33	1.6□
16	22.5	2.6□	1.00	1.6□	3.33	1.6□	2.50	1.25	3.00	1.1□
16	45	2.6□	1.00	1.6□	5.33	2.6□	3.00	1.50	3.00	2.50
16	90	2.6□	1.00	1.6□	6.00	3.00	5.00	2.50	3.00	2.6□

NOTES:

1. THE THRUST BLOCK FACE SHALL BE POURED AGAINST UNDISTURBED EARTH.
2. CLASS B CONCRETE, MINIMUM COMPRESSIVE STRENGTH AT 28 DAYS □4,000 PSI.
3. THRUST BLOCK TO ABUT OR REST AGAINST UNDISTRIBUTED SOIL OR EARTH COMPACTED TO 95□ MODIFIED PROCTER.
4. THRUST BLOCKS FOR HDPE PIPE SHALL BE PER PIPE MANUFACTURER.

REV	DESCRIPTION	DATE
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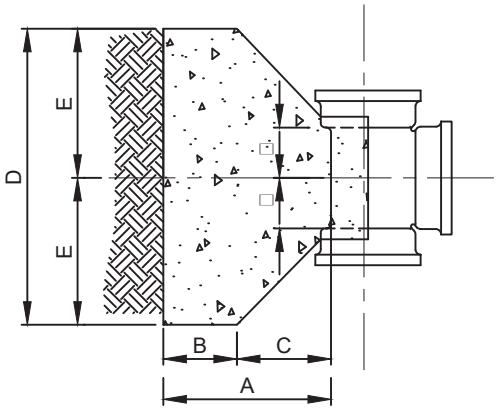
1	UPDATED	5/2020

REVISIONS

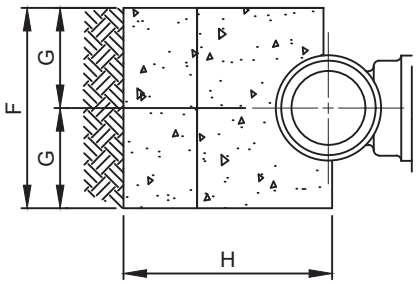
THRUST BLOCK, HORI□ONTAL BEND (TRADITIONAL DWSD SI□ING)

CITY OF DETROIT
WATER AND SEWERAGE DEPARTMENT
ENGINEERING DIVISION

SCALE NONE	SHEET 1 OF 1
DATE 9/2018	DWG. No. 331413-01



PLAN



ELEVATION

SI□E OF PIPE (IN)	A (FT)	B MIN. (FT)	C (FT)	D (FT)	E (FT)	F (FT)	G (FT)	H MIN (FT)	□ (FT)
6X6	1.□5	0.□5	1.00	2.50	1.25	1.50	0.□5	2.25	0.50
8X8	1.□5	0.□5	1.00	3.00	1.50	2.00	1.00	2.25	0.50
12X8	1.□5	0.□5	1.00	3.00	1.50	2.00	1.00	2.42	0.50
12X12	2.08	0.□5	1.33	4.00	2.00	3.00	1.50	2.□5	0.6□
16X8	1.□5	0.□5	1.00	3.00	1.50	2.00	1.00	2.□5	0.50
16X12	2.08	0.□5	1.33	4.00	2.00	3.00	1.50	3.08	0.6□
16X16	2.6□	1.00	1.6□	5.00	2.50	4.00	2.00	3.6□	0.92

NOTES:

1. THE THRUST BLOCK FACE SHALL BE POURED AGAINST UNDISTURBED EARTH.
2. CLASS B CONCRETE, MINIMUM COMPRESSIVE STRENGTH AT 28 DAYS □4,000 PSI.
3. THRUST BLOCK TO ABUT OR REST AGAINST UNDISTRIBUTED SOIL OR EARTH COMPACTED TO 95□ MODIFIED PROCTER.
4. THRUST BLOCKS FOR HDPE PIPE SHALL BE PER PIPE MANUFACTURER.

REV	DESCRIPTION	DATE
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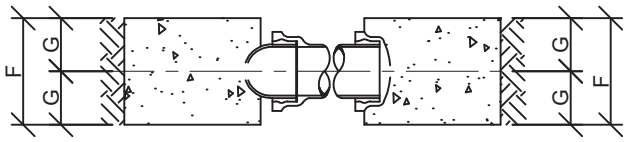
1	UPDATED	5/2020

REVISIONS

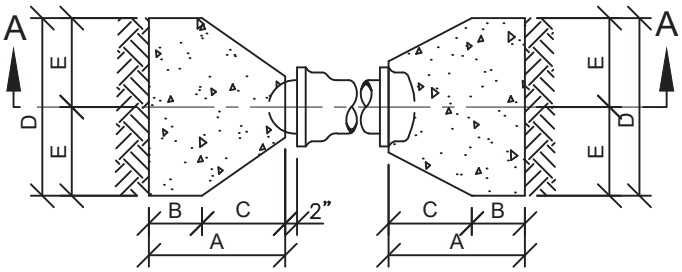
THRUST BLOCK, TEES (TRADITIONAL DWSD SI□ING)

CITY OF DETROIT
WATER AND SEWERAGE DEPARTMENT
ENGINEERING DIVISION

SCALE NONE	SHEET 1 OF 1
DATE 9/2018	DWG. No. 331413-02



SECTION A-A



PLAN

SIZE OF PIPE (IN)	A MIN. (FT)	B MIN. (FT)	C (FT)	D (FT)	E (FT)	F (FT)	G (FT)
6	1.92	0.75	1.17	2.50	1.25	1.50	0.75
8	1.92	0.75	1.17	3.00	1.50	2.00	1.00
12	2.08	0.75	1.33	4.00	2.00	3.00	1.50
16	2.67	1.00	1.67	5.00	2.50	4.00	2.00

NOTES:

1. THE THRUST BLOCK FACE SHALL BE POURED AGAINST UNDISTURBED EARTH.
2. CLASS B CONCRETE, MINIMUM COMPRESSIVE STRENGTH AT 28 DAYS 4,000 PSI.
3. THRUST BLOCK TO ABUT OR REST AGAINST UNDISTRIBUTED SOIL OR EARTH COMPACTED TO 95 MODIFIED PROCTER.
4. THRUST BLOCKS FOR HDPE PIPE SHALL BE PER PIPE MANUFACTURER.

REV	DESCRIPTION	DATE
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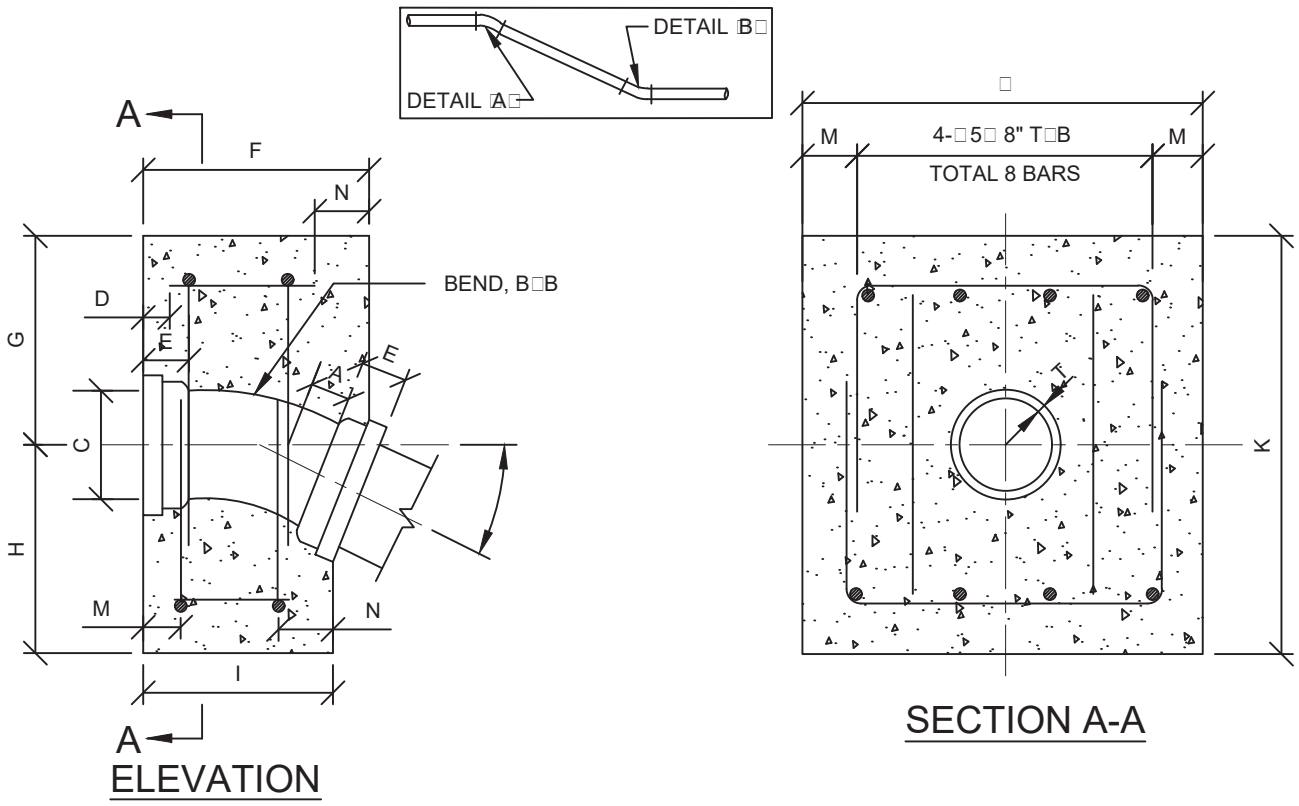
1	UPDATED	5/2020

REVISIONS

THRUST BLOCK, PLUGS AND CAPS (TRADITIONAL DWSD SIZING)

CITY OF DETROIT
WATER AND SEWERAGE DEPARTMENT
ENGINEERING DIVISION

SCALE NONE	SHEET 1 OF 1
DATE 9/2018	DWG. No. 331413-03



ELEVATION

SECTION A-A

SCHEDULE OF THRUST BLOCK DIMENSIONS												DIMENSIONS - INCHES					
SI□E OF PIPE (IN)	BEND IN DEGREE	F (FT)	G (FT)	H (FT)	I (FT)	□ (FT)	K (FT)	L (FT)	M (FT)	N (FT)	□□	A	C	E	R	D	T
6	22.5	1.583	1.33	1.6□	1.33	2.6□	3.00	0.00	0.33	0.25	3□ 8"	5.0	10.6	4.0	15.06	1.50	0.55
6	45	1.583	1.33	1.6□	1.00	2.6□	3.00	0.00	0.33	0.25	3□ 8"	5.0	10.6	4.0	0□25	1.50	0.55
8	22.5	1.583	1.33	1.6□	1.33	2.6□	3.00	0.33	0.33	0.25	4□ 8"	5.5	13.0	4.0	1□62	1.50	0.60
8	45	1.6□	1.50	2.50	1.00	4.00	4.00	0.50	0.50	0.25	4□ 12"	5.5	13.0	4.0	08.44	1.50	0.60
10	22.5	1.83	1.50	2.50	1.42	3.50	4.00	0.50	0.50	0.25	4□ 10"	6.5	15.3	4.0	22.62	1.50	0.68
10	45	1.92	1.6□	2.83	1.00	4.00	4.50	0.6□	0.6□	0.25	4□ 12"	6.5	15.3	4.0	10.88	1.50	0.68
12	22.5	2.00	1.50	2.50	1.583	4.00	4.00	0.6□	0.50	0.33	4□ 12"	□.5	1□.6	4.0	2□62	1.50	0.□5
12	45	2.08	1.50	3.00	1.1□	5.00	4.50	0.92	0.□5	0.25	4□ 14"	□.5	1□.6	4.0	13.25	1.50	0.□5
16	22.5	2.1□	1.6□	2.83	1.583	5.00	4.50	0.83	0.□5	0.33	4□ 14"	8.0	22.2	4.0	2□62	1.□5	0.89

DETAIL "A"

NOTES:

1. THE THRUST BLOCK FACE SHALL BE POURED AGAINST UNDISTURBED EARTH.
2. CLASS B CONCRETE, MINIMUM COMPRESSIVE STRENGTH AT 28 DAYS □ 4,000 PSI.
3. THRUST BLOCK TO ABUT OR REST AGAINST UNDISTRIBUTED SOIL OR EARTH COMPACTED TO 95□ MODIFIED PROCTER.
4. THRUST BLOCKS FOR HDPE PIPE SHALL BE PER PIPE MANUFACTURER.

REV	DESCRIPTION	DATE
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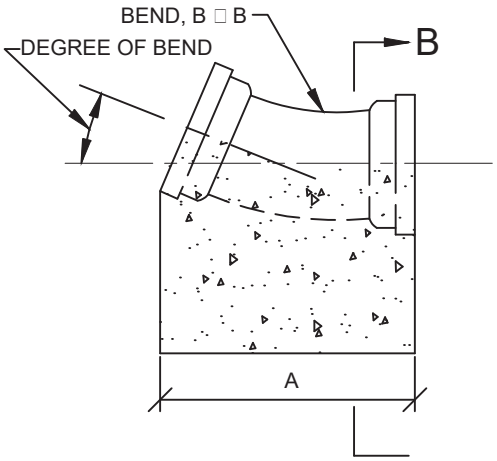
1	UPDATED	5/2020

REVISIONS

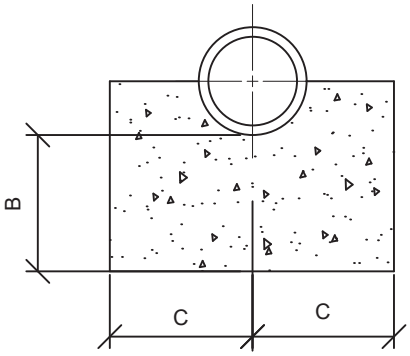
THRUST BLOCK, VERTICAL BEND (TRADITIONAL DWSD SI□ING)

CITY OF DETROIT
WATER AND SEWERAGE DEPARTMENT
ENGINEERING DIVISION

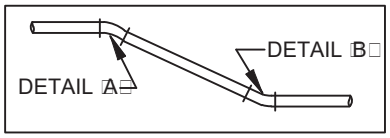
SCALE NONE	SHEET 1 OF 2
DATE 9/2018	DWG. No. 331413-04



ELEVATION B



SECTION B-B



NOTES:

1. THE THRUST BLOCK FACE SHALL BE POURED AGAINST UNDISTURBED EARTH.
2. CLASS B CONCRETE, MINIMUM COMPRESSIVE STRENGTH AT 28 DAYS □4,000 PSI.
3. THRUST BLOCK TO ABUT OR REST AGAINST UNDISTRIBUTED SOIL OR EARTH COMPACTED TO 95□ MODIFIED PROCTER.
4. THRUST BLOCKS FOR HDPE PIPE SHALL BE PER PIPE MANUFACTURER.

SI□E OF PIPE (IN)	BEND IN DEGREE	A (FT)	B (FT)	C (FT)
6	22.5	1.6□	1.00	1.00
6	45	1.6□	1.00	1.00
8	22.5	1.□5	1.00	1.00
8	45	1.□5	1.00	1.00
10	22.5	1.92	1.00	1.00
10	45	1.92	1.00	1.00
12	22.5	2.1□	1.00	1.00
12	45	2.1□	1.00	1.00
16	22.5	2.25	1.00	1.25
16	45	2.25	1.00	1.25

DETAIL "B"

REV	DESCRIPTION	DATE
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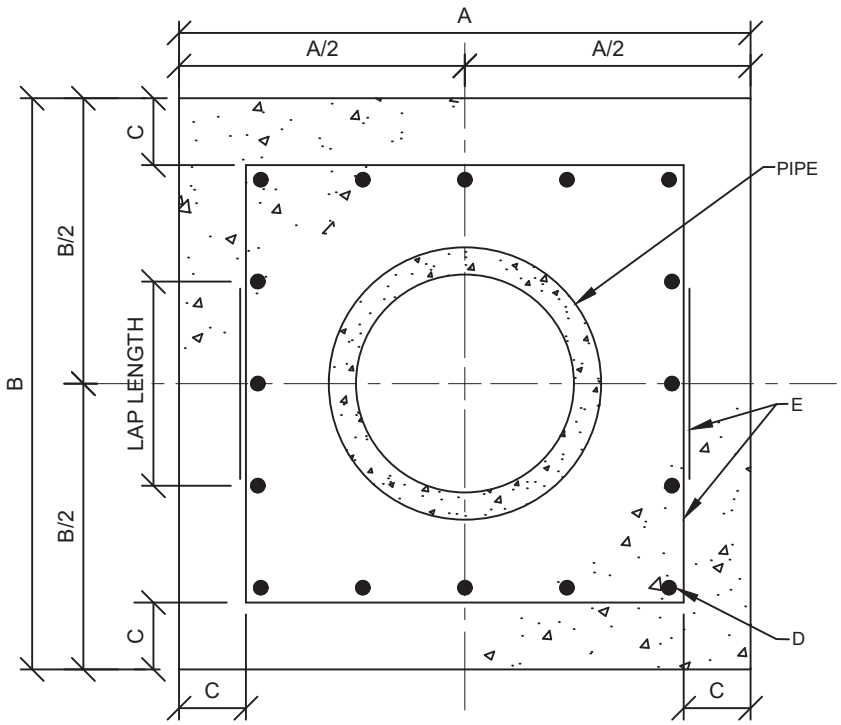
1	UPDATED	5/2020

REVISIONS

THRUST BLOCK, VERTICAL BEND (TRADITIONAL DWSD SI□ING)

CITY OF DETROIT
WATER AND SEWERAGE DEPARTMENT
ENGINEERING DIVISION

SCALE NONE	SHEET 2 OF 2
DATE 9/2018	DWG. No. 331413-05



PIPE SI□E	A	B	C	D	E
8 INCH PIPE	2□6"	2□6"	6"	□6 BARS □ 1□6" O.C.	□4 TIE BARS □ 2□0" O.C.
12 INCH PIPE	3□0"	3□0"	6"	□6 BARS □ 1□0" O.C.	□4 TIE BARS □ 2□0" O.C.
16 INCH PIPE	3□6"	3□6"	6"	□□ BARS □ □1/2" O.C.	□4 TIE BARS □ 2□0" O.C.

NOTES:

1. TIE BARS MAY BE PLACED AS 2-PIECE U-BARS WITH MINIMUM LAP LENGTH OF 20 INCHES.
2. PROVIDE CORNER BARS AT ALL PIPE ENCASEMENT CORNERS/BENDS TO MATCH SI□E OF TYPICAL LONGITUDINAL REINFORCING BARS. CORNER BARS TO BE LAP SPLICED WITH TYPICAL LONGITUDINAL REINFORCING BARS ON EACH SIDE OF THE CORNER/BEND.
3. LAP SPLICE □6 REINFORCING BARS 39" AT SPLICES. LAP SPLICE □□ REINFORCING BARS 44" AT SPLICES.
4. REFER TO TABLES OF ENCASEMENT LENGTHS FOR REQUIRED MINIMUM ENCASEMENT LENGTHS.
5. CLASS B CONCRETE, MINIMUM COMPRESSIVE STRENGTH AT 28 DAYS □ 4,000 PSI.
6. ALL REINFORCING BARS SHALL CONFORM TO ASTM A615, GRADE 60 AND MUST CONFORM TO THE LATEST BUILDING CODE REQUIREMENTS FOR STRUCTURAL CONCRETE OF THE AMERICAN CONCRETE INSTITUTE (ACI) AND THE CONCRETE REINFORCING STEEL INSTITUTE (CRSI).
7. □. DESIGN SOIL BEARING PRESSURE IS 1,500 PSF. VERIFY IN FIELD.

REV	DESCRIPTION	DATE
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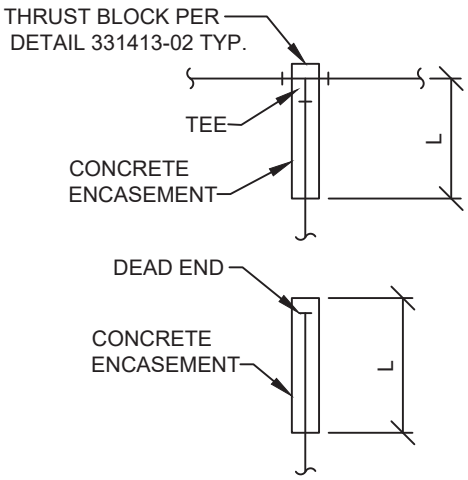
1	UPDATED	5/2020

REVISIONS

ENCASEMENT, WATER DISTRIBUTION PIPE IN CONCRETE

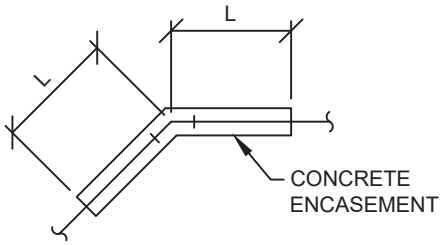
CITY OF DETROIT
WATER AND SEWERAGE DEPARTMENT
ENGINEERING DIVISION

SCALE NONE	SHEET 1 OF 2
DATE 10/2018	DWG. No. 331413-06



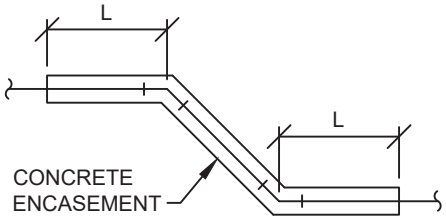
TEE OR DEAD END SIZE	LENGTH L
8" X 8" TEE	13
8" X 12" TEE	22
8" X 16" TEE	32
12" X 16" TEE	32
16" X 16" TEE	32
8" DEAD END	13
12" DEAD END	22
16" DEAD END	32

HORIZONTAL TEES AND DEAD ENDS



PIPE SIZE	LENGTH L
8"	10
12"	16
16"	23

HORIZONTAL BENDS



PIPE SIZE	LENGTH L
8"	13
12"	22
16"	32

VERTICAL BENDS

NOTE:

1. MINIMUM ENCASEMENT LENGTHS "L" AT BENDS, TEES AND DEAD ENDS.

REV	DESCRIPTION	DATE
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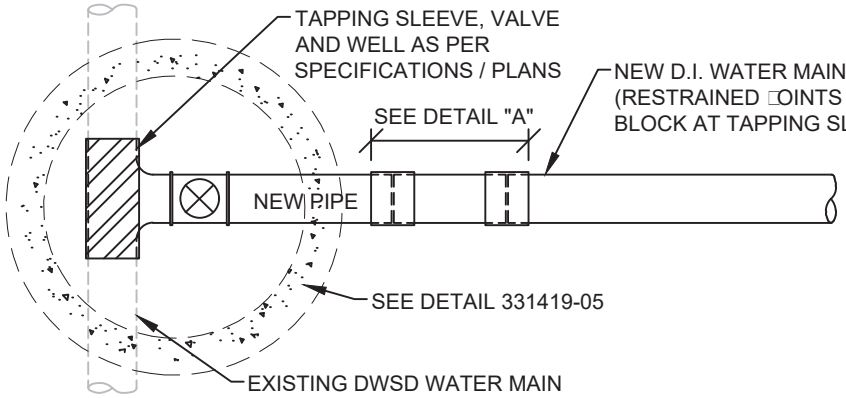
1	UPDATED	5/2020

REVISIONS

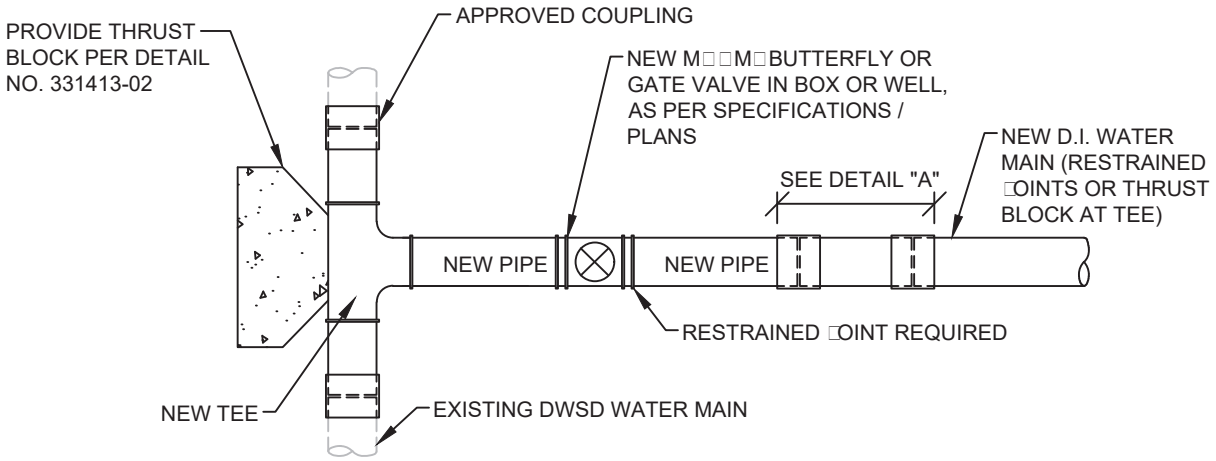
ENCASEMENT, WATER DISTRIBUTION PIPE IN CONCRETE

CITY OF DETROIT
WATER AND SEWERAGE DEPARTMENT
ENGINEERING DIVISION

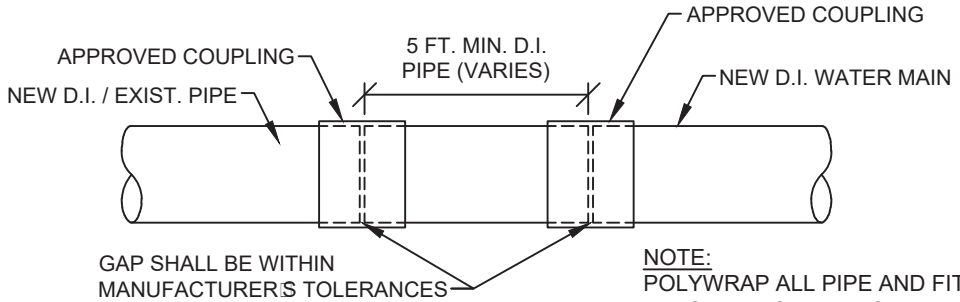
SCALE NONE	SHEET 2 OF 2
DATE 10/2018	DWG. No. 331413-0



CONNECTION WITH EXISTING DWSD MAIN WITH TAPPING SLEEVE AND VALVE



CONNECTION AT EXISTING DWSD MAIN WITH TEE / VALVE



NOTE:
POLYWRAP ALL PIPE AND FITTINGS BEFORE BACKFILLING.

DETAIL "A"

REV	DESCRIPTION	DATE
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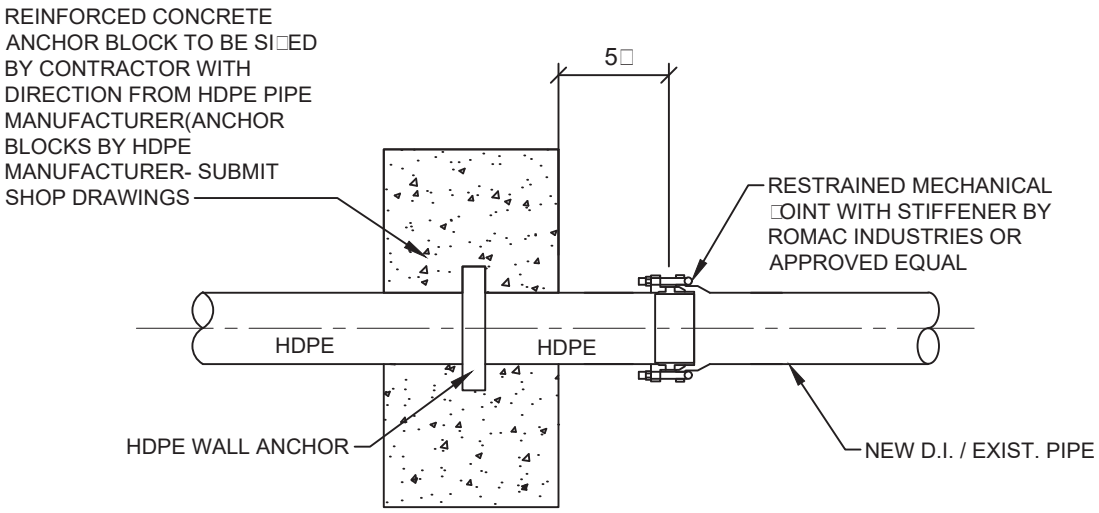
-	-	-
-	-	-
-	-	-
1	UPDATED	5/2020

REVISIONS

CONNECTION WITH EXISTING WATER MAIN

CITY OF DETROIT
WATER AND SEWERAGE DEPARTMENT
ENGINEERING DIVISION

SCALE NONE	SHEET 1 OF 1
DATE 10/2018	DWG. No. 331413-08



NOTES:

1. USE RESTRAINED MECHANICAL □OINTS WITH STIFFENERS THAT ARE SUITABLE FOR THE EXISTING PIPE MATERIAL OR NEW D.I. PIPE.
2. USE PIPE WRAPPING, PIPE COUPLINGS/ SLEEVES AS NECESSARY TO FACILITATE INSTALLATION AS REQUIRED.

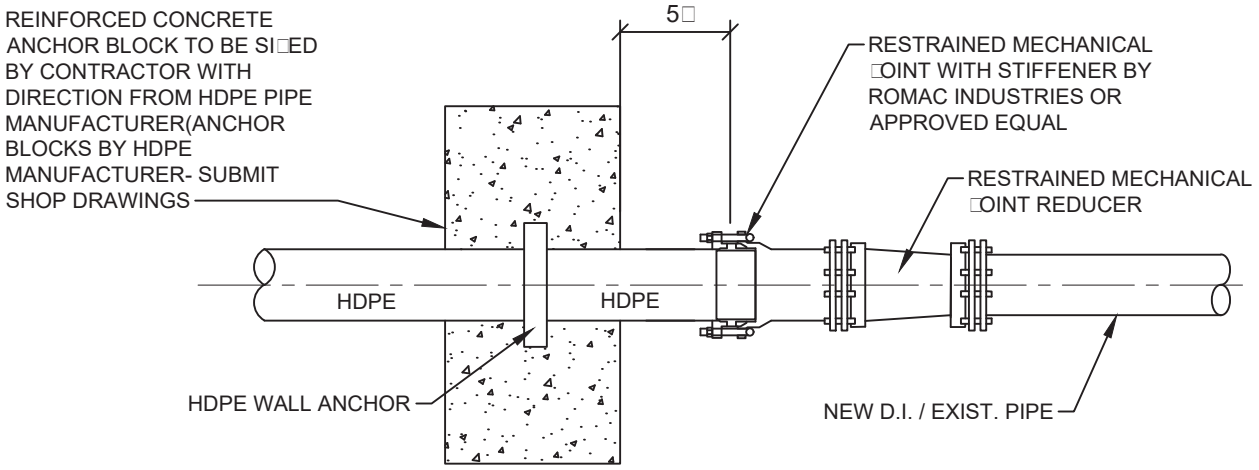
REV	DESCRIPTION	DATE

REVISIONS

HDPE TO EXISTING PIPE TRANSITION (NO REDUCER)

CITY OF DETROIT
WATER AND SEWERAGE DEPARTMENT
ENGINEERING DIVISION

SCALE NONE	SHEET 1 OF 1
DATE 5/2020	DWG. No. 331413-09



NOTES:

1. USE RESTRAINED MECHANICAL □OINTS WITH STIFFENERS THAT ARE SUITABLE FOR THE EXISTING PIPE MATERIAL OR NEW D.I. PIPE.
2. USE PIPE WRAPPING, PIPE COUPLINGS/ SLEEVES AS NECESSARY TO FACILITATE INSTALLATION AS REQUIRED.

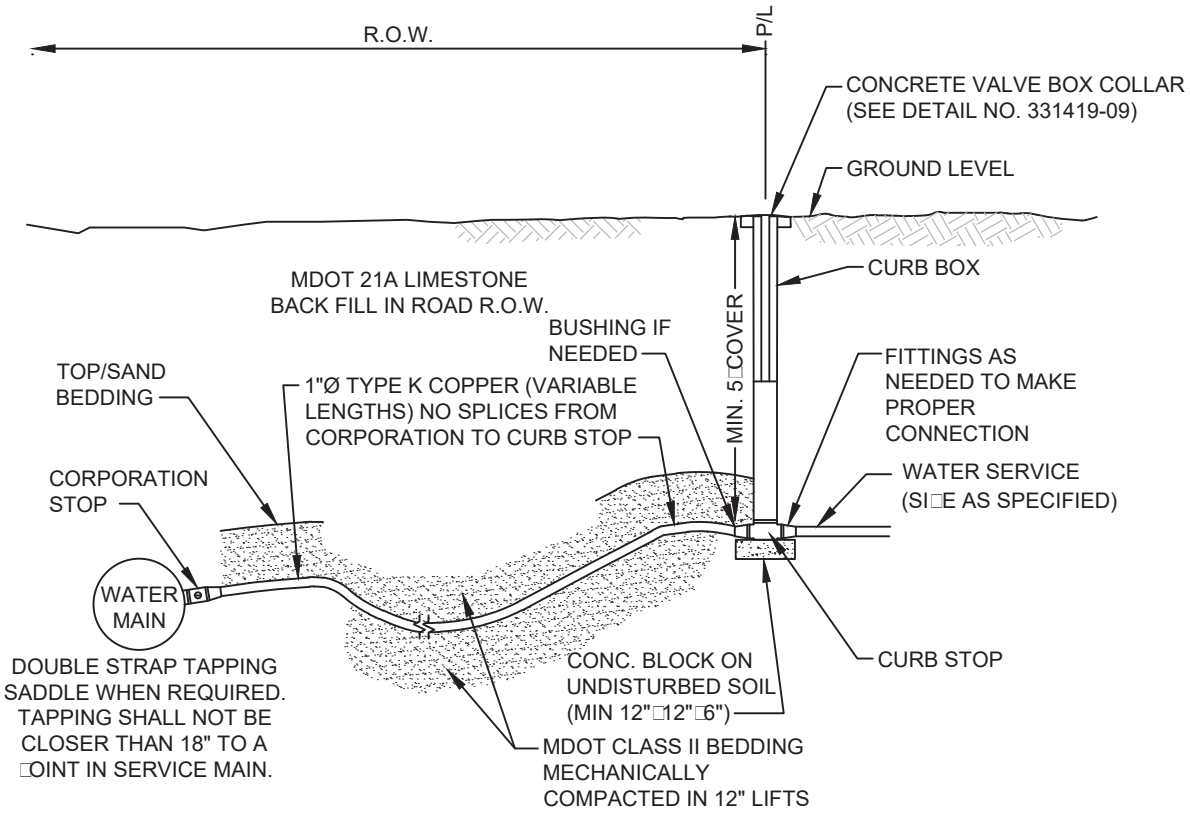
REV	DESCRIPTION	DATE

REVISIONS

HDPE TO EXISTING PIPE TRANSITION (REDUCER)

CITY OF DETROIT
WATER AND SEWERAGE DEPARTMENT
ENGINEERING DIVISION

SCALE NONE	1 OF 1 SHEET
DATE 5/2020	331413-10 DWG. No.



NOTES:

1. CURB BOX SHALL BE INSTALLED ON PROPERTY LINE.
2. TRENCH CONSTRUCTION / BACK FILL SHALL BE DONE IN SAME MANNER AS WATER MAIN TRENCH DETAIL.
3. IF EXISTING SERVICE RUN IS LEAD PIPE (P□), THEN REPLACE PER SPECIFICATIONS SECTION 33141□-81.
4. WRAP CORPORATION AND SERVICE SADDLE WITH WAX TAPE CONFORMING WITH AWWA C21□.

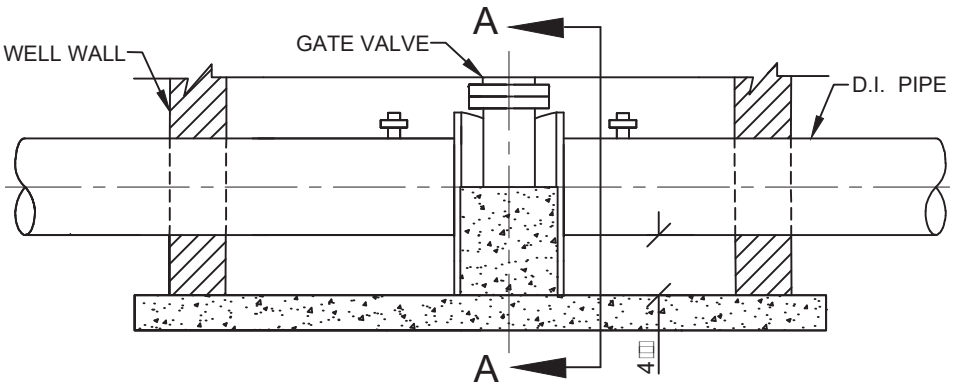
REV	DESCRIPTION	DATE

REVISIONS

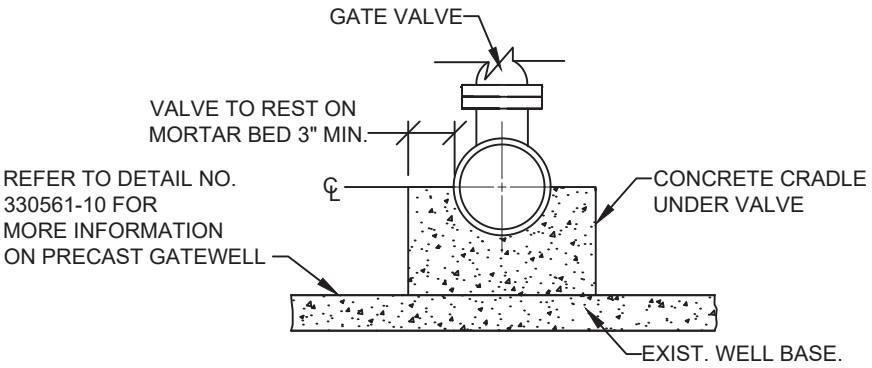
CONNECTION, RESIDENTIAL SERVICE

CITY OF DETROIT
WATER AND SEWERAGE DEPARTMENT
ENGINEERING DIVISION

SCALE NONE	SHEET 1 OF 1
DATE 5/2020	DWG. No. 33141□-01



ELEVATION



SECTION A-A

NOTE:

1. SIZE AND REINFORCEMENT REQUIREMENTS TO BE PER MANUFACTURERS RECOMMENDATIONS.

REV	DESCRIPTION	DATE
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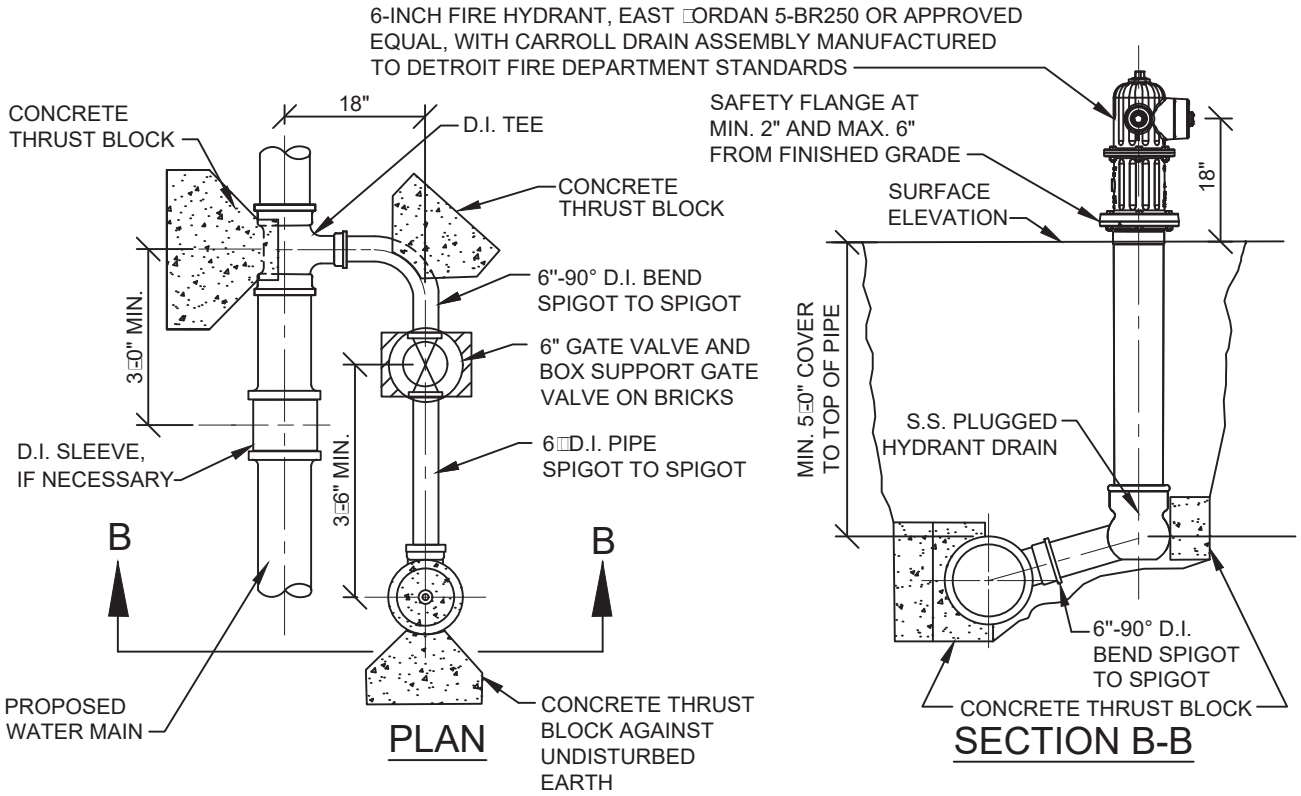
1	UPDATED	5/2020

REVISIONS

VALVE, GATE, CRADLE SUPPORT, CONCRETE

CITY OF DETROIT
WATER AND SEWERAGE DEPARTMENT
ENGINEERING DIVISION

SCALE NONE	SHEET 1 OF 1
DATE 9/2018	DWG. No. 331419-01



NOTES:

1. ALL INSTALLATION OR REPLACEMENT WORK FROM PROPOSED WATER MAIN AND TO HYDRANT SHALL BE A COMPLETE ASSEMBLY.
2. HYDRANT TO BE A MINIMUM OF 3 FEET BEHIND CURB.
3. THRUST BLOCKS TO BE SI□ED ACCORDING TO THRUST BLOCK STANDARD DETAIL DRAWING.
4. SEE TRENCH DETAIL FOR BACKFILL AND COMPACTION.
5. PROVIDE COLLAR AT HYDRANT VALVE.
6. SEE DETAIL 331419-06 FOR TRACER WIRE INSTALLATION.
7. PUMPER NO□□LE SHALL FACE STREET.
8. TAPPING SLEEVE □ VALVE SHALL NOT BE USED TO ESTABLISH A HYDRANT CONNECTION TO THE WATER MAIN.
9. UNDER NO CIRCUMSTANCES SHALL A WATER SERVICE BE TAPPED OFF OF THE 6-INCH DI HYDRANT SERVICE PIPE.

REV	DESCRIPTION	DATE
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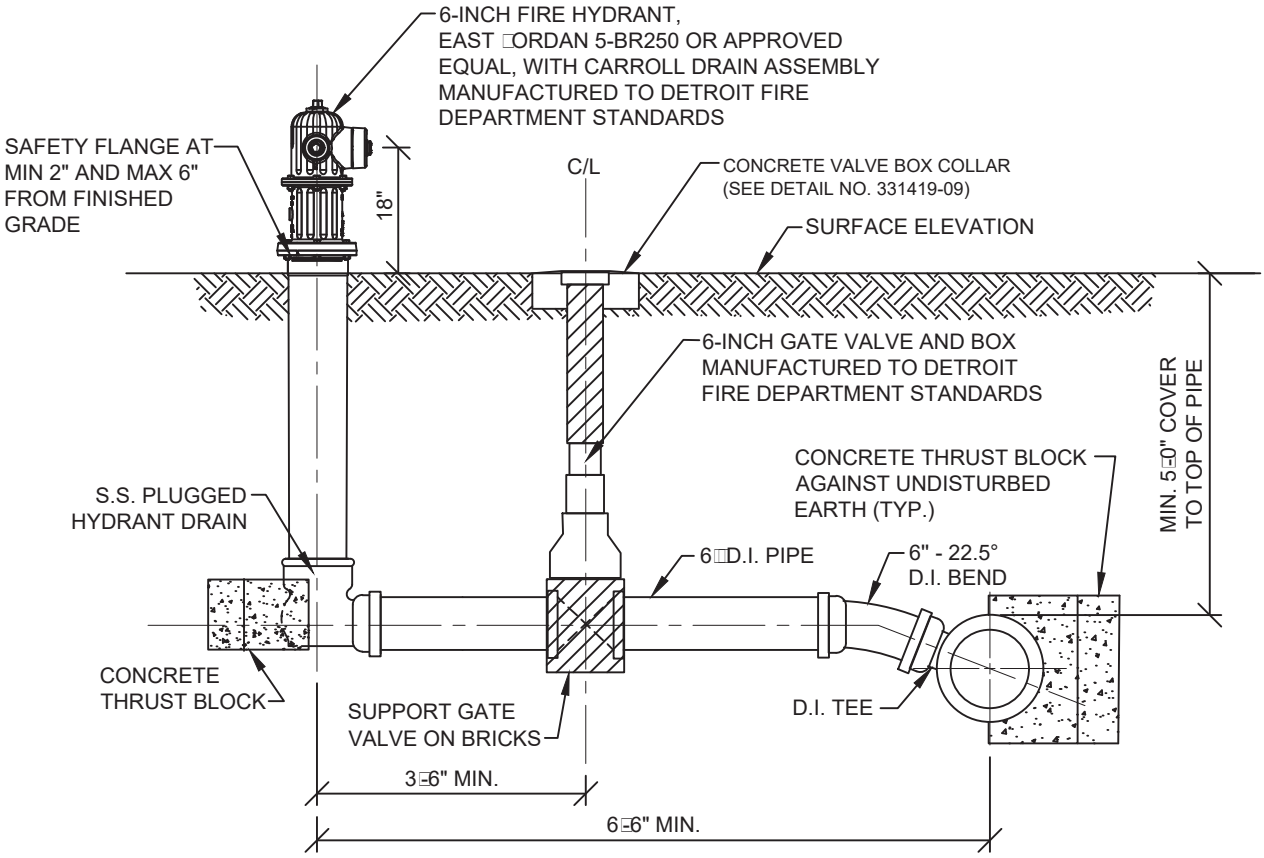
1	UPDATED	5/2020

REVISIONS

HYDRANT, 6 INCH INSTALLATION OFFSET

CITY OF DETROIT
WATER AND SEWERAGE DEPARTMENT
ENGINEERING DIVISION

SCALE NONE	SHEET 1 OF 1
DATE 9/2018	DWG. No. 331419-02



NOTES:

1. ALL INSTALLATION OR REPLACEMENT WORK FROM PROPOSED WATER MAIN AND TO HYDRANT SHALL BE CONSIDERED A COMPLETE ASSEMBLY.
2. HYDRANT TO BE A MINIMUM OF 3 FEET BEHIND CURB.
3. THRUST BLOCKS TO BE SI□ED ACCORDING TO THRUST BLOCK STANDARD DETAIL DRAWING.
4. SEE TRENCH DETAIL FOR BACKFILL AND COMPACTION.
6. SEE DETAIL 331419-06 FOR TRACER WIRE INSTALLATION.
□. PUMPER NO□□LE SHALL FACE STREET.
8. TAPPING SLEEVE □ VALVE SHALL NOT BE USED TO ESTABLISH A HYDRANT CONNECTION TO THE WATER MAIN.
9. UNDER NO CIRCUMSTANCES SHALL A WATER SERVICE BE TAPPED OFF OF THE 6-INCH DI HYDRANT SERVICE PIPE.

REV	DESCRIPTION	DATE
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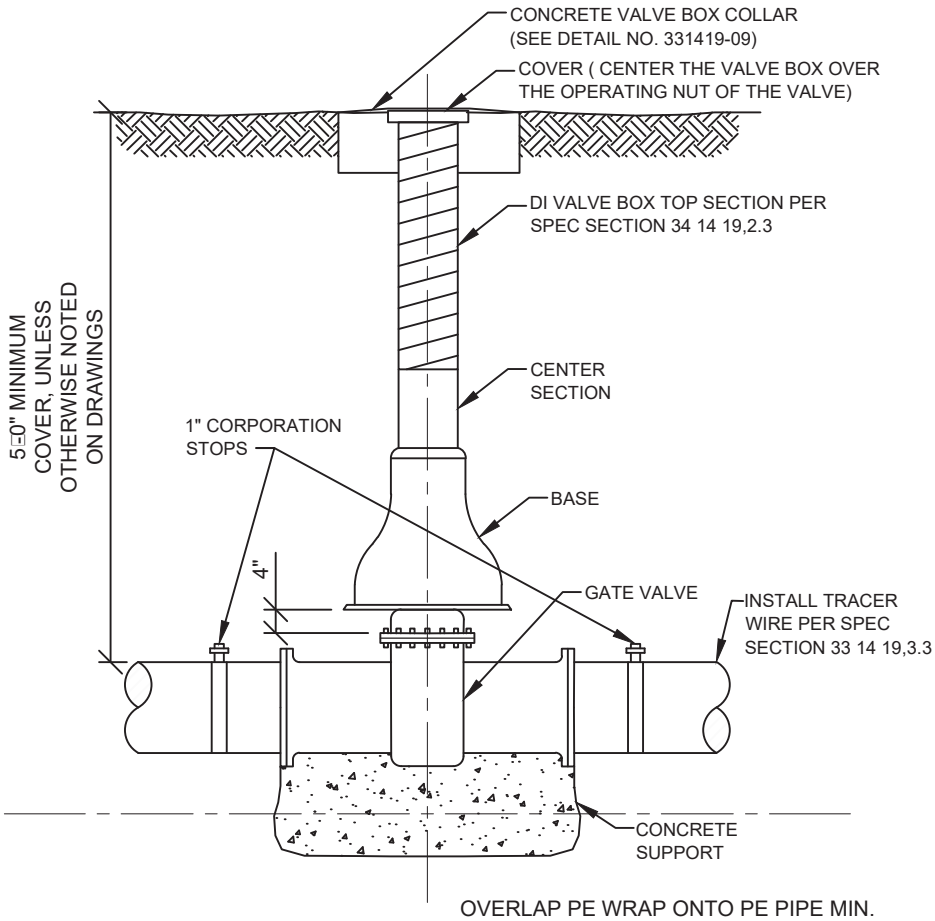
1	UPDATED	5/2020

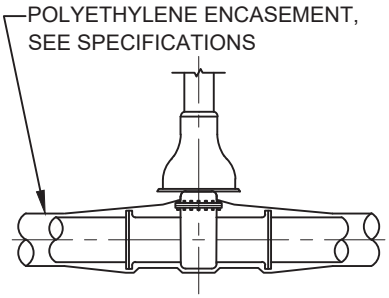
REVISIONS

HYDRANT, 6 INCH INSTALLATION STRAIGHT AWAY

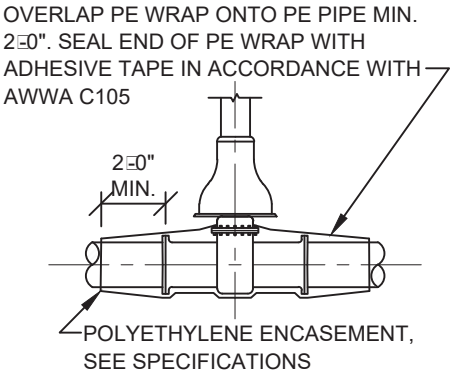
CITY OF DETROIT
WATER AND SEWERAGE DEPARTMENT
ENGINEERING DIVISION

SCALE NONE	SHEET 1 OF 1
DATE 9/2018	DWG. No. 331419-03





GATE VALVE ON D.I. PIPE



GATE VALVE ON PE PIPE

NOTES:

1. ALL MECHANICAL JOINTS REQUIRE RETAINER GLAND.
2. 12 INCH DIAMETER VALVES AND SMALLER SHALL BE TWO PIECE TYPE.
3. VALVES LARGER THAN 12 INCH DIAMETER SHALL BE THREE PIECE TYPE.
4. WRAP ALL BURIED VALVES, MECHANICAL JOINTS, AND JOINT RESTRAINT DEVICES WITH WAX TAPE IN ACCORDANCE WITH AWWA C21. OVERWRAP WAX TAPE WITH ONE WRAP OF PE ENCASEMENT IN ACCORDANCE WITH AWWA C105. TIGHTLY TAPE THE PE WRAP TO SEAL ALL JOINTS AND FOLDS.

REV	DESCRIPTION	DATE
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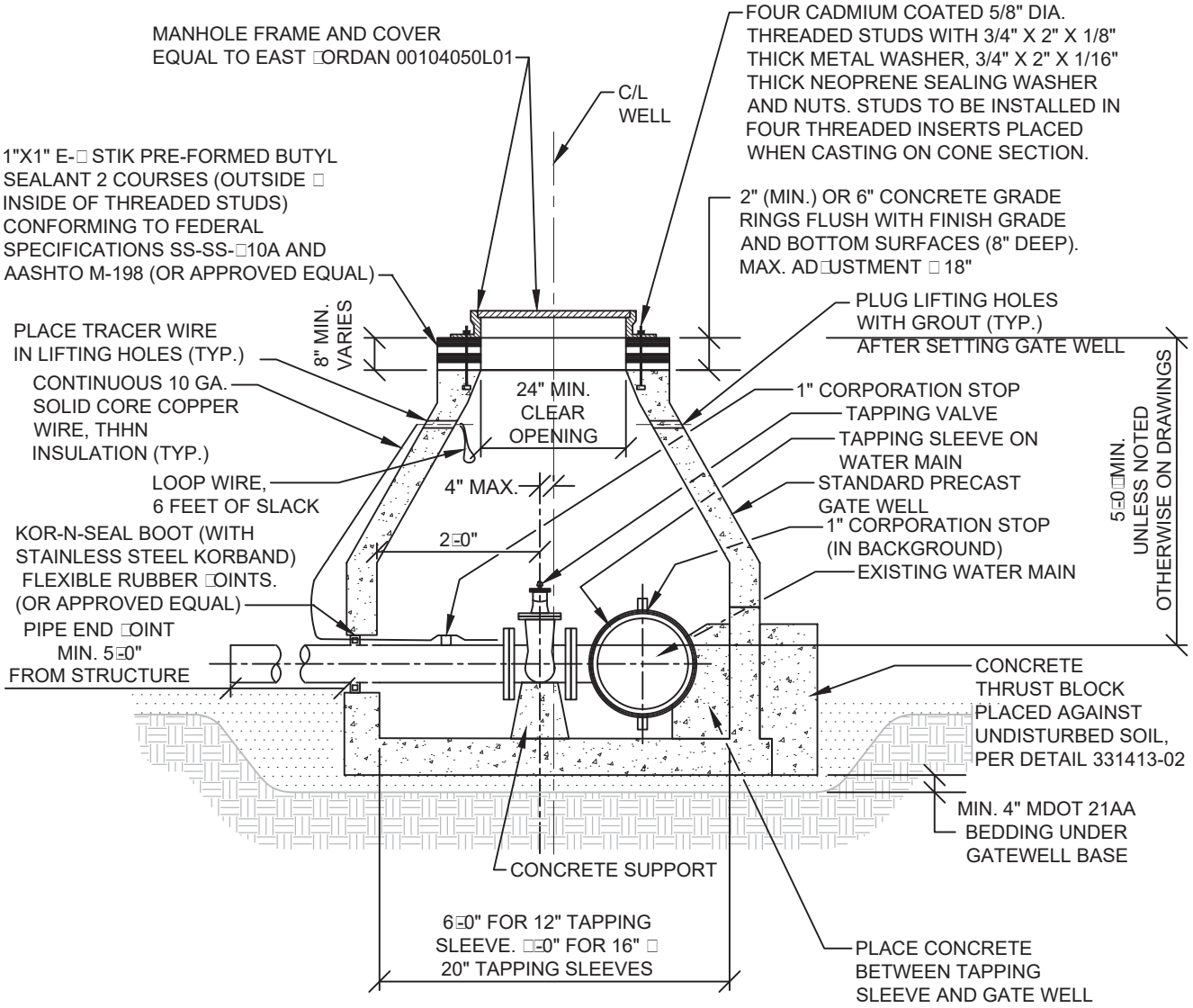
1	UPDATED	5/2020

REVISIONS

VALVE BOX INSTALLATION

CITY OF DETROIT
WATER AND SEWERAGE DEPARTMENT
ENGINEERING DIVISION

SCALE NONE	SHEET 1 OF 1
DATE 9/2018	DWG. No. 331419-04



NOTES:

1. RUBBER "O" RINGS FOR AD□USTING RINGS NOT USED IN PAVEMENT AREAS.
2. MANHOLE STEPS SHALL BE INSTALLED IN WELL WALL WHERE HEIGHT FROM TOP OF PIPE TO TOP OF WELL EXCEEDS 5□0".TOP STEP SHALL NOT BE MORE THAN 16" BELOW MH COVER OR AS DIRECTED. BOTTOM STEP SHALL NOT BE MORE THAN 18" ABOVE THE BENCH OR FLOOR LEVEL..
3. TRACING WIRE ON HDPE PIPE ONLY.

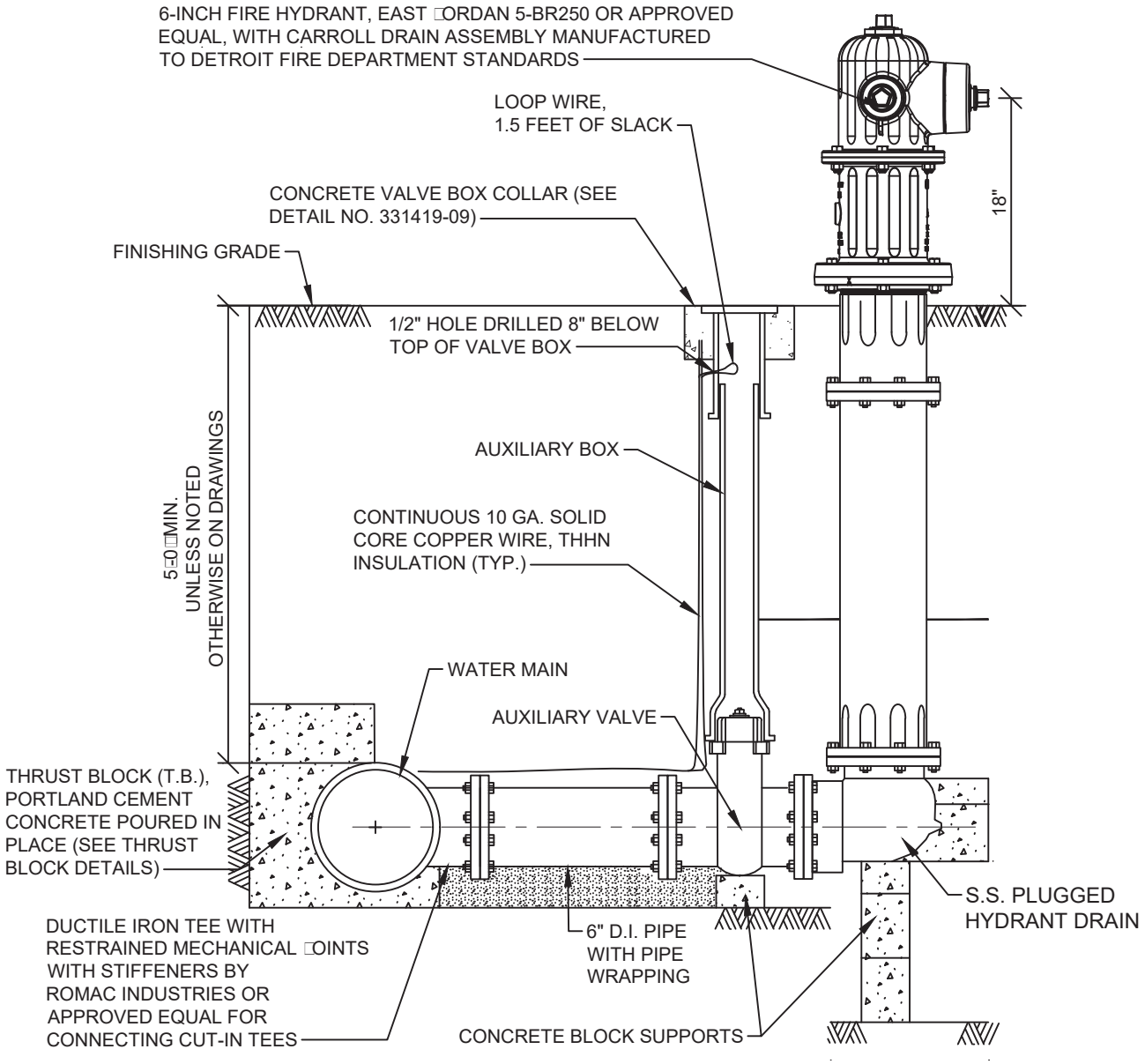
REV	DESCRIPTION	DATE

REVISIONS

CONNECTION, NEW MAIN TO EXISTING MAIN USING TAPPING VALVE AND WELL

CITY OF DETROIT
WATER AND SEWERAGE DEPARTMENT
ENGINEERING DIVISION

SCALE NONE	SHEET 1 OF 1
DATE 5/2020	DWG. No. 331419-05



NOTES:

1. HYDRANT SHALL BE MANUFACTURED BY E□
2. USE RESTRAINED MECHANICAL □OINTS WITH STIFFENERS THAT ARE SUITABLE FOR THE EXISTING PIPE MATERIAL.
3. HYDRANT TO BE MIN. 3 FT. FROM CURB.
4. PUMPER NO□□LE SHALL FACE STREET.
8. TAPPING SLEEVE □ VALVE SHALL NOT BE USED TO ESTABLISH A HYDRANT CONNECTION TO THE WATER MAIN.
9. UNDER NO CIRCUMSTANCES SHALL A WATER SERVICE BE TAPPED OFF OF THE 6-INCH DI SERVICE PIPE.

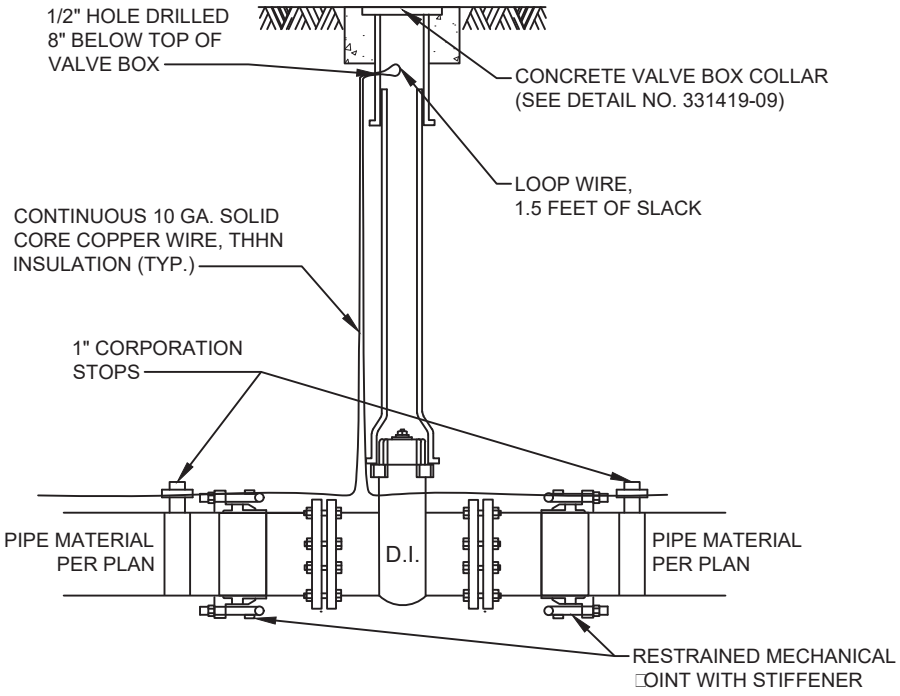
REV	DESCRIPTION	DATE

REVISIONS

FIRE HYDRANT INSTALLATION (HDPE PIPE)

CITY OF DETROIT
WATER AND SEWERAGE DEPARTMENT
ENGINEERING DIVISION

SCALE NONE	SHEET 1 OF 1
DATE 5/2020	DWG. No. 331419-06



NOTES:

1. USE RESTRAINED MECHANICAL JOINTS WITH STIFFENERS THAT ARE SUITABLE FOR THE PIPE MATERIAL. STIFFENERS SHALL BE BY ROMAC INDUSTRIES OR APPROVED EQUAL.
2. POLYWRAP VALVE PER DETAIL 331419-04.
3. 12 INCH DIAMETER VALVES AND SMALLER SHALL BE TWO PIECE TYPE.
4. VALVES LARGER THAN 12 INCH DIAMETER SHALL BE THREE PIECE TYPE.

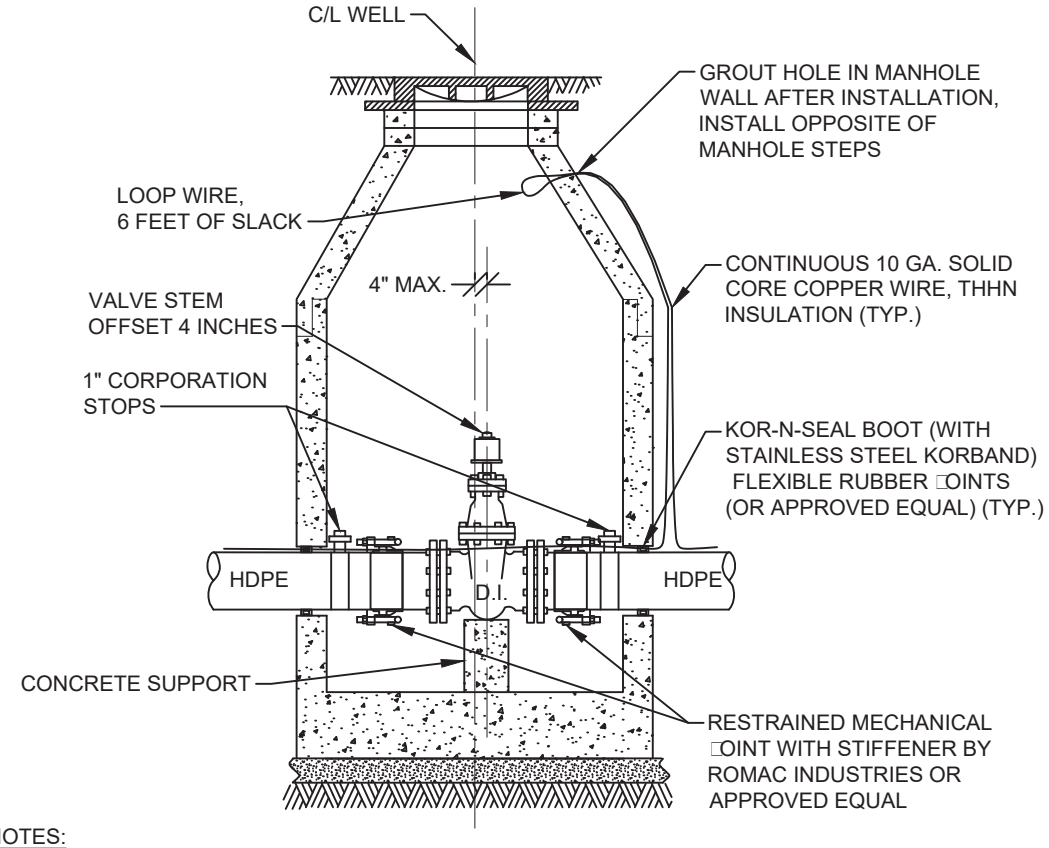
REV	DESCRIPTION	DATE

REVISIONS

VALVE BOX DETAIL (HDPE PIPE)

CITY OF DETROIT
WATER AND SEWERAGE DEPARTMENT
ENGINEERING DIVISION

SCALE NONE	SHEET 1 OF 1
DATE 5/2020	DWG. No. 331419-0



NOTES:

1. USE RESTRAINED MECHANICAL JOINTS WITH STIFFENERS THAT ARE SUITABLE FOR THE EXISTING PIPE MATERIAL.
2. REINFORCED CONCRETE ANCHOR BLOCK TO BE SIZED BY CONTRACTOR WITH DIRECTION FROM HDPE PIPE MANUFACTURER.
3. MANHOLE STEPS SHALL BE INSTALLED IN WELL WALL WHERE HEIGHT FROM TOP OF PIPE TO TOP OF WELL EXCEEDS 5'-0".TOP STEP SHALL NOT BE MORE THAN 16" BELOW MH COVER OR AS DIRECTED. BOTTOM STEP SHALL NOT BE MORE THAN 18" ABOVE THE BENCH OR FLOOR LEVEL.

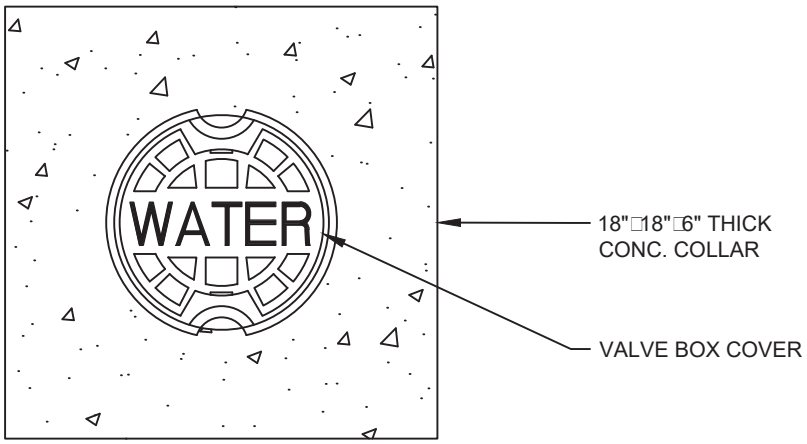
REV	DESCRIPTION	DATE

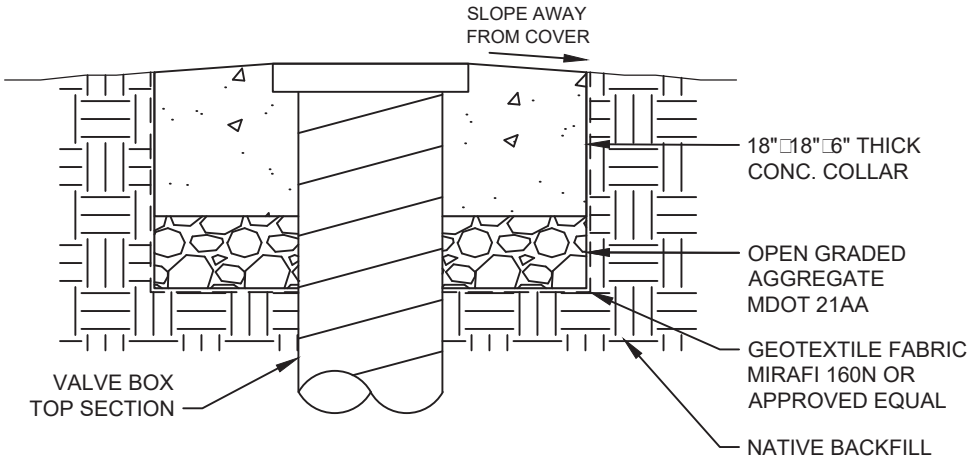
REVISIONS

VALVE WELL DETAIL (HDPE PIPE)

CITY OF DETROIT
WATER AND SEWERAGE DEPARTMENT
ENGINEERING DIVISION

SCALE NONE	SHEET 1 OF 1
DATE 5/2020	DWG. No. 331419-08





NOTE:
1. CLASS B CONCRETE, MINIMUM COMPRESSIVE STRENGTH AT 28 DAYS □4,000 PSI.

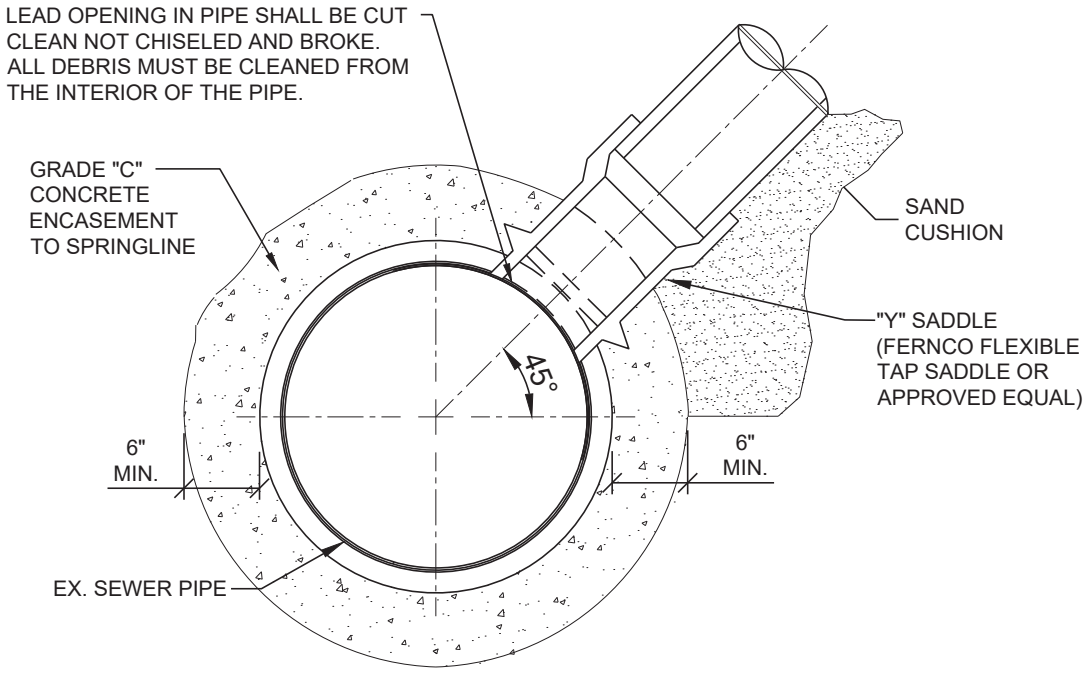
REV	DESCRIPTION	DATE

REVISIONS

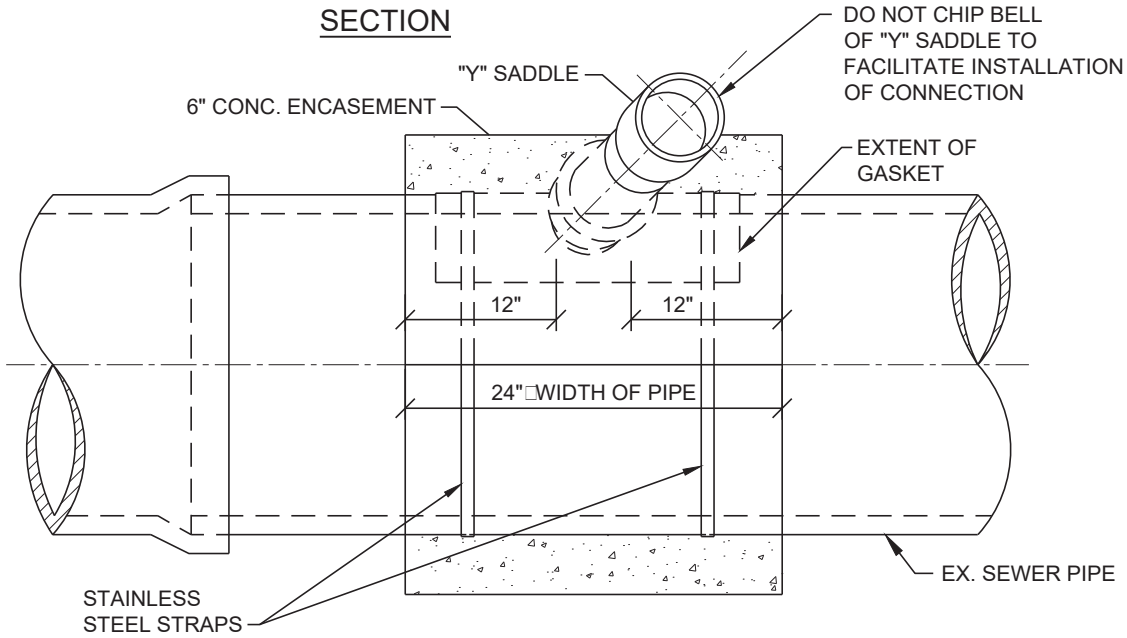
CONCRETE VALVE BOX COLLAR

CITY OF DETROIT
WATER AND SEWERAGE DEPARTMENT
ENGINEERING DIVISION

SCALE NONE	SHEET 1 OF 1
DATE 5/2020	DWG. No. 331419-09



SECTION



ELEVATION

NOTES:

1. FOR SEWERS 18" OR LESS A "Y" SADDLE MAY BE USED IF THE OUTSIDE DIA. OF THE TAP IS LESS THAN ONE HALF THE DIA. OF THE SEWER BEING TAPPED.
2. PROVIDE EXTENSION CLAMPS FOR 15" SEWERS AND LARGER.
3. CONCRETE BELOW PIPE IS ONLY REQUIRED FOR 15" SEWERS AND LARGER WITH STRAPS.

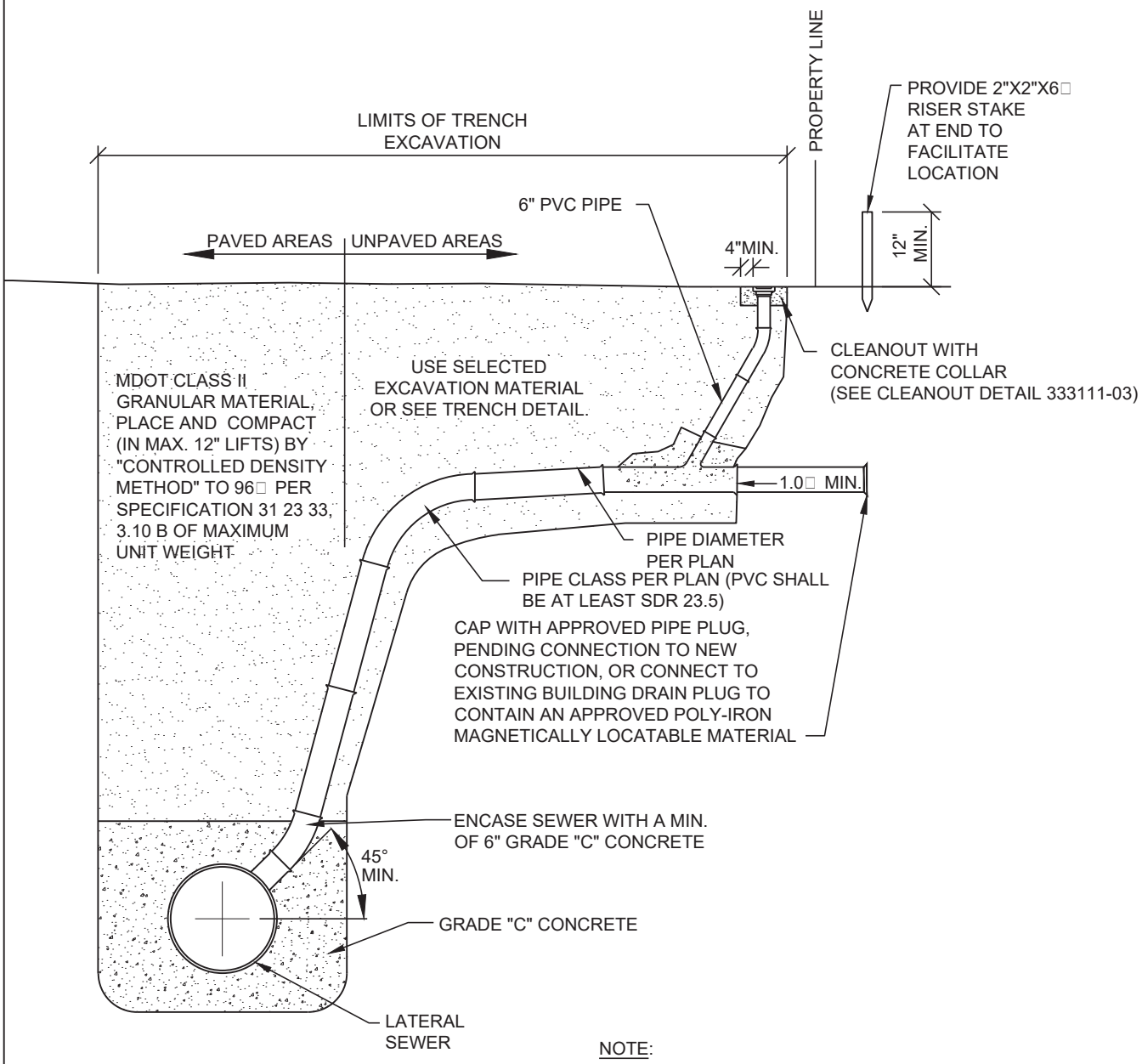
REV	DESCRIPTION	DATE
1	UPDATED	06/2020

REVISIONS

CONNECTION, SADDLE TO LATERAL SEWER

CITY OF DETROIT
WATER AND SEWERAGE DEPARTMENT
ENGINEERING DIVISION

SCALE NONE	SHEET 1 OF 1
DATE 09/2018	DWG. No. 333111-01



NOTE:

1. SEE SECTION 33 31 3.3.E

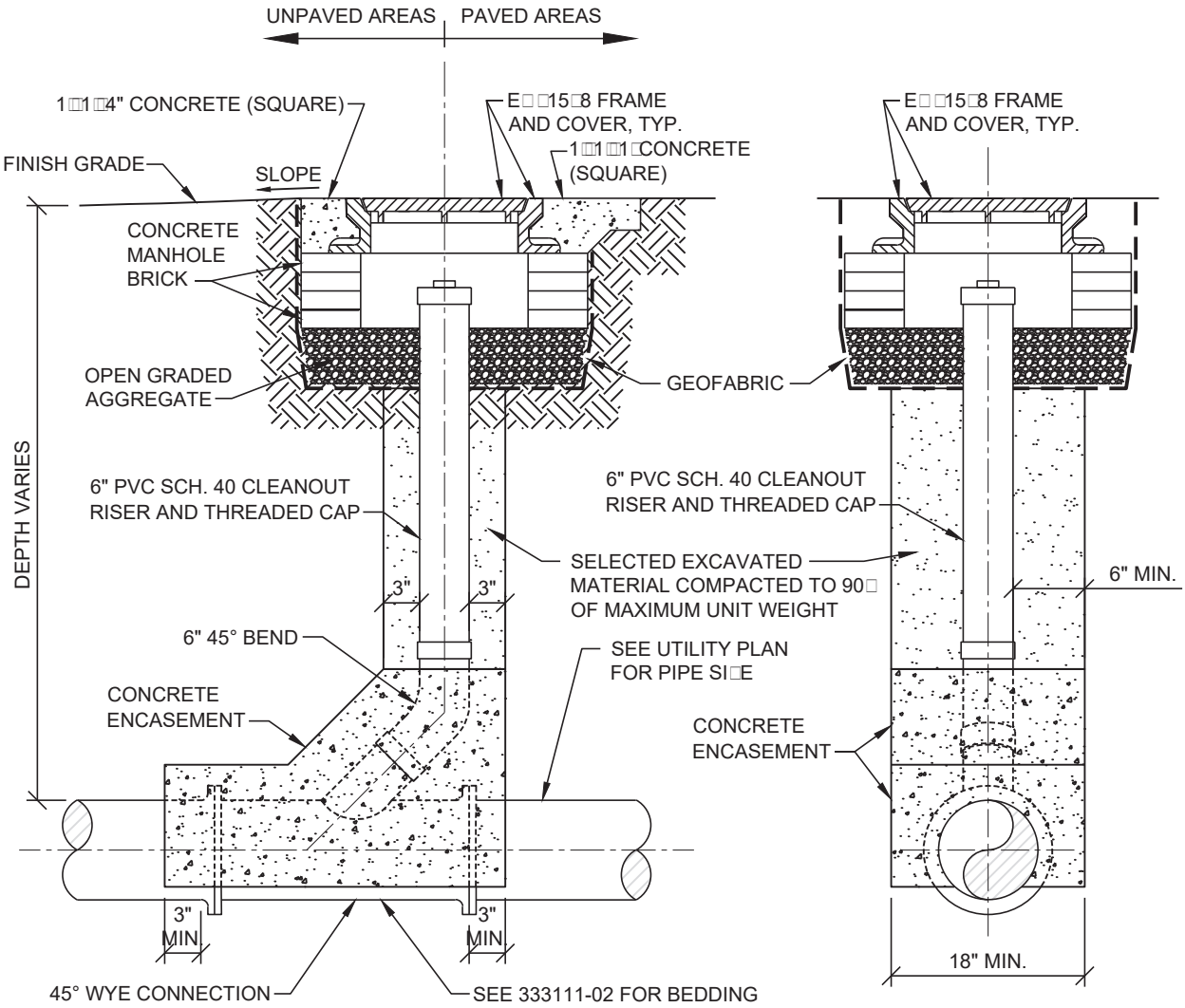
REV	DESCRIPTION	DATE
1	UPDATED	06/2020

REVISIONS

WYE, CONNECTION AND EXTENSION

CITY OF DETROIT
WATER AND SEWERAGE DEPARTMENT
ENGINEERING DIVISION

SCALE NONE	SHEET 1 OF 1
DATE 09/2018	DWG. No. 333111-02



SIDE VIEW

FRONT VIEW

NOTES:

1. MINIMUM SEPARATION DISTANCE BETWEEN LATERALS: 5 FT
2. MINIMUM DEPTH OF COVER OVER PIPE: 2 FT

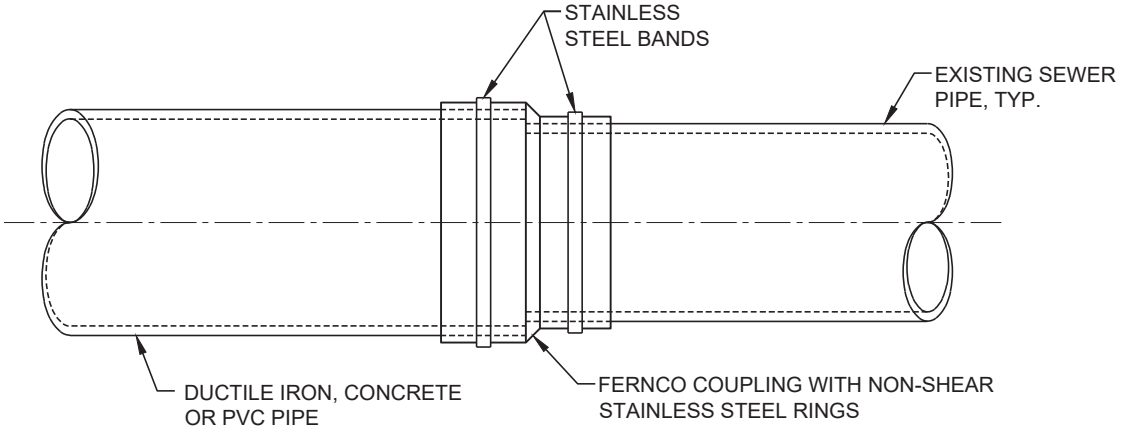
REV	DESCRIPTION	DATE
1	UPDATED	06/2020

REVISIONS

CLEANOUT

CITY OF DETROIT
WATER AND SEWERAGE DEPARTMENT
ENGINEERING DIVISION

SCALE NONE	SHEET 1 OF 1
DATE 9/2018	DWG. No. 333111-03



DISSIMILAR SEWER PIPE □OINT DETAIL

NOTES:

1. DUCTILE IRON OR CAST IRON PIPE

   WHERE EXISTING BELL SI□E IS DISSIMILAR AND CAN NOT BE CONNECTED BY STANDARD FITTINGS, A FERNCO COUPLING WITH NON-SHEAR STAINLESS STEEL RINGS SHALL BE USED.

2. PVC PIPE

   WHERE PVC PIPE SI□E IS DISSIMILAR AND PVC COUPLINGS ARE NOT SUITABLE, A FERNCO COUPLING WITH NON-SHEAR STAINLESS STEEL RINGS SHALL BE USED.

3. CONCRETE PIPE

   WHERE PIPE SI□E IS DISSIMILAR AND A NORMAL BELL AND SPIGOT GASKETED □OINT IS NOT PRACTICAL, A FERNCO COUPLING WITH NON-SHEAR STAINLESS STEEL RINGS SHALL BE USED TO COMPLETE THE □OINT.

SIMILAR SEWER PIPE □OINT NOTES

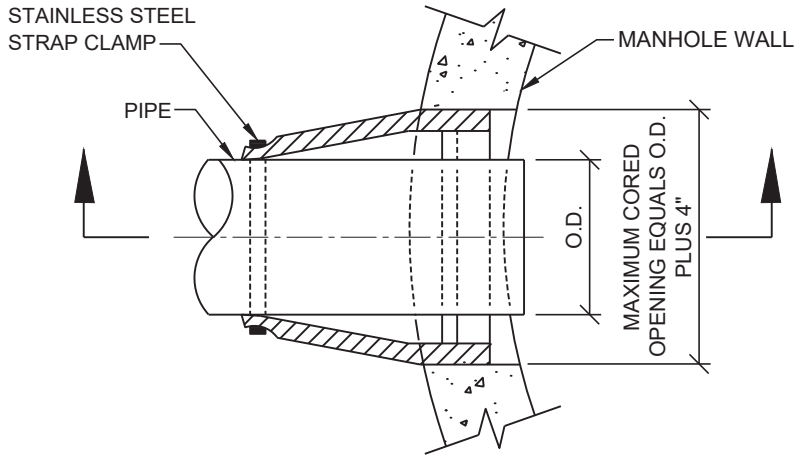
REV	DESCRIPTION	DATE
1	UPDATED	06/2020

REVISIONS

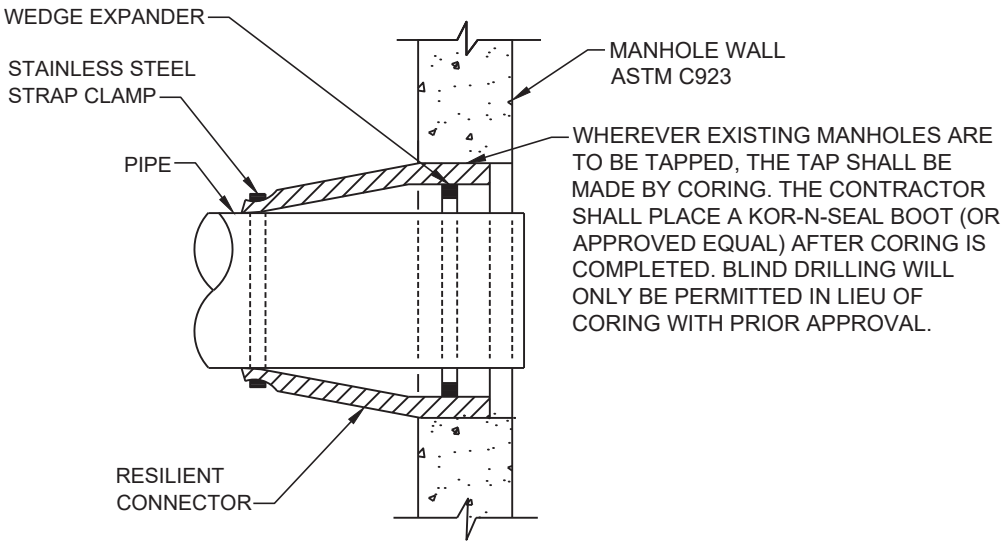
SEWER PIPE □OINT DETAIL

CITY OF DETROIT
WATER AND SEWERAGE DEPARTMENT
ENGINEERING DIVISION

SCALE NONE	SHEET 1 OF 1
DATE 9/2018	DWG. No. 333111-04



PLAN



SECTION

NOTE:

1. ALL NEW PIPE OPENINGS FOR PROPOSED MANHOLES SHALL BE MADE BY MANHOLE MANUFACTURER.

WATERTIGHT RESILIENT CONNECTOR FOR CONNECTING PROPOSED PIPES TO EXISTING MANHOLES AND EXISTING PIPES TO PROPOSED MANHOLES

REV	DESCRIPTION	DATE
1	UPDATED	06/2020

REVISIONS

SEWER PIPE CONNECTION WITH MANHOLE

CITY OF DETROIT
WATER AND SEWERAGE DEPARTMENT
ENGINEERING DIVISION

SCALE NONE	SHEET 1 OF 1
DATE 9/2018	DWG. No. 333111-05

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REV	DESCRIPTION	DATE
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REVISIONS

PERMEABLE CONCRETE PAVEMENT (ROADWAY, PARKING LOT, AND ALLEY)

CITY OF DETROIT
WATER AND SEWERAGE DEPARTMENT
ENGINEERING DIVISION

SCALE NONE	SHEET 1 OF 1
DATE 12/2018	DWG. No. G/01

Deleted from this set; consult DPW details.

			PERMEABLE CONCRETE PAVEMENT (ROADWAY, PARKING LOT, AND ALLEY)	CITY OF DETROIT WATER AND SEWERAGE DEPARTMENT ENGINEERING DIVISION
				G/01-a

Deleted from this set; consult DPW details.

REV	DESCRIPTION	DATE
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REVISIONS

PERMEABLE CONCRETE SIDEWALK

CITY OF DETROIT
WATER AND SEWERAGE DEPARTMENT
ENGINEERING DIVISION

SCALE NONE	SHEET 1 OF 1
DATE 12/2018	DWG. No. G/02

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REV	DESCRIPTION	DATE
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REVISIONS

PERMEABLE CONCRETE PAVEMENT (ROADWAY, PARKING LOT, AND ALLEY)

CITY OF DETROIT
WATER AND SEWERAGE DEPARTMENT
ENGINEERING DIVISION

SCALE NONE	SHEET 1 OF 1
DATE 12/2018	DWG. No. **G/03**

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REV	DESCRIPTION	DATE
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REVISIONS

PERMEABLE ASPHALT SIDEWALK

CITY OF DETROIT
WATER AND SEWERAGE DEPARTMENT
ENGINEERING DIVISION

SCALE NONE	SHEET 1 OF 1
DATE 12/2018	DWG. No. G/04

Moved To Stormwater Design Management Manual

REV	DESCRIPTION	DATE
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REVISIONS

PERMEABLE INTERLOCKING UNIT PAVERS (ROADWAY, PARKING LOTS, AND ALLEY)

CITY OF DETROIT
WATER AND SEWERAGE DEPARTMENT
ENGINEERING DIVISION

SCALE NONE	SHEET 1 OF 1
DATE 12/2018	DWG. No. **G/05**

Moved To Stormwater Design Management Manual

REV	DESCRIPTION	DATE
-	-	-
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REVISIONS

PERMEABLE UNIT PAVERS (SIDEWALK)

CITY OF DETROIT
WATER AND SEWERAGE DEPARTMENT
ENGINEERING DIVISION

SCALE NONE	SHEET 1 OF 1
DATE 12/2018	DWG. No. G/07

Moved To Stormwater Design Management Manual

REV	DESCRIPTION	DATE
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REVISIONS

PERMEABLE PAVEMENT WITH CONTINUOUS BOTTOM SLOPE <2%

CITY OF DETROIT
WATER AND SEWERAGE DEPARTMENT
ENGINEERING DIVISION

SCALE NONE	SHEET 1 OF 1
DATE 12/2018	DWG. No. G/10

Moved To Stormwater Design Management Manuall

REV	DESCRIPTION	DATE
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REVISIONS

PERMEABLE PAVEMENT EDGE RESTRAINTS

CITY OF DETROIT
WATER AND SEWERAGE DEPARTMENT
ENGINEERING DIVISION

SCALE NONE	SHEET 1 OF 1
DATE 12/2018	DWG. No. G/13

Moved To Stormwater Design Management Manual

REV	DESCRIPTION	DATE
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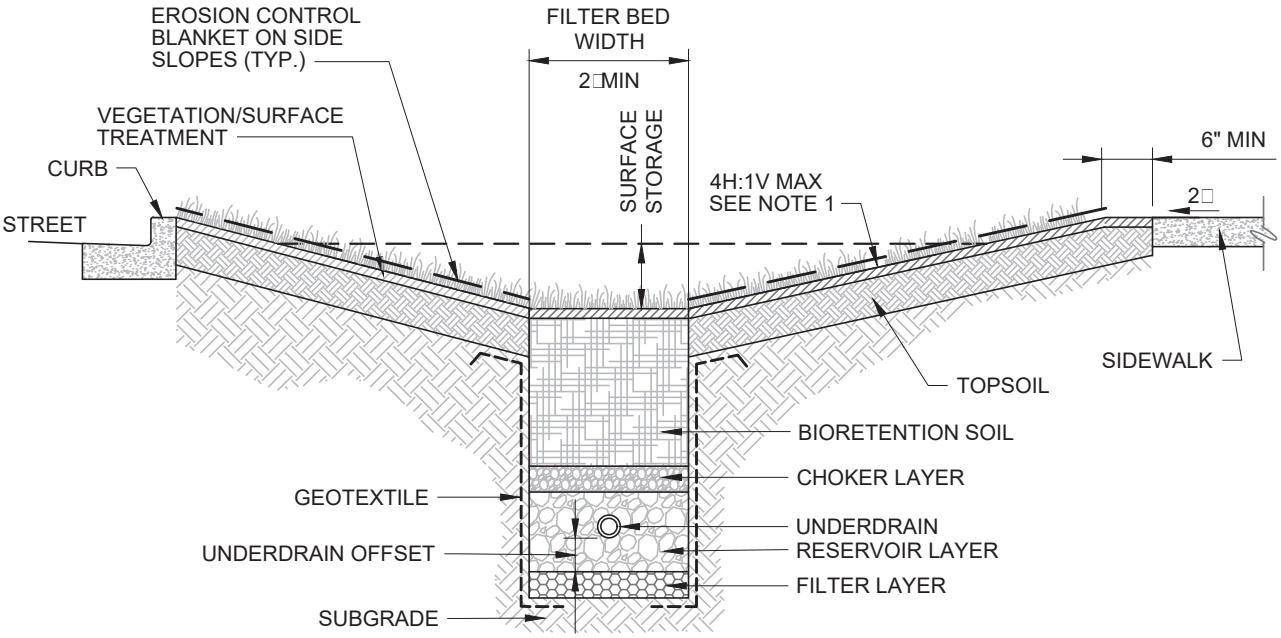
REVISIONS

BIORETENTION IN OPEN AREA

CITY OF DETROIT
WATER AND SEWERAGE DEPARTMENT
ENGINEERING DIVISION

SCALE NONE	SHEET 1 OF 1
DATE 12/2018	DWG. No. **G/20**



SECTION

ITEM	MATERIAL	LAYER THICKNESS
SURFACE STORAGE	6" MAX SURFACE STORAGE.	__ INCH
VEGETATION/SURFACE TREATMENT	PER PLANTING PLAN. FOR PERENNIAL PLANTINGS, APPLY 1" MULCH LAYER. FOR TURF GRASS PLANTINGS, NO MULCH.	
BIORETENTION SOIL	BIORETENTION SOIL MIX.	__ INCH
CHOKER LAYER	MDOT 34G, AASHTO #8 OR APPROVED EQUIVALENT.	4 INCH
RESERVOIR LAYER	MDOT 4AA OR 6AA, AASHTO #3, #5 OR #57 OR APPROVED EQUIVALENT.	__ INCH
FILTER LAYER	MDOT 34G, AASHTO #8 OR APPROVED EQUIVALENT.	4 INCH
UNDERDRAIN	PERFORATED PVC OR HDPE UNDERDRAIN WHEN CALLED FOR PER DESIGN PLANS. CLEANOUT AT TERMINAL ENDS DWG NO. G/51. PIPE BEDDING AND CATCH BASIN CONNECTION DWG NO. G/52. 4" TYP, 8" MAX PIPE DIAMETER.	__ INCH
UNDERDRAIN OFFSET	OFFSET DISTANCE UNDERDRAIN SET ABOVE THE FILTER LAYER.	__ INCH
GEOTEXTILE	GEOTEXTILE CLASS 2, LOCATED ON SIDES OF FACILITY ONLY.	
SUBGRADE	REFER TO SPECIFICATION FOR SUBGRADE PREPARATION.	
INLET AND OUTLET	LOCATIONS PER DESIGN PLANS. REFER TO DWG NOS. G/40 - G/42.	

NOTE:
1. BIORETENTION FACILITY DEPICTED IS ONE WITHOUT AN OVERFLOW STRUCTURE. THIS TYPE OF FACILITY REQUIRES A SURFACE OUTLET. AN OVERFLOW STRUCTURE MAY BE USED INSTEAD OF A SURFACE OUTLET.

REV	DESCRIPTION	DATE
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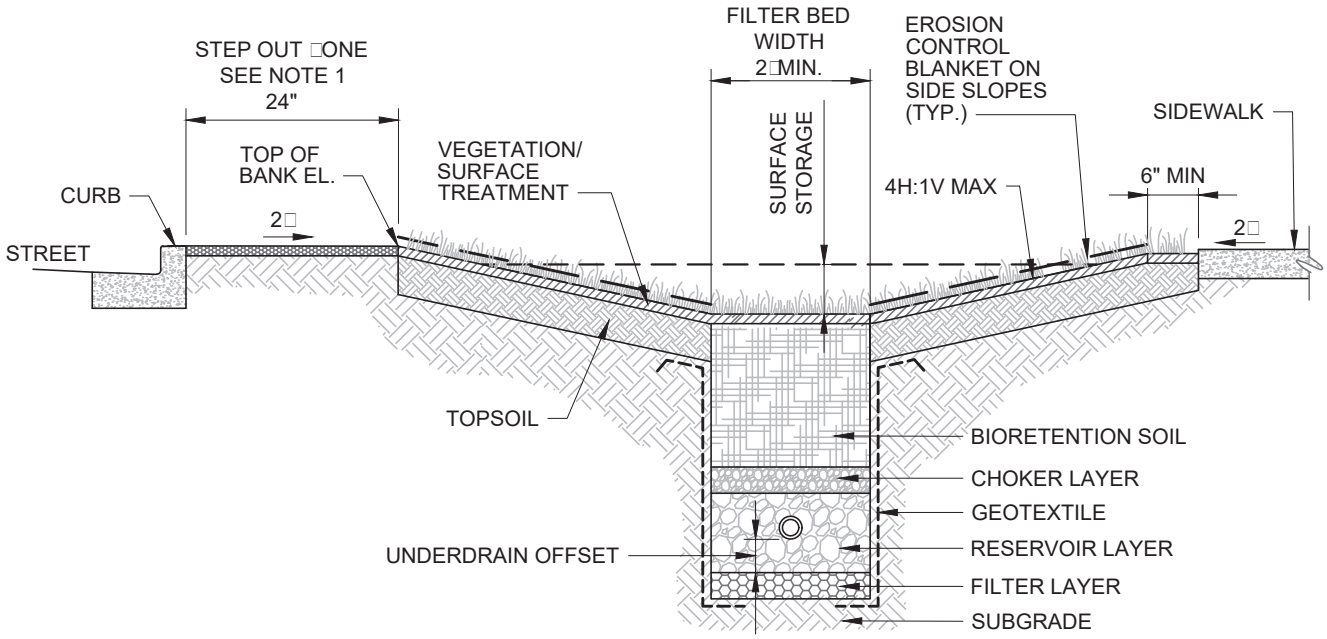
REVISIONS

LINEAR BIORETENTION ADJACENT TO ROADWAY NO STEP OUT ZONE

CITY OF DETROIT
WATER AND SEWERAGE DEPARTMENT
ENGINEERING DIVISION

SCALE NONE	SHEET 1 OF 1
DATE 12/2018	DWG. No. G/21



SECTION

ITEM	MATERIAL	LAYER THICKNESS
SURFACE STORAGE	6" MAX SURFACE STORAGE.	__ INCH
VEGETATION/SURFACE TREATMENT	PER PLANTING PLAN. FOR PERENNIAL PLANTINGS, APPLY 1" MULCH LAYER. FOR TURF GRASS PLANTINGS, NO MULCH.	
BIORETENTION SOIL	BIORETENTION SOIL MIX.	__ INCH
CHOKER LAYER	MDOT34G, AASHTO #8 OR APPROVED EQUIVALENT.	4 INCH
RESERVOIR LAYER	MDOT 4AA OR 6AA, AASHTO #3, #5 OR #57 OR APPROVED EQUIVALENT.	__ INCH
FILTER LAYER	MDOT 34G, AASHTO #8 OR APPROVED EQUIVALENT.	4 INCH
UNDERDRAIN	PERFORATED PVC OR HDPE UNDERDRAIN WHEN CALLED FOR PER DESIGN PLANS. CLEANOUT AT TERMINAL ENDS DWG NO. G/51. PIPE BEDDING AND CATCH BASIN CONNECTION DWG NO. G/52. 4" TYP, 8" MAX PIPE DIAMETER.	__ INCH
UNDERDRAIN OFFSET	OFFSET DISTANCE UNDERDRAIN SET ABOVE THE FILTER LAYER.	__ INCH
GEOTEXTILE	GEOTEXTILE CLASS 2, LOCATED ON SIDES OF FACILITY ONLY.	
SUBGRADE	REFER TO SPECIFICATION FOR SUBGRADE PREPARATION.	

NOTES:

1. STEP OUT □ONE REQUIRED WHEN PARALLEL PARKING IS PROVIDED. SEE DESIGN PLANS FOR SURFACE TREATMENT.
2. BIORETENTION FACILITY DEPICTED IS ONE WITHOUT AN OVERFLOW STRUCTURE. THIS TYPE OF FACILITY REQUIRES A SURFACE OUTLET. AN OVERFLOW STRUCTURE MAY USED INSTEAD OF A SURFACE OUTLET.

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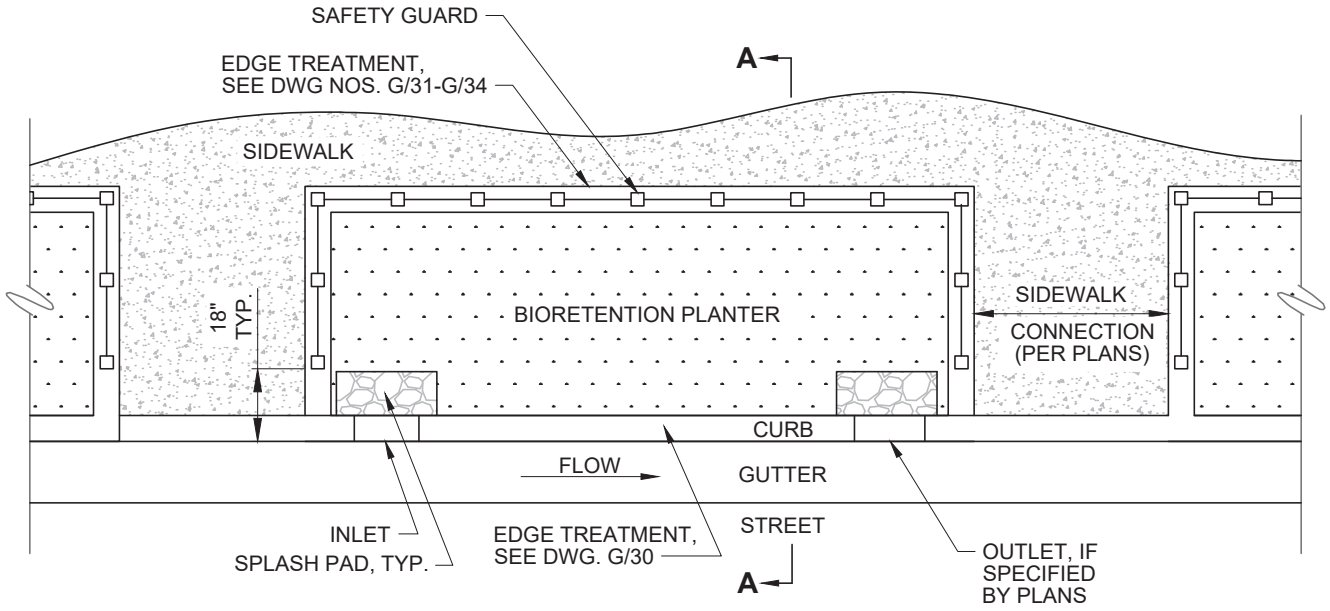
REVISIONS

LINEAR BIORETENTION ADJACENT TO ROADWAY WITH STEP OUT ZONE

CITY OF DETROIT
WATER AND SEWERAGE DEPARTMENT
ENGINEERING DIVISION

SCALE NONE	SHEET 1 OF 1
DATE 12/2018	DWG. No. G/22



PLAN VIEW

REV	DESCRIPTION	DATE
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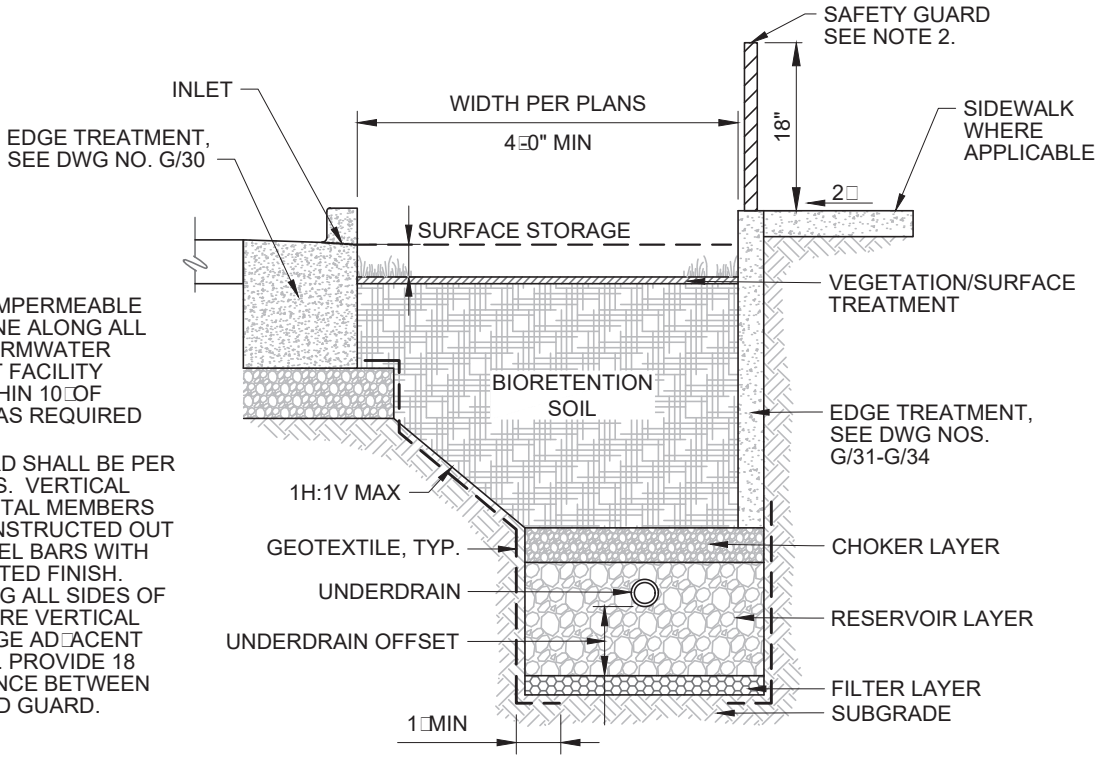
REVISIONS

BIORETENTION PLANTER ADJACENT TO ROADWAY (1 OF 2)

CITY OF DETROIT
WATER AND SEWERAGE DEPARTMENT
ENGINEERING DIVISION

SCALE NONE	SHEET 1 OF 2
DATE 12/2018	DWG. No. G/23



NOTES:

1. PROVIDE AN IMPERMEABLE GEOMEMBRANE ALONG ALL SIDES OF STORMWATER MANAGEMENT FACILITY LOCATED WITHIN 10' OF BUILDING OR AS REQUIRED BY ENGINEER.
2. SAFETY GUARD SHALL BE PER DESIGN PLANS. VERTICAL AND HORIZONTAL MEMBERS SHALL BE CONSTRUCTED OUT OF SOLID STEEL BARS WITH POWDER COATED FINISH. LOCATE ALONG ALL SIDES OF FACILITY WHERE VERTICAL GRADE CHANGE ADJACENT TO SIDEWALK. PROVIDE 18 INCH CLEARANCE BETWEEN ROADWAY AND GUARD.

SECTION A-A

ITEM	MATERIAL	LAYER THICKNESS
SURFACE STORAGE	6" MAX SURFACE STORAGE.	__ INCH
VEGETATION/SURFACE TREATMENT	PER PLANTING PLAN. FOR PERENNIAL PLANTINGS, APPLY 1" MULCH LAYER. TURF NOT ALLOWED FOR THIS TYPE OF PLANTER.	
BIORETENTION SOIL	BIORETENTION SOIL MIX.	__ INCH
CHOKER LAYER	MDOT 34G, AASHTO #8 OR APPROVED EQUIVALENT.	4 INCH
RESERVOIR LAYER	MDOT 4AA OR 6AA, AASHTO #3, #5 OR #57 OR APPROVED EQUIVALENT.	__ INCH
FILTER LAYER	MDOT 34G, AASHTO #8 OR APPROVED EQUIVALENT.	4 INCH
UNDERDRAIN	PERFORATED PVC OR HDPE UNDERDRAIN WHEN CALLED FOR PER DESIGN PLANS. CLEANOUT AT TERMINAL ENDS DWG NO. G/51. PIPE BEDDING AND CATCH BASIN CONNECTION DWG NO. G/52. 4" TYP, 8" MAX PIPE DIAMETER.	__ INCH
UNDERDRAIN OFFSET	OFFSET DISTANCE UNDERDRAIN SET ABOVE THE FILTER LAYER.	__ INCH
GEOTEXTILE	GEOTEXTILE CLASS 2, LOCATED ON SIDES OF FACILITY ONLY.	
SUBGRADE	REFER TO SPECIFICATION FOR SUBGRADE PREPARATION.	
EDGE TREATMENT	FOR STREETSIDE EDGE TREATMENT CONDITIONS, SEE DWG NO. G/30. FOR OTHER THREE SIDES, SEE DWG NOS. G/31 - G/34.	
INLET AND OUTLET	LOCATIONS PER DESIGN PLANS. REFER TO DWG NOS. G/40 - G/42.	

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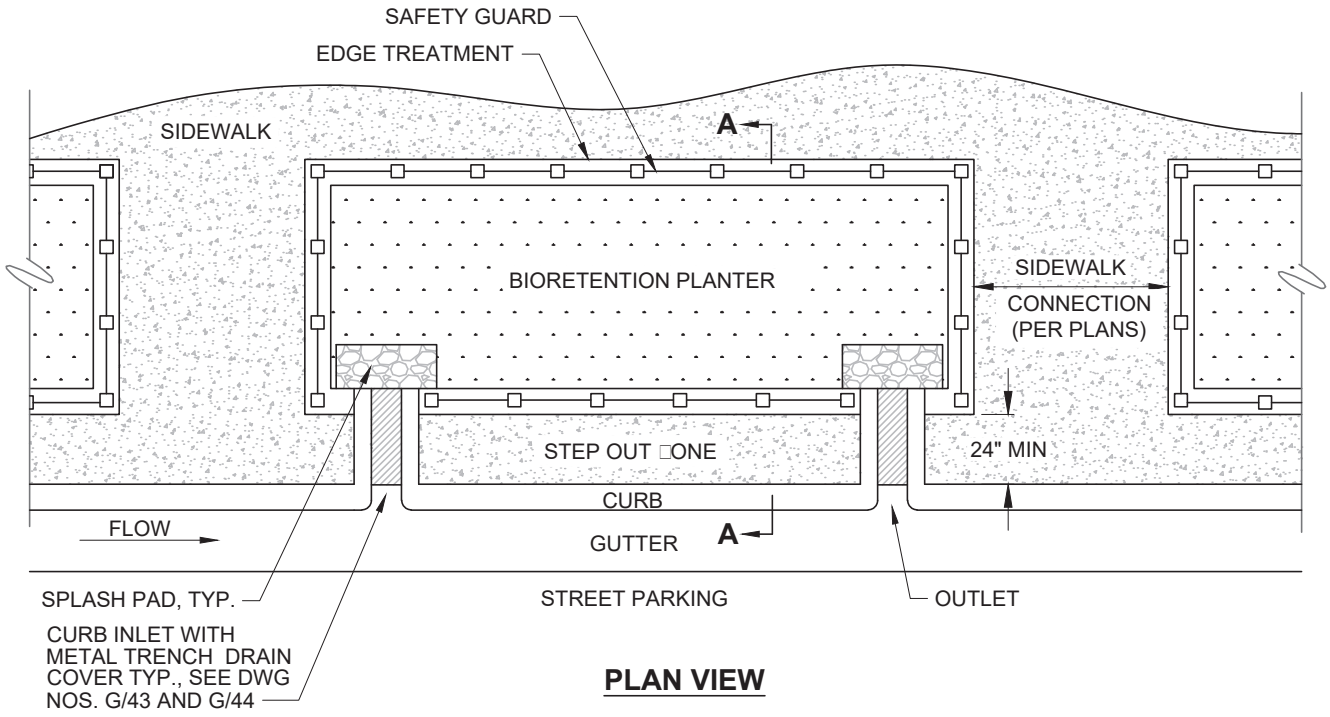
REVISIONS

BIORETENTION PLANTER ADJACENT TO ROADWAY (2 OF 2)

CITY OF DETROIT
WATER AND SEWERAGE DEPARTMENT
ENGINEERING DIVISION

SCALE NONE	SHEET 2 OF 2
DATE 12/2018	DWG. No. G/23



PLAN VIEW

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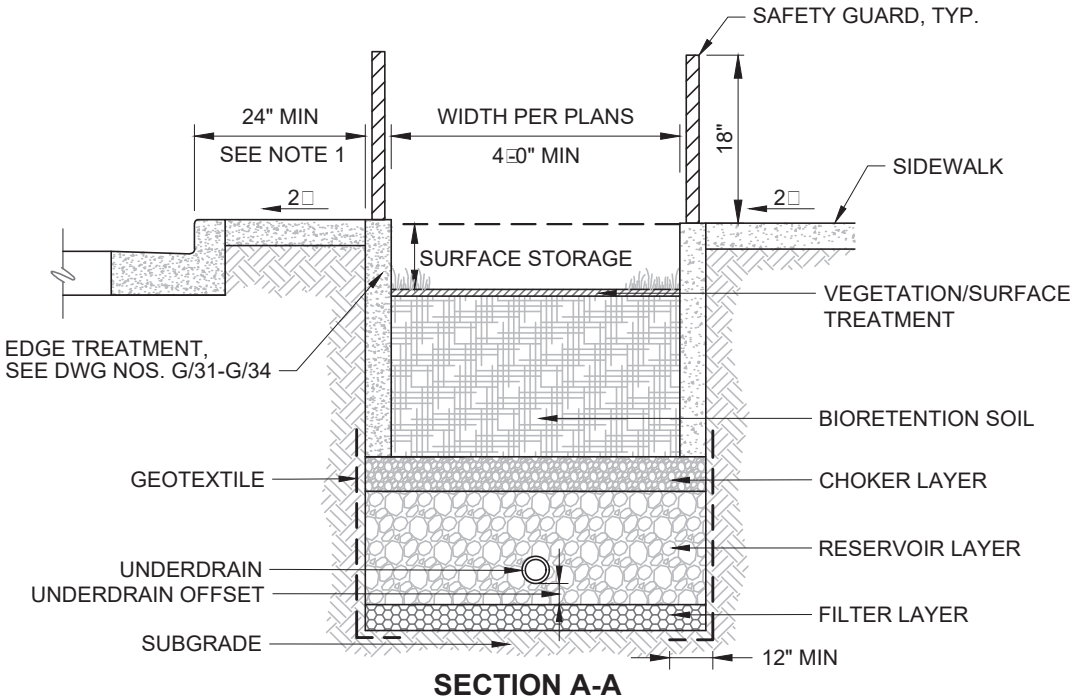
REVISIONS

BIORETENTION PLANTER ADJACENT TO ROADWAY WITH STEP OUT ZONE (1 OF 2)

CITY OF DETROIT
WATER AND SEWERAGE DEPARTMENT
ENGINEERING DIVISION

SCALE NONE	SHEET 1 OF 2
DATE 12/2018	DWG. No. G/24



SECTION A-A

ITEM	MATERIAL	LAYER THICKNESS
SURFACE STORAGE	6" MAX SURFACE STORAGE.	__ INCH
VEGETATION/SURFACE TREATMENT	PER PLANTING PLAN. FOR PERENNIAL PLANTINGS, APPLY 1" MULCH LAYER. TURF NOT ALLOWED FOR THIS TYPE OF PLANTER.	
BIORETENTION SOIL	BIORETENTION SOIL MIX.	__ INCH
CHOKER LAYER	MDOT 34G, AASHTO #8 OR APPROVED EQUIVALENT.	4 INCH
RESERVOIR LAYER	MDOT 4AA OR 6AA, AASHTO #3, #5 OR #57 OR APPROVED EQUIVALENT.	__ INCH
FILTER LAYER	MDOT 34G, AASHTO #8 OR APPROVED EQUIVALENT.	4 INCH
UNDERDRAIN	PERFORATED PVC UNDERDRAIN WHEN CALLED FOR PER DESIGN PLANS. CLEANOUT AT TERMINAL ENDS DWG NO. G/51. PIPE BEDDING AND CATCH BASIN CONNECTION DWG NO. G/52. 4" TYP, 8" MAX PIPE DIAMETER.	__ INCH
UNDERDRAIN OFFSET	OFFSET DISTANCE UNDERDRAIN SET ABOVE THE FILTER LAYER.	___ INCH
GEOTEXTILE	GEOTEXTILE CLASS 2, LOCATED ON SIDES OF FACILITY ONLY.	
SUBGRADE	REFER TO SPECIFICATION FOR SUBGRADE PREPARATION.	
EDGE TREATMENT	FOR ALTERNATIVE EDGE TREATMENT CONDITIONS, SEE DWG NOS. G/31 TO G/34.	
INLET AND OUTLET	LOCATIONS PER DESIGN PLANS. REFER TO DWG NO. G/43 AND G/44.	

NOTES:

1. STEP OUT ZONE REQUIRED WHEN PARALLEL PARKING IS PROVIDED. INSTALLATION SHALL BE VEGETATION/SURFACE TREATMENT OR PAVEMENT BASED ON SURROUNDING CONDITIONS. SIDEWALK SHALL BE SLOPED TOWARD STREET.
2. OUTLET REQUIRED AS SPECIFIED BY DESIGN PLANS.
3. PROVIDE AN IMPERMEABLE GEOMEMBRANE ALONG ALL SIDES OF STORMWATER MANAGEMENT FACILITY LOCATED WITHIN 10' OF BUILDING OR AS REQUIRED BY ENGINEER.
4. SAFETY GUARD SHALL BE PER DESIGN PLANS. VERTICAL AND HORIZONTAL MEMBERS SHALL BE CONSTRUCTED OUT OF SOLID STEEL BARS WITH POWDER COATED FINISH. LOCATE ALONG ALL SIDES OF FACILITY WHERE VERTICAL GRADE CHANGE ADJACENT TO SIDEWALK. PROVIDE 18 INCH CLEARANCE BETWEEN ROADWAY AND GUARD.

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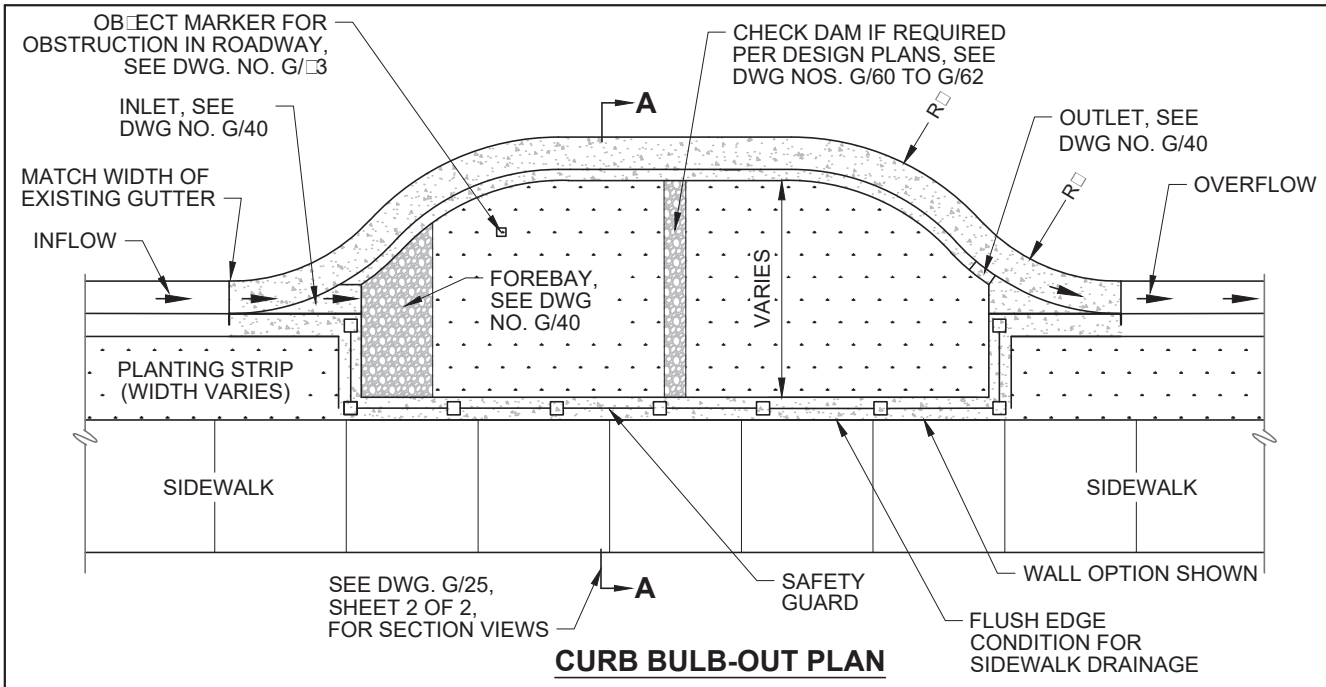
REVISIONS

BIORETENTION PLANTER ADJACENT TO ROADWAY WITH STEP OUT ZONE (2 OF 2)

CITY OF DETROIT
WATER AND SEWERAGE DEPARTMENT
ENGINEERING DIVISION

SCALE NONE	SHEET 2 OF 2
DATE 12/2018	DWG. No. **G/24**



CURB BULB-OUT PLAN

R□□ RADIUS PER DESIGN PLAN, 5□MIN.

ITEM	MATERIAL	LAYER THICKNESS
SURFACE STORAGE	6" MAC SURFACE STORAGE.	__ INCH
VEGETATION/SURFACE TREATMENT	PER PLANTING PLAN. FOR PERENNIAL PLANTINGS, APPLY 1" MULCH LAYER. TURF NOT ALLOWED FOR THIS TYPE OF PLANTER.	
BIORETENTION SOIL	BIORETENTION SOIL MIX.	__ INCH
CHOKER LAYER	MDOT 34G, AASHTO #8 OR APPROVED EQUIVALENT.	4 INCH
RESERVOIR LAYER	MDOT 4AA OR 6AA, AASHTO #3, #5 OR #57 OR APPROVED EQUIVALENT.	__ INCH
FILTER LAYER	MDOT 34G, AASHTO #8 OR APPROVED EQUIVALENT. WHEN FILTER LAYER IS OMITTED, PROVIDE GEOTEXTILE CLASS 2 MATERIAL BENEATH RESERVOIR LAYER.	4 INCH
UNDERDRAIN	PERFORATED PVC OR HDPE UNDERDRAIN WHEN CALLED FOR PER DESIGN PLANS. CLEANOUT AT TERMINAL ENDS DWG NO. G/51. PIPE BEDDING AND CATCH BASIN CONNECTION DWG NO. G/52. 4" TYP, 8" MAX PIPE DIAMETER.	__ INCH
UNDERDRAIN OFFSET	OFFSET DISTANCE UNDERDRAIN SET ABOVE THE FILTER LAYER.	___ INCH
GEOTEXTILE	GEOTEXTILE CLASS 2, LOCATED ON SIDES OF FACILITY ONLY.	
SUBGRADE	REFER TO SPECIFICATION FOR SUBGRADE PREPARATION.	
EDGE TREATMENT	FOR STREETSIDE EDGE TREATMENT, SEE DWG NO. G/30. FOR OTHER THREE SIDES, SEE DWG NOS. G/31 TO G/34.	
INLET AND OUTLET	REFER TO DWG NO. G/40.	
CHECK DAMS	AS REQUIRED PER DESIGN PLANS. SEE DWG NOS. G/60 TO G/62.	

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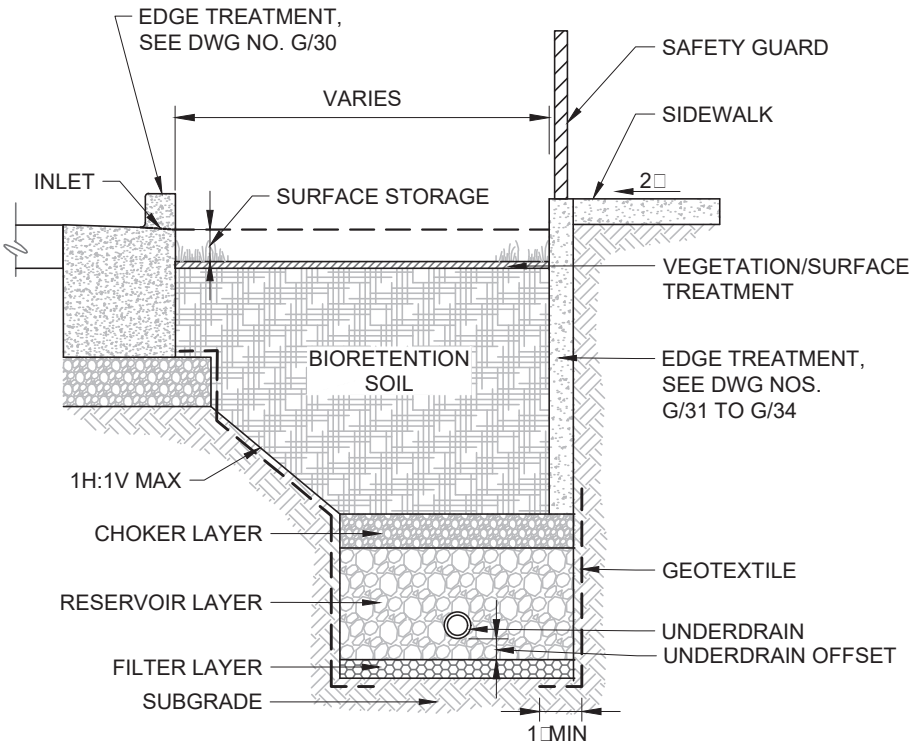
REVISIONS

CURB BULB-OUT IN PLANTING STRIP BIORETENTION (1 OF 2)

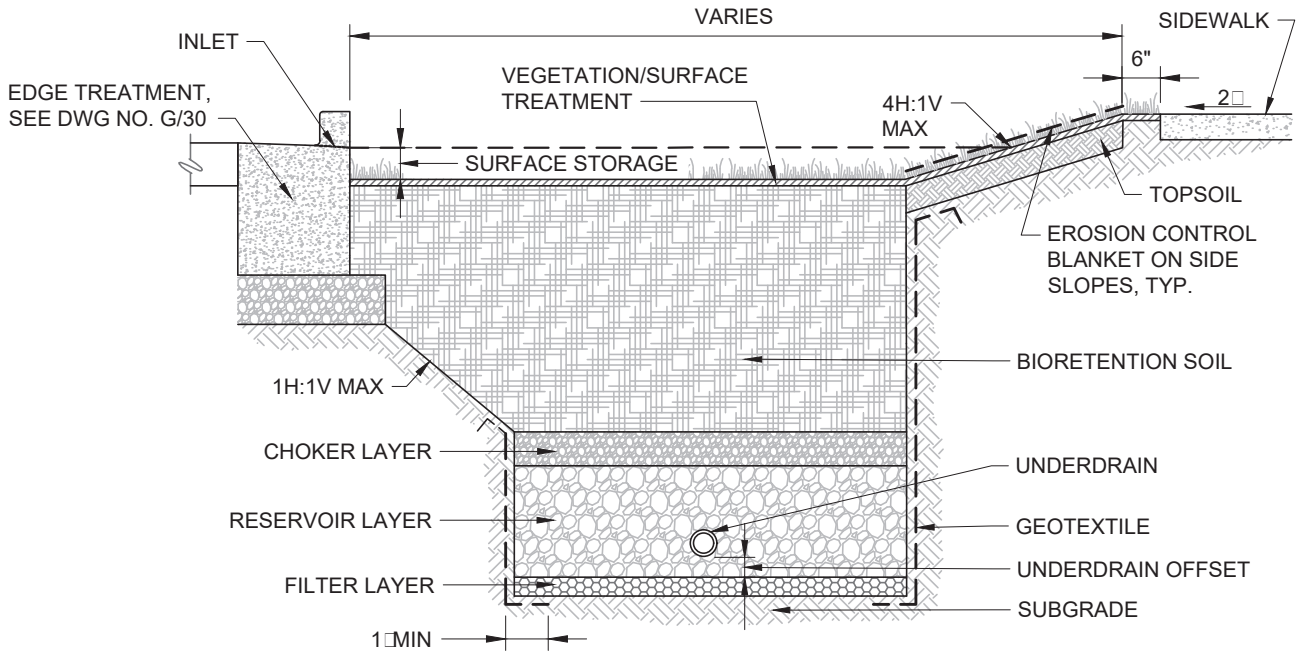
CITY OF DETROIT
WATER AND SEWERAGE DEPARTMENT
ENGINEERING DIVISION

SCALE NONE	SHEET 1 OF 2
DATE 12/2018	DWG. No. G/25

NOTES:
1. LONGITUDINAL SLOPE OF CURB BULB-OUT MATCHES ROAD, OR FLATTER AS REQUIRED PER DESIGN PLANS.
2. SIDEWALK ELEVATION MUST BE SET ABOVE INLET AND OUTLET ELEVATIONS TO ALLOW OVERFLOW TO DRAIN TO STREET BEFORE PONDING LEVEL REACHES SIDEWALK.
3. PROVIDE AN IMPERMEABLE GEOMEMBRANE ALONG ALL SIDES OF STORMWATER MANAGEMENT FACILITY LOCATED WITHIN 10□OF BUILDING OR AS REQUIRED BY ENGINEER.
4. SAFETY GUARD SHALL BE PER DESIGN PLANS. VERTICAL AND HORI□ONTAL MEMBERS SHALL BE CONSTRUCTED OUT OF SOLID STEEL BARS WITH POWDER COATED FINISH. LOCATE ALONG ALL SIDES OF FACILITY WHERE VERTICAL GRADE CHANGE AD□ACENT TO SIDEWALK. PROVIDE 18 INCH CLEARANCE BETWEEN ROADWAY AND GUARD.



SECTION A-A
(WALL OPTION)



SECTION A-A
(SLOPE OPTION)

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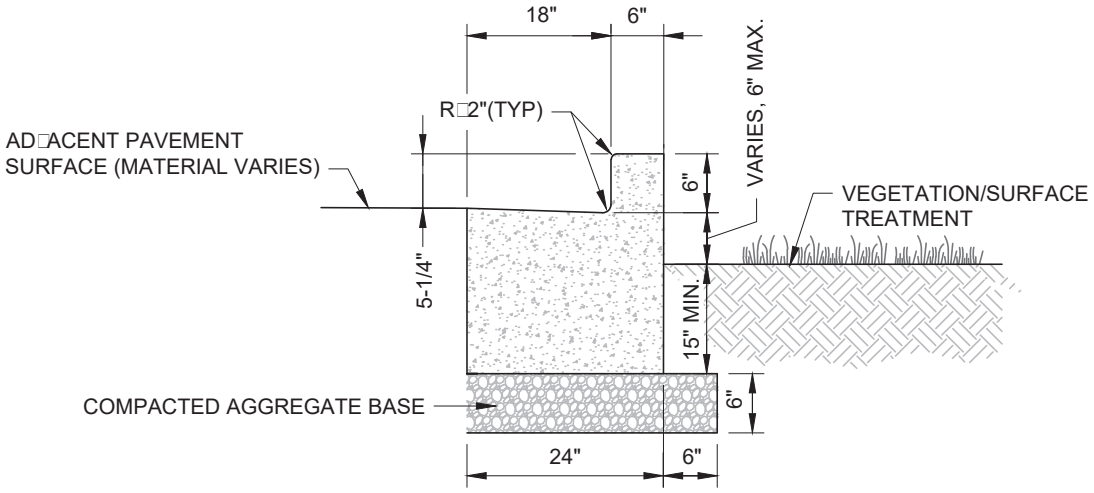
REVISIONS

CURB BULB-OUT IN PLANTING STRIP BIORETENTION (2 OF 2)

CITY OF DETROIT
WATER AND SEWERAGE DEPARTMENT
ENGINEERING DIVISION

SCALE NONE	SHEET 2 OF 2
DATE 12/2018	DWG. No. G/25



THICKENED CONCRETE CURB AND GUTTER

NOTES:

1. SLOPE OF GUTTER AND CURB REVEAL TO MATCH STANDARD CURB AND GUTTER.
2. INSTALL SAWN CONTRACTION □OINTS AT 25□MAX. SPACING.
3. INSTALL EXPANSION □OINTS AT □5□MAX. SPACING. CONSTRUCT USING 1/2" COMPRESSIBLE MATERIAL.

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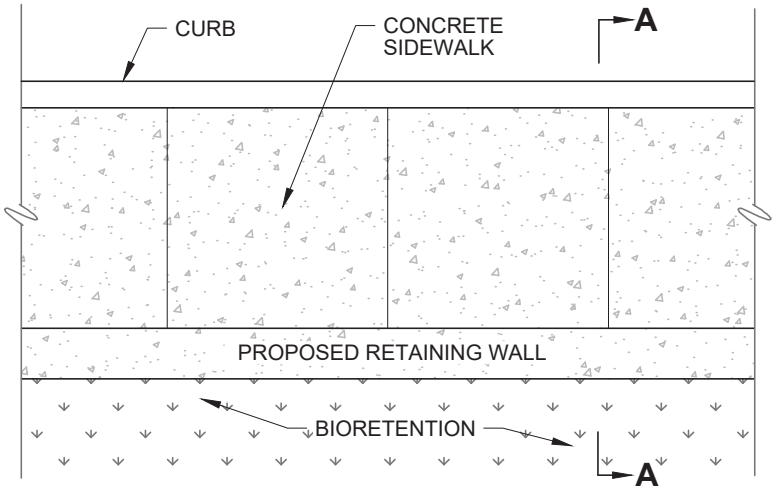
REVISIONS

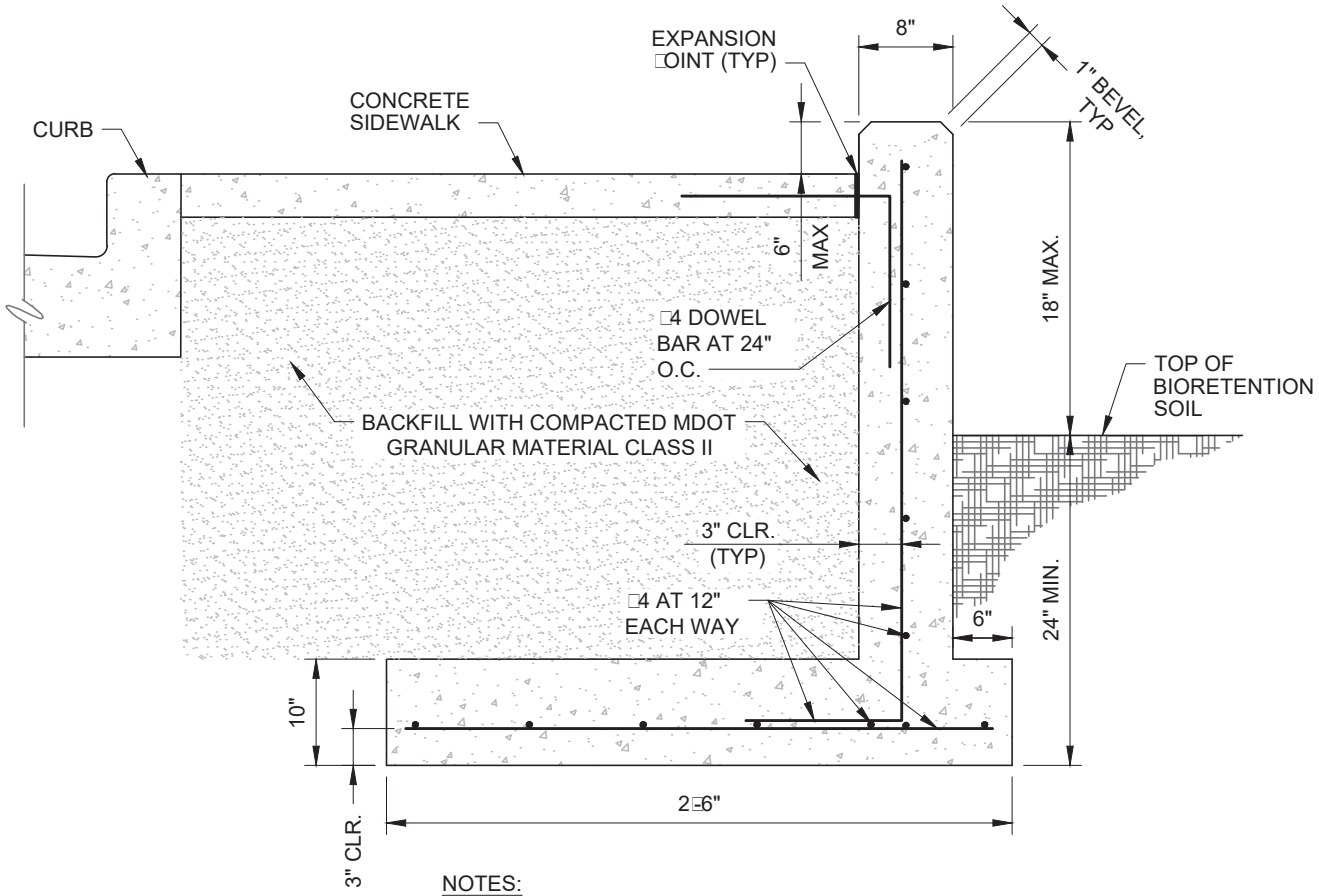
THICKENED CONCRETE CURB AND GUTTER EDGE TREATMENT

CITY OF DETROIT
WATER AND SEWERAGE DEPARTMENT
ENGINEERING DIVISION

SCALE NONE	SHEET 1 OF 1
DATE 12/2018	DWG. No. **G/30**



PLAN VIEW



NOTES:
1. CONCRETE STRENGTH = 4,000 PSI.
2. STEEL REINFORCEMENT STRENGTH = 60,000 PSI.

SECTION A-A

REV	DESCRIPTION	DATE
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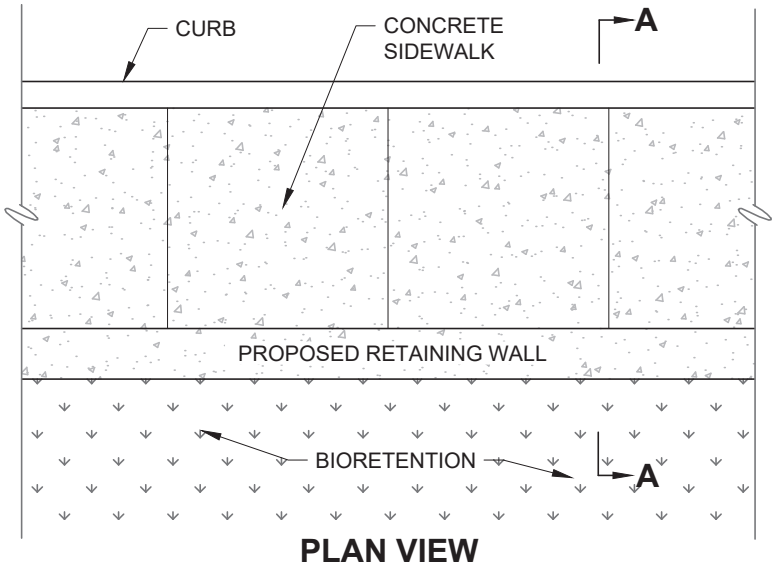
REVISIONS

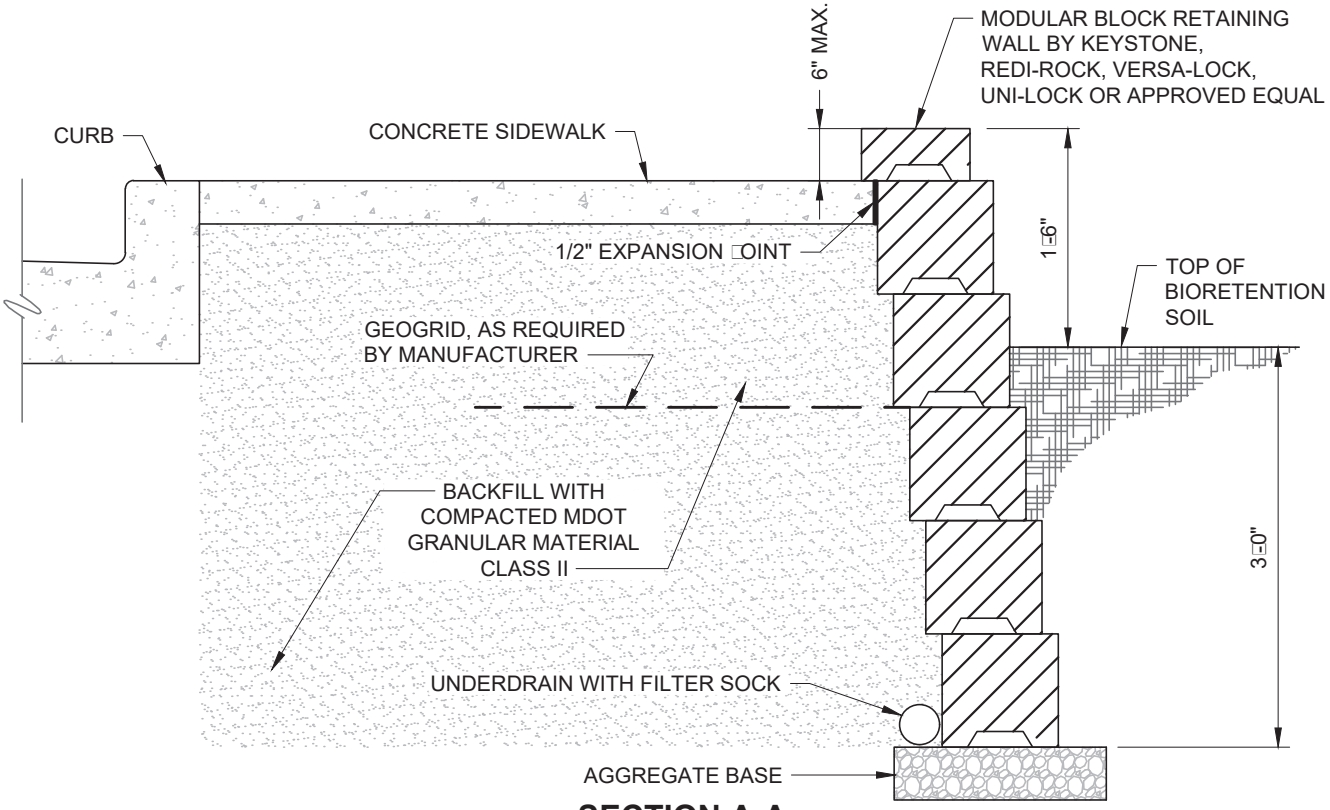
CONCRETE RETAINING WALL EDGE TREATMENT WITH FOOTING

CITY OF DETROIT
WATER AND SEWERAGE DEPARTMENT
ENGINEERING DIVISION

SCALE NONE	SHEET 1 OF 1
DATE 12/2018	DWG. No. G/32



PLAN VIEW



SECTION A-A

NOTES:
1. WALL FACE PATTERN TO BE APPROVED BY THE CITY.
2. WALL TO BE GRAVITY TYPE WITH A SETBACK (BATTER).
3. WALL MANUFACTURER TO SUBMIT DESIGN CALCULATIONS SEALED BY A LICENSED PROFESSIONAL ENGINEER REGISTERED IN MICHIGAN.
4. CONNECT UNDERDRAIN TO SEWER SYSTEM PER DESIGN PLANS.

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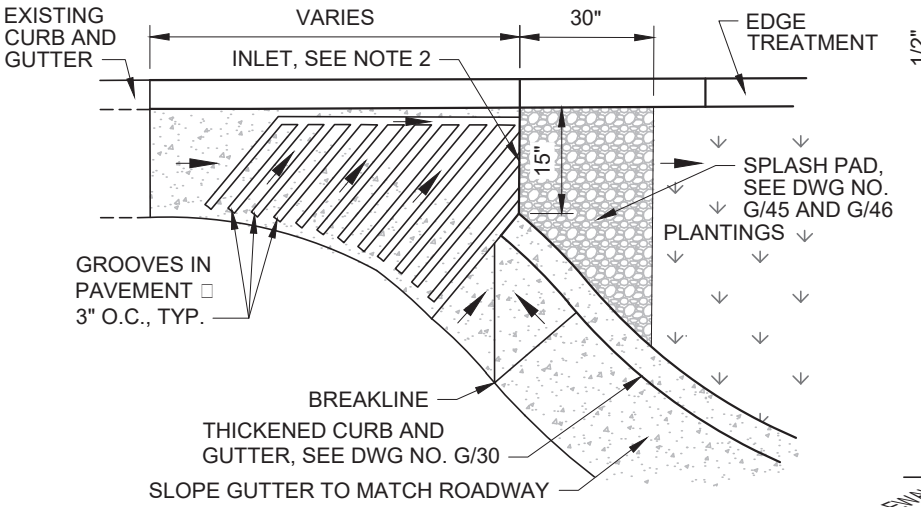
REVISIONS

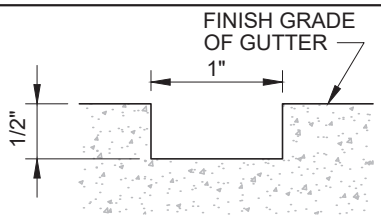
MODULAR BLOCK RETAINING WALL EDGE TREATMENT

CITY OF DETROIT
WATER AND SEWERAGE DEPARTMENT
ENGINEERING DIVISION

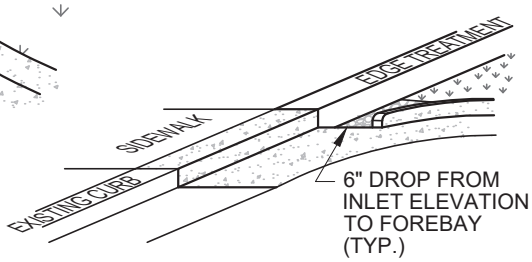
SCALE NONE	SHEET 1 OF 1
DATE 12/2018	DWG. No. G/34



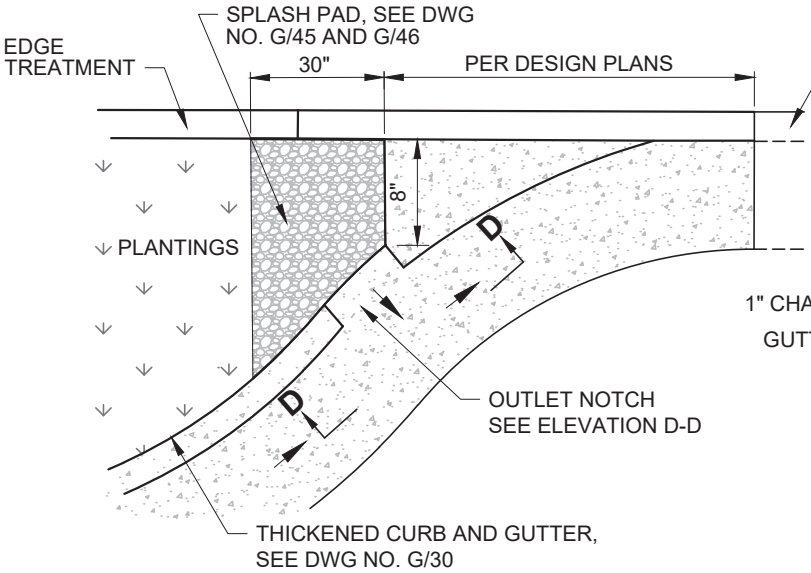
DETAIL A
INLET PLAN VIEW



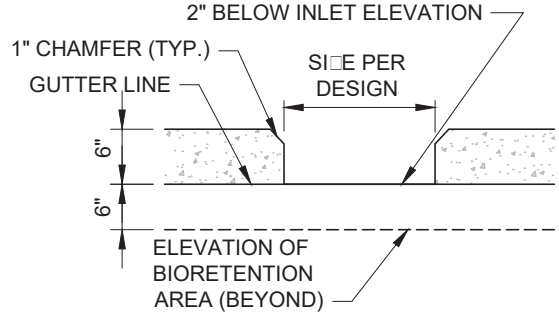
GROOVE DETAIL
SECTION



DETAIL C
INLET ISOMETRIC VIEW



DETAIL B
OUTLET PLAN VIEW



ELEVATION D-D
OUTLET NOTCH

NOTES:
1. FLOW THROUGH CURB BULB-OUTS MAY ONLY BE USED WHEN EXISTING CATCH BASIN INLETS ARE LEFT IN PLACE FOR OVERFLOW SITUATIONS.
2. INLET MAY BE MODIFIED TO CONTROL THE AMOUNT OF FLOW RATE ENTERING THE STORMWATER FACILITY.

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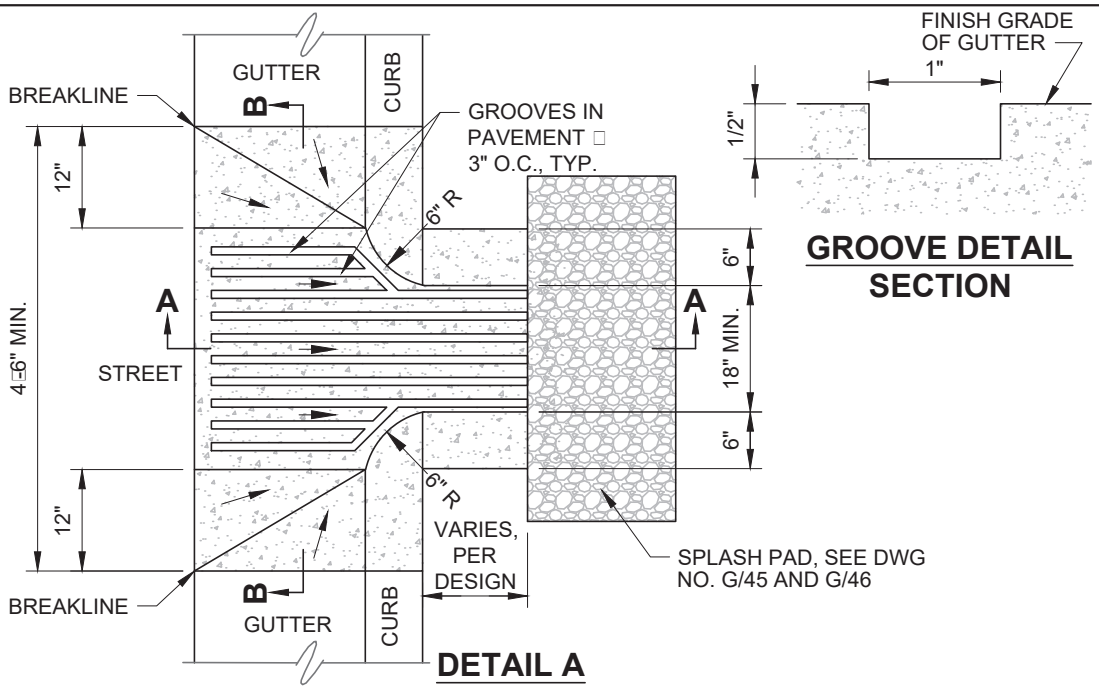
REVISIONS

INLET AND OUTLET FOR CURB BULB-OUT BIORETENTION

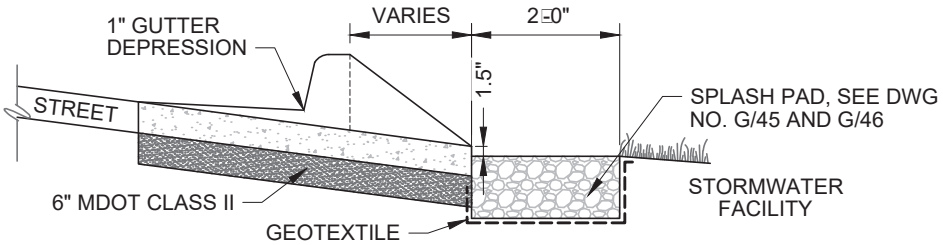
CITY OF DETROIT
WATER AND SEWERAGE DEPARTMENT
ENGINEERING DIVISION

SCALE NONE	SHEET 1 OF 1
DATE 12/2018	DWG. No. G/40

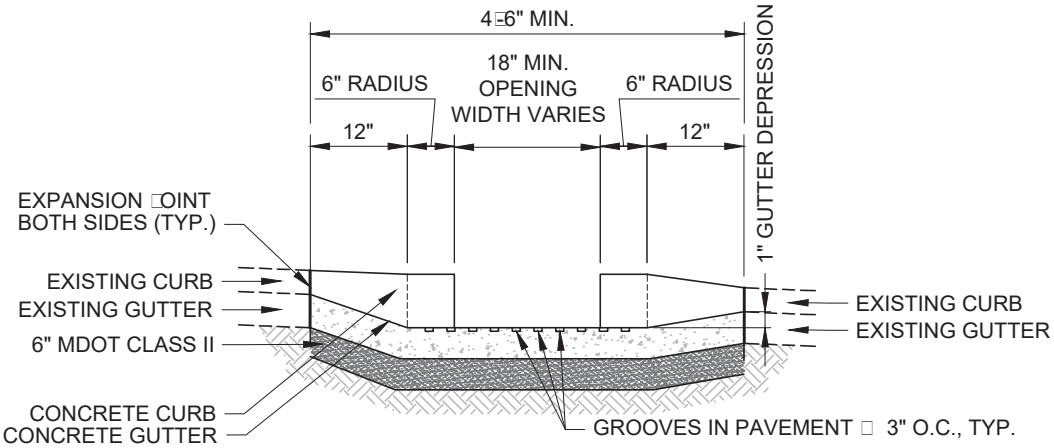


GROOVE DETAIL SECTION

DETAIL A
INLET WITH FLARED ENDS AND STONE SPLASH PAD



SECTION A-A



SECTION B-B

NOTE:

1. CONCRETE THICKNESS SHALL BE 6" MINIMUM.

REV	DESCRIPTION	DATE
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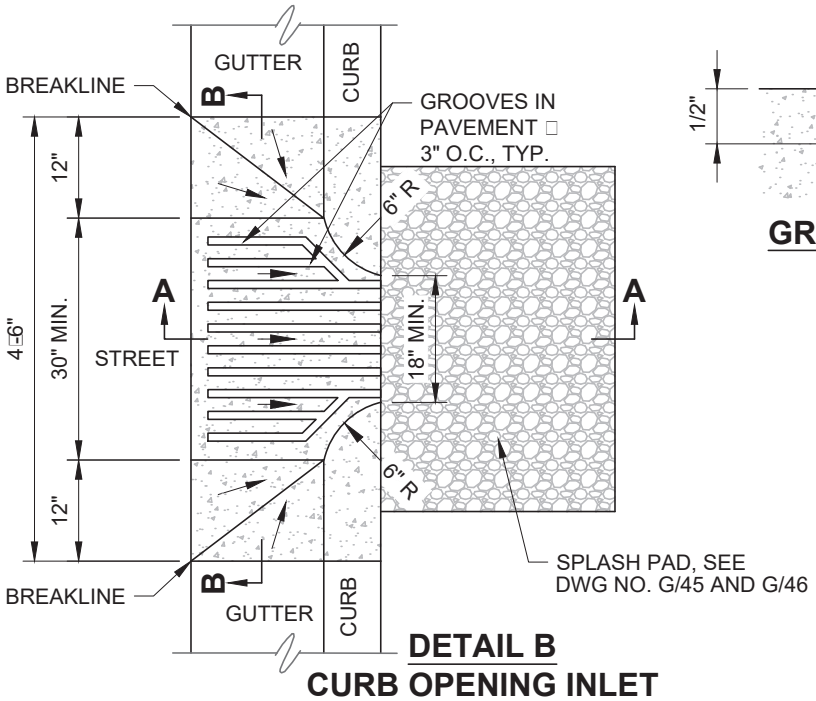
REVISIONS

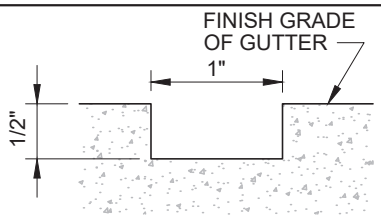
CURB OPENING INLET TYPE A

CITY OF DETROIT
WATER AND SEWERAGE DEPARTMENT
ENGINEERING DIVISION

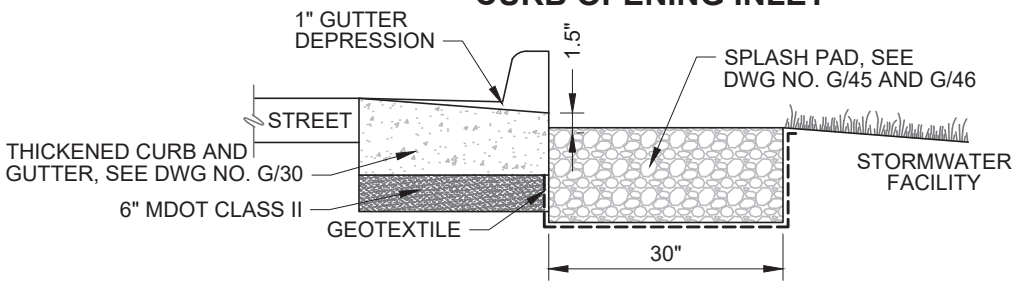
SCALE NONE	SHEET 1 OF 1
DATE 12/2018	DWG. No. G/41



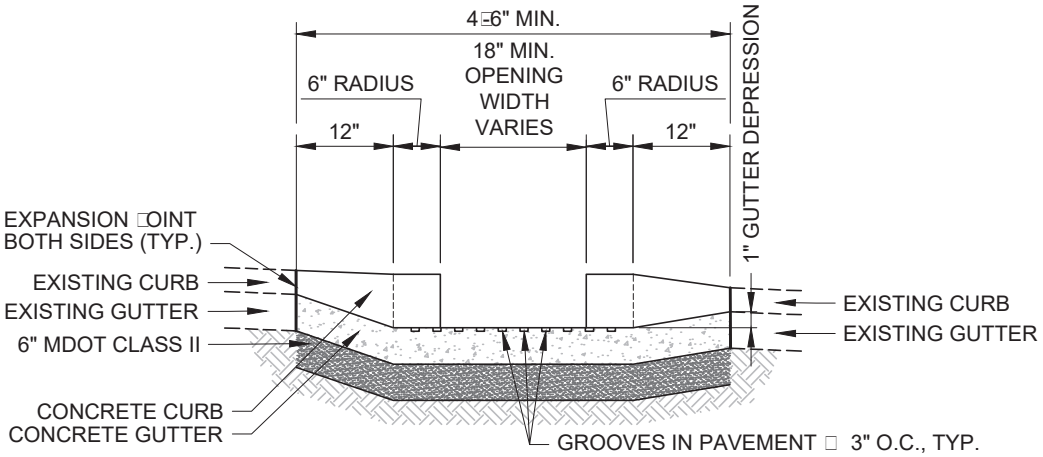
DETAIL B
CURB OPENING INLET



GROOVE DETAIL SECTION



SECTION A-A



SECTION B-B

NOTE:

1. CONCRETE THICKNESS SHALL BE 6" MINIMUM.

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REVISIONS

CURB OPENING INLET TYPE B

CITY OF DETROIT
WATER AND SEWERAGE DEPARTMENT
ENGINEERING DIVISION

SCALE NONE	SHEET 1 OF 1
DATE 12/2018	DWG. No. G/42

Moved to Stormwater Design Management Manual

REV	DESCRIPTION	DATE
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REVISIONS

CURB OPENING INLET TYPE C WITH TRENCH DRAIN COVER (1 OF 2)

CITY OF DETROIT
WATER AND SEWERAGE DEPARTMENT
ENGINEERING DIVISION

SCALE NONE	SHEET 1 OF 2
DATE 12/2018	DWG. No. **G/43**

Moved to Stormwater Design Management Manual

REV	DESCRIPTION	DATE
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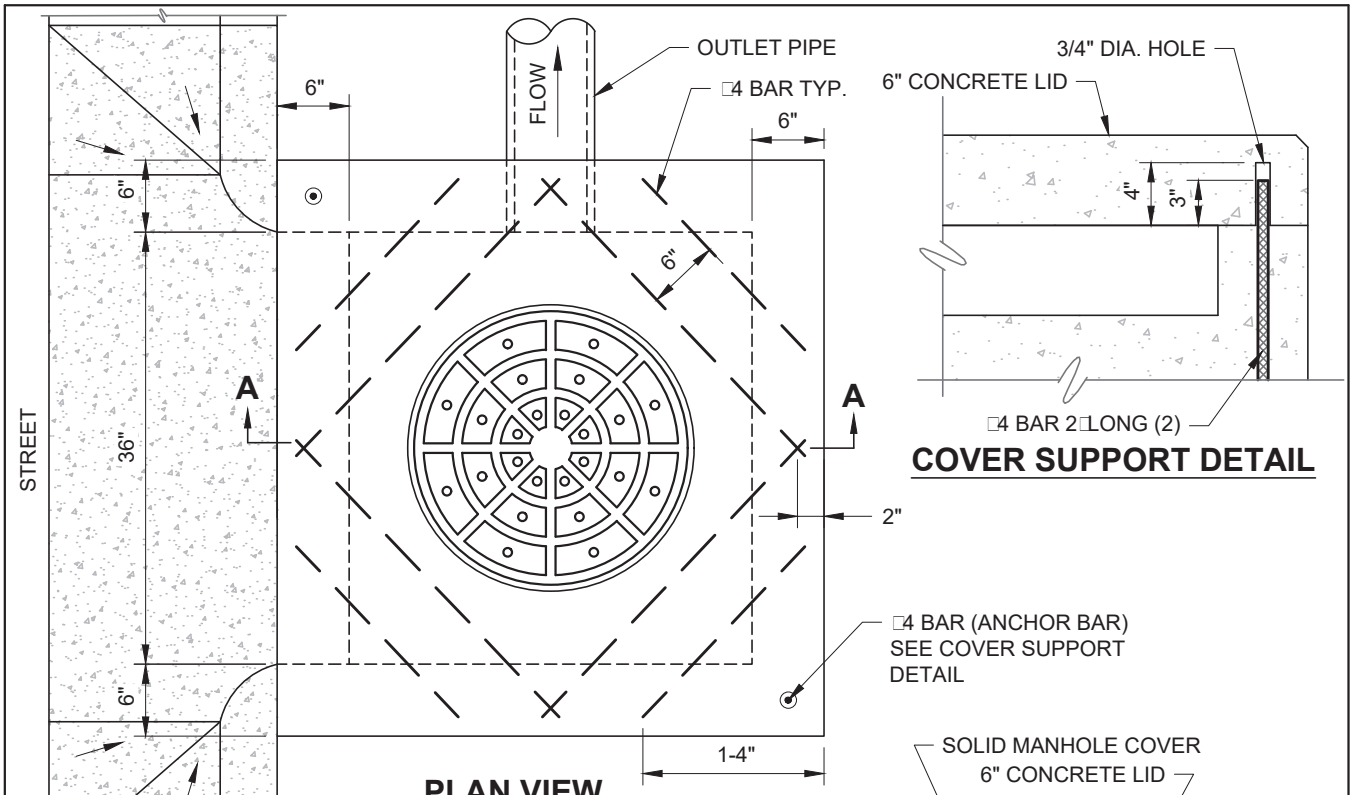
REVISIONS

CURB OPENING INLET TYPE C WITH TRENCH DRAIN COVER (2 OF 2)

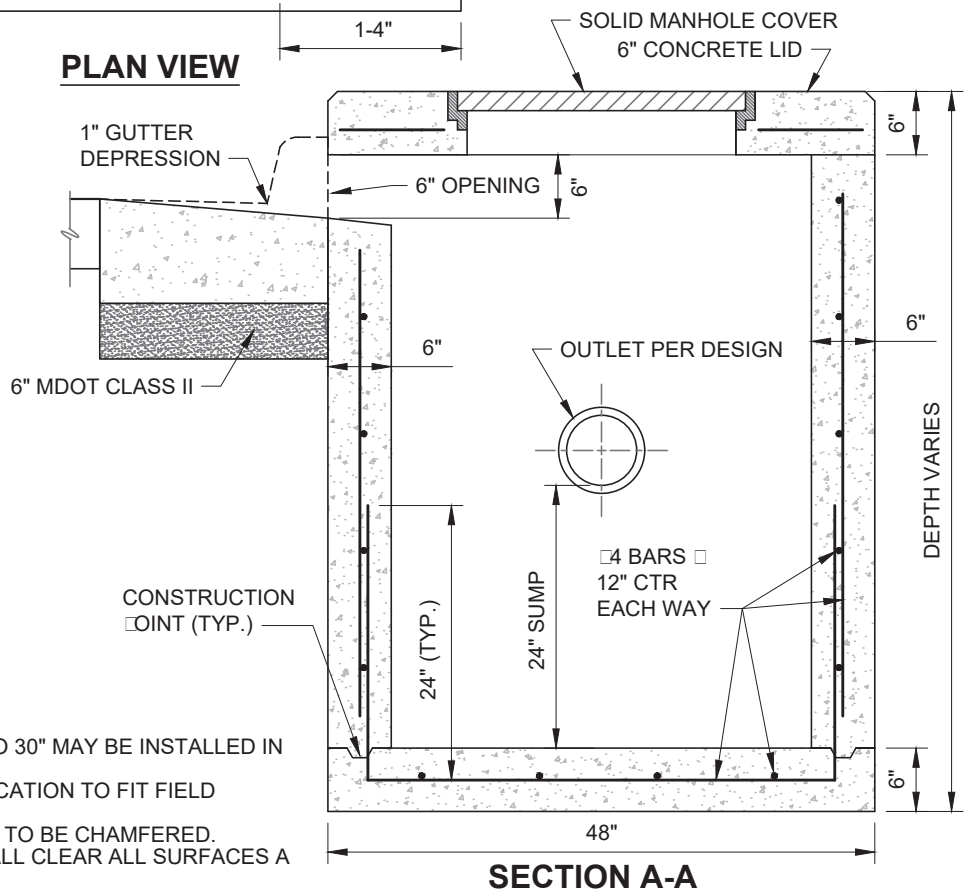
CITY OF DETROIT
WATER AND SEWERAGE DEPARTMENT
ENGINEERING DIVISION

SCALE NONE	SHEET 2 OF 2
DATE 12/2018	DWG. No. G/43



PLAN VIEW

COVER SUPPORT DETAIL



SECTION A-A

NOTES:
1. OUTLET PIPE - ANY SI□E UP TO 30" MAY BE INSTALLED IN ANY WALL.
2. OPENINGS - NUMBER AND LOCATION TO FIT FIELD CONDITIONS.
3. ALL EXPOSED EDGES OF BOX TO BE CHAMFERED.
4. ALL REINFORCING STEEL SHALL CLEAR ALL SURFACES A MINIMUM OF 2".

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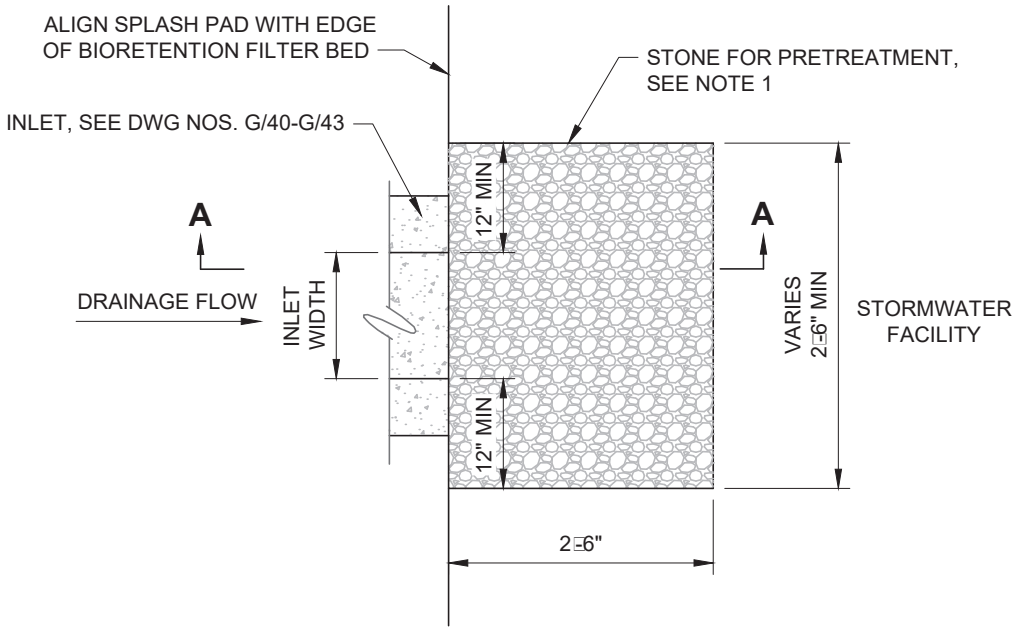
REVISIONS

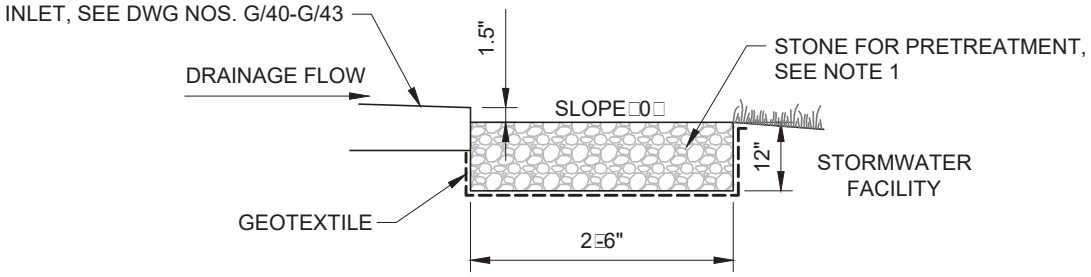
AREA INLET TYPE 1

CITY OF DETROIT
WATER AND SEWERAGE DEPARTMENT
ENGINEERING DIVISION

SCALE NONE	SHEET 1 OF 1
DATE 12/2018	DWG. No. G/44



PLAN VIEW



SECTION A-A

NOTE:
1. STONE SPLASH PAD SHALL BE MDOT COBBLESTONE, ROUND EDGES.

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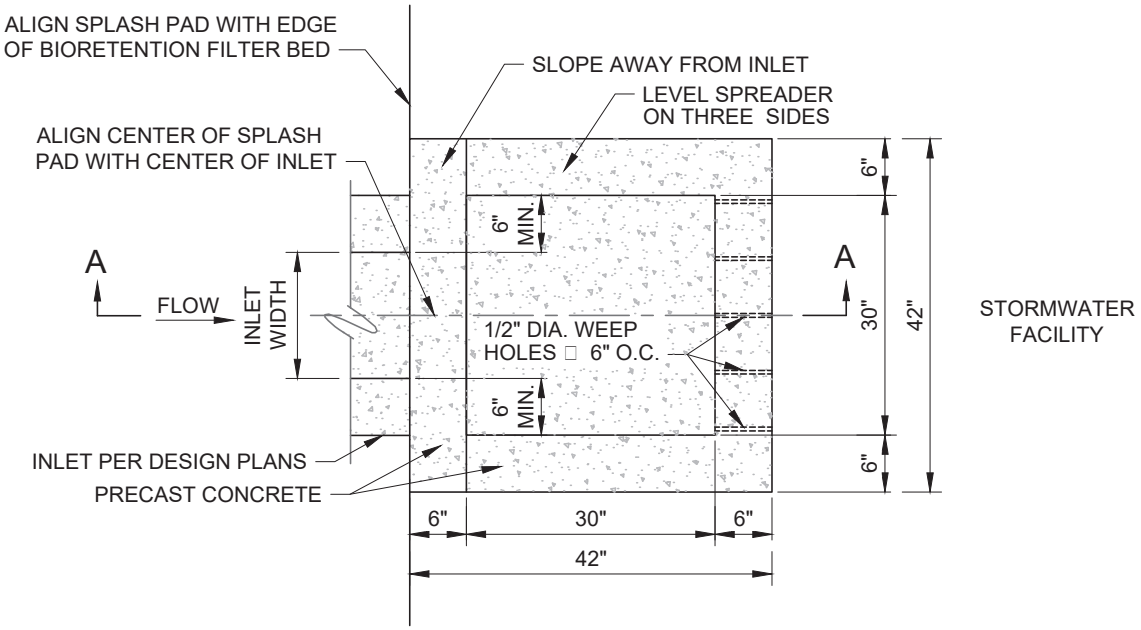
REVISIONS

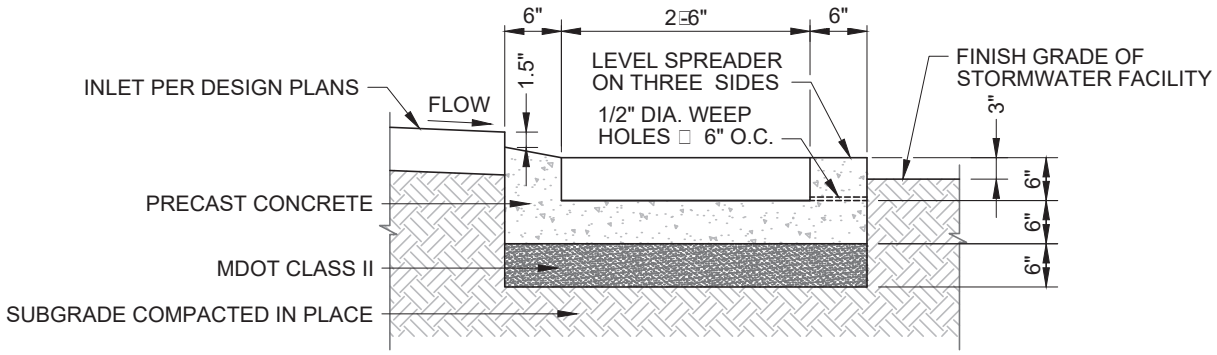
STONE SPLASH PAD

CITY OF DETROIT
WATER AND SEWERAGE DEPARTMENT
ENGINEERING DIVISION

SCALE NONE	SHEET 1 OF 1
DATE 12/2018	DWG. No. G/45



PLAN VIEW



SECTION A-A

REV	DESCRIPTION	DATE
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REVISIONS

CONCRETE SPLASH PAD

CITY OF DETROIT
WATER AND SEWERAGE DEPARTMENT
ENGINEERING DIVISION

SCALE NONE	SHEET 1 OF 1
DATE 12/2018	DWG. No. G/46

Moved to Stormwater Design Management Manual

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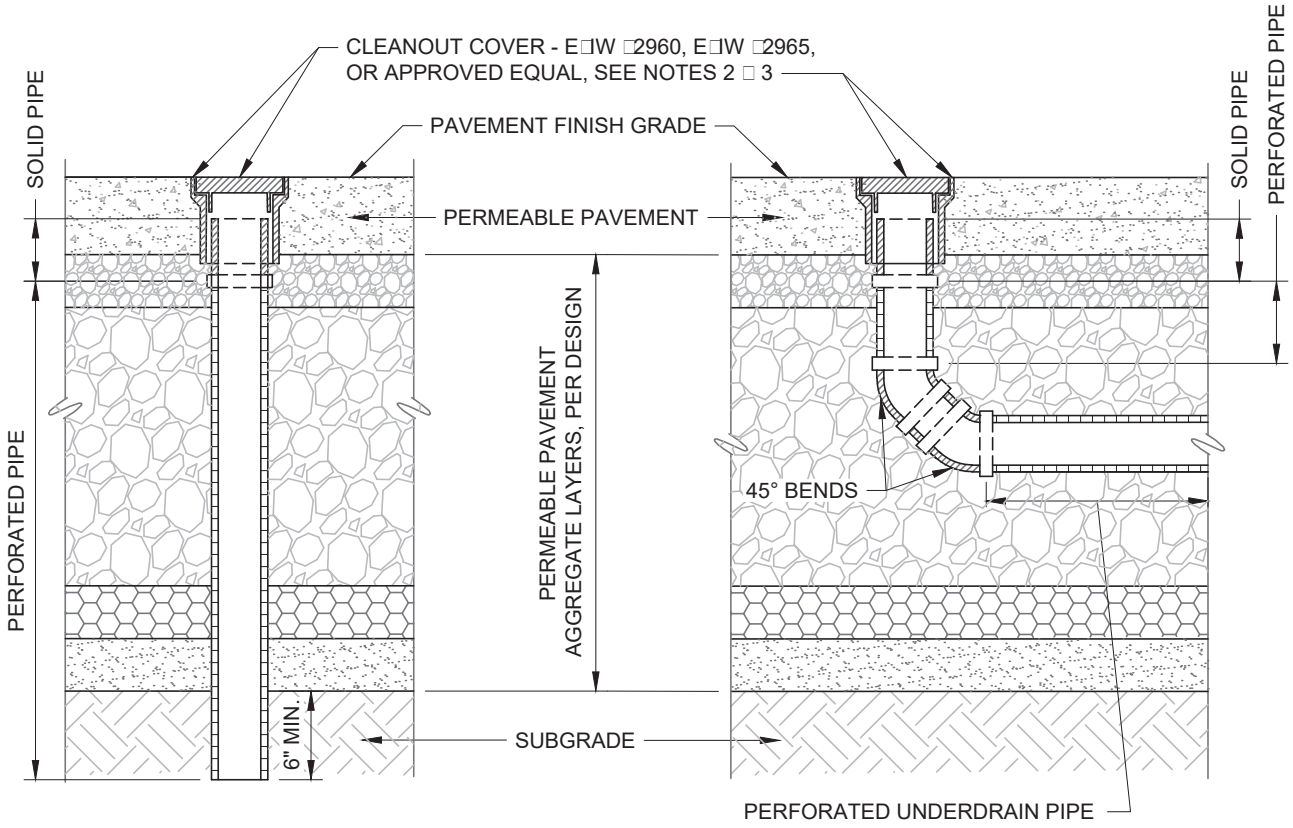
REVISIONS

OVERFLOW RISER WITH BEEHIVE GRATE

CITY OF DETROIT
WATER AND SEWERAGE DEPARTMENT
ENGINEERING DIVISION

SCALE NONE	SHEET 1 OF 1
DATE 12/2018	DWG. No. **G/50**



DETAIL A
OBSERVATION WELL IN PERMEABLE PAVEMENT

DETAIL B
UNDERDRAIN CLEANOUT FOR PERMEABLE PAVEMENT

NOTES:

1. CLEANOUT AND OBSERVATION WELL PIPE MATERIAL SHALL BE SCHD 40 PVC PIPE, HDPE, OR APPROVED EQUAL WITH AN INSIDE DIAMETER OF 4 TO 6 INCHES. DIAMETER OF CLEANOUT AND RISER SHALL MATCH SI□E OF UNDERDRAIN. PERFORATED PIPE IS REQUIRED FOR ALL OBSERVATION WELLS, OR CLEANOUTS USED AS OBSERVATION WELLS.
2. FACTORY ATTACHED BRASS OR HIGH IMPACT PLASTIC HEAD WITH RIBS TO PREVENT ROTATION WHEN REMOVING LOCKABLE CAP.
3. LOCKABLE CAP SHALL BE BRASS AND RATED FOR HS-20 LOADING IN VEHICULAR AREAS, MOUNTED FLUSH TO GRADE. LOCKABLE CAP MAY BE HIGH IMPACT PLASTIC THAT IS UV STABLE IN NON-VEHICULAR LOADING AREA.
4. IN FACILITIES SUB□ECT TO VEHICULAR TRAFFIC, CONCRETE APRONS AROUND CLEANOUTS ARE AN OPTION, AS SHOWN IN DESIGN PLANS.

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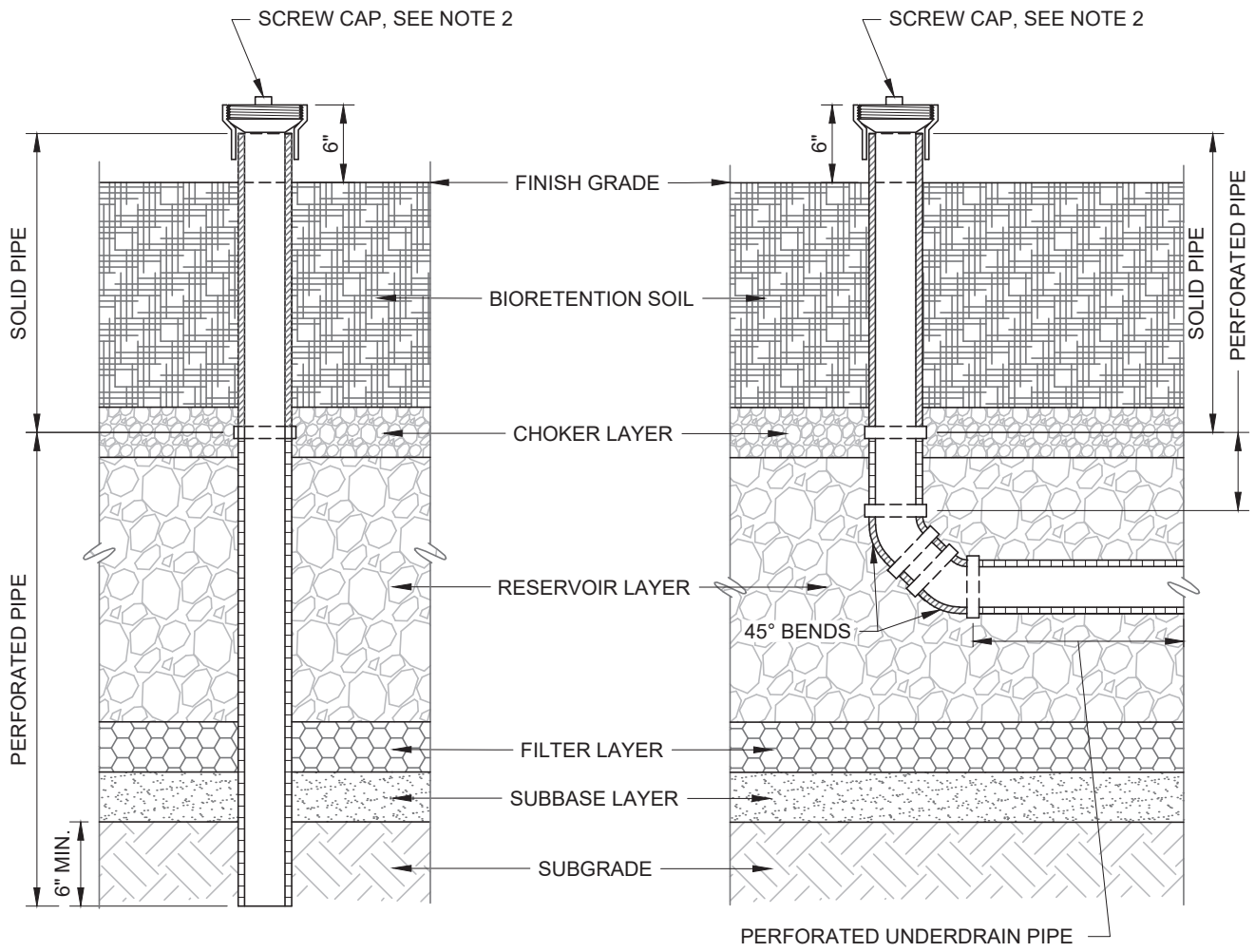
REVISIONS

STORMWATER FACILITY UNDERDRAIN PIPE RISERS IN PERMEABLE PAVEMENTS

CITY OF DETROIT
WATER AND SEWERAGE DEPARTMENT
ENGINEERING DIVISION

SCALE NONE	SHEET 1 OF 1
DATE 12/2018	DWG. No. **G/51**



DETAIL A
OBSERVATION WELL FOR BIORETENTION

DETAIL B
UNDERDRAIN CLEANOUT FOR BIORETENTION

NOTES:

1. CLEANOUT AND OBSERVATION WELL PIPE MATERIAL SHALL BE SCHD 40 PVC PIPE, HDPE, OR APPROVED EQUAL WITH AN INSIDE DIAMETER OF 4 TO 6 INCHES. DIAMETER OF CLEANOUT AND RISER SHALL MATCH SI□E OF UNDERDRAIN. PERFORATED PIPE IS REQUIRED FOR ALL OBSERVATION WELLS, OR CLEANOUTS USED AS OBSERVATION WELLS.
2. CAP ON RISERS IN BIORETENTION FACILITY SHALL BE PVC SCREW IN PLUG.

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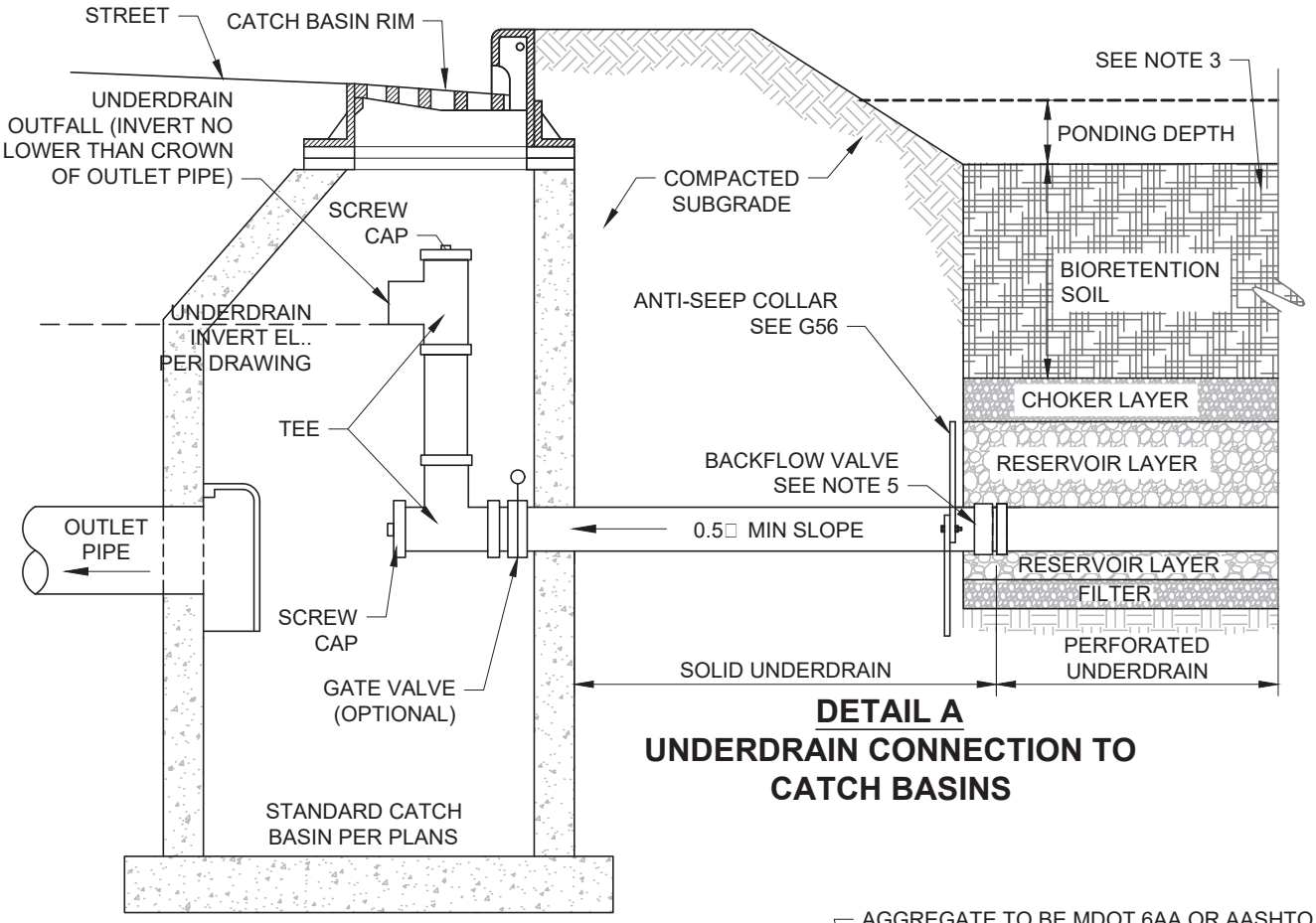
REVISIONS

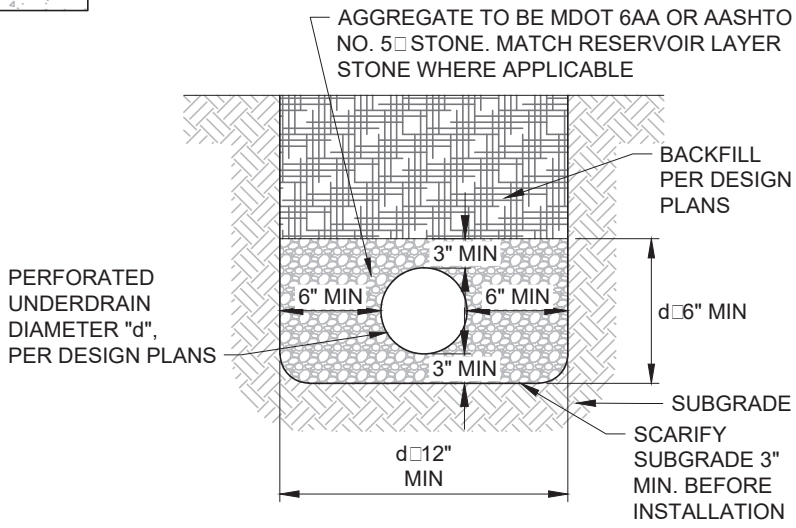
STORMWATER FACILITY UNDERDRAIN PIPE RISERS IN BIORETENTION

CITY OF DETROIT
WATER AND SEWERAGE DEPARTMENT
ENGINEERING DIVISION

SCALE NONE	SHEET 1 OF 1
DATE 12/2018	DWG. No. G/52



DETAIL A
UNDERDRAIN CONNECTION TO CATCH BASINS



DETAIL B
UNDERDRAIN BEDDING

NOTES:

1. CATCH BASIN CONNECTIONS FROM UNDERDRAINS SERVICING PRIVATE PROPERTY ARE PROHIBITED.
2. WHEN STORMWATER FACILITY IS LOCATED MORE THAN 10 FEET FROM CATCH BASIN, PROVIDE ADDITIONAL CLEANOUT OUTSIDE OF STORMWATER FACILITY WITHIN 10 FEET OF CATCH BASIN.
3. STORMWATER FACILITY DEPICTED IS BIORETENTION FACILITY. CONNECTIONS TO CATCH BASIN WILL ALSO APPLY TO PERMEABLE PAVEMENTS AND LINEAR BIORETENTION SYSTEMS WITH UNDERDRAINS.
4. OPTIONAL PVC GATE VALVE OR PVC PIPE CAP TO BE USED TO REGULATE FLOW IN UNDERDRAIN PIPE AS INDICATED IN DESIGN PLANS. VALVE MAY ALSO BE USED IN OVERFLOW RISER AS DIRECTED.
5. WHEN CONNECTING TO A COMBINED SEWER SYSTEM, A BACKFLOW VALVE WITH SERVICE ACCESS EXTENSION IS REQUIRED AT CONNECTION BETWEEN PERFORATED AND NON-PERFORATED PIPE.

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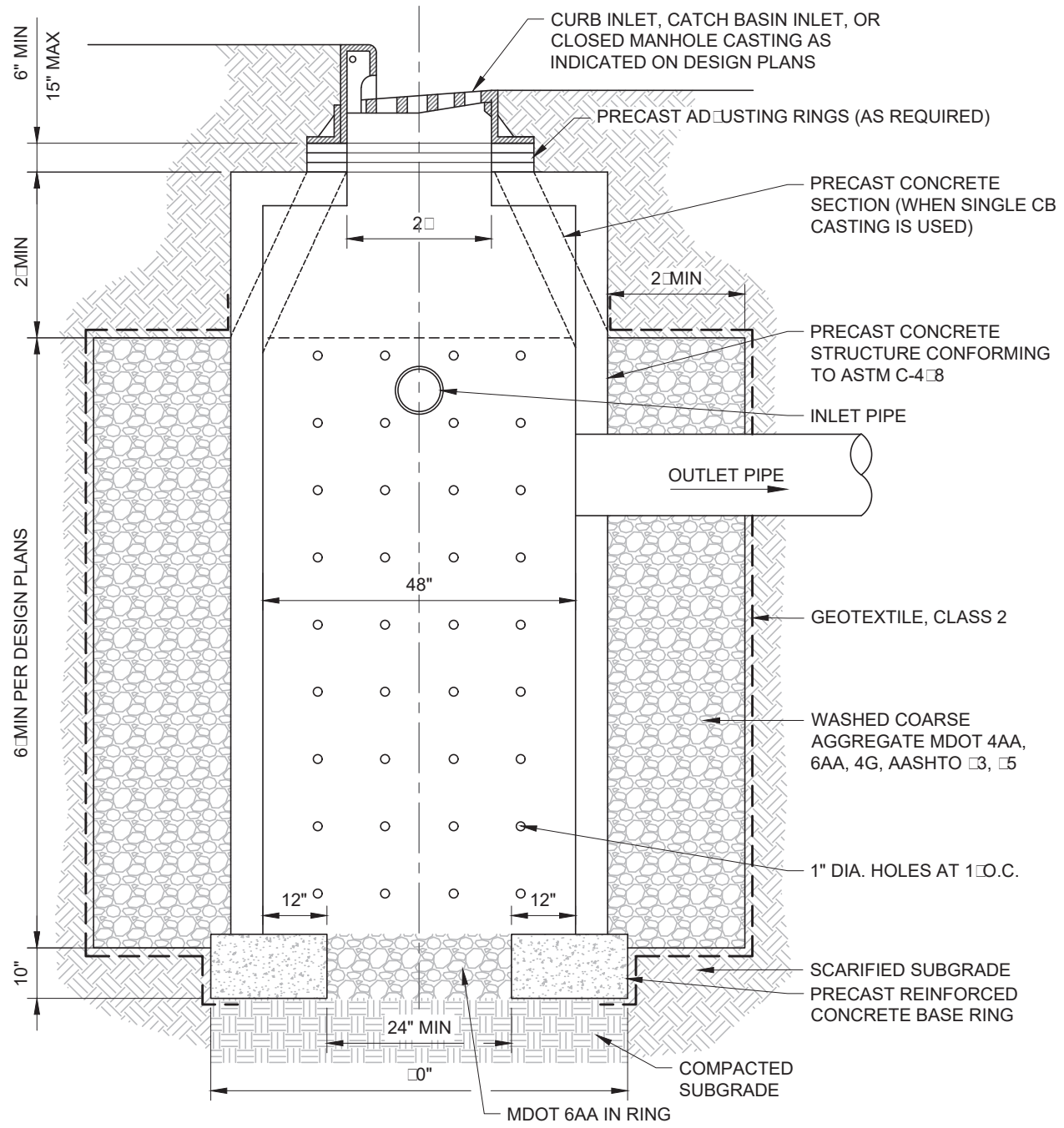
REVISIONS

STORMWATER FACILITY UNDERDRAIN BEDDING AND CATCH BASIN CONNECTION

CITY OF DETROIT
WATER AND SEWERAGE DEPARTMENT
ENGINEERING DIVISION

SCALE NONE	SHEET 1 OF 1
DATE 12/2018	DWG. No. G/53



SECTION

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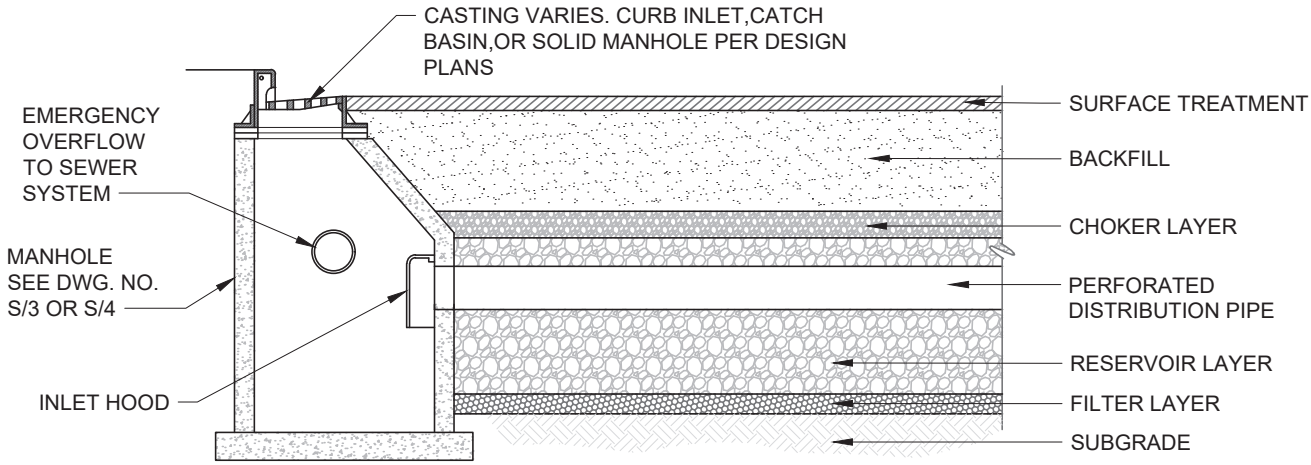
REVISIONS

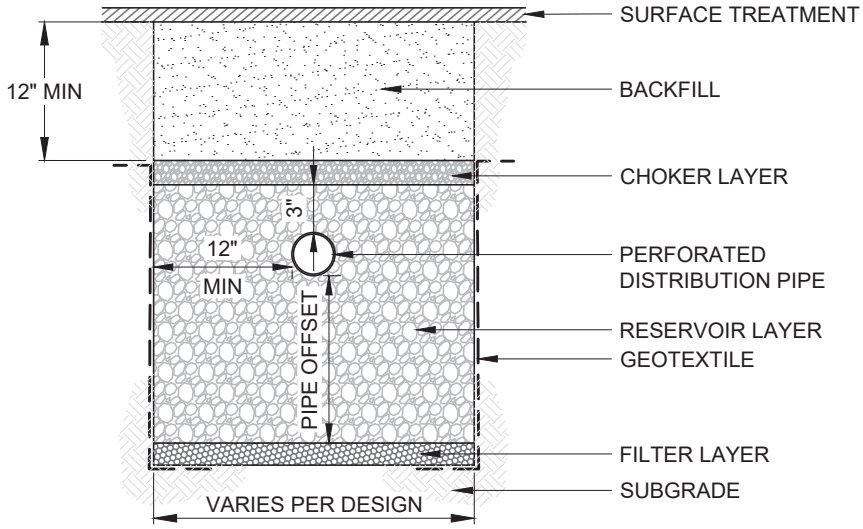
LEACHING BASIN

CITY OF DETROIT
WATER AND SEWERAGE DEPARTMENT
ENGINEERING DIVISION

SCALE NONE	SHEET 1 OF 1
DATE 12/2018	DWG. No. G/54



PROFILE



SECTION

ITEM	MATERIAL	LAYER THICKNESS
SURFACE TREATMENT	PAVEMENT OR VEGETATION AS SPECIFIED ON DESIGN PLANS.	
BACKFILL	BACKFILL MATERIAL AS SPECIFIED ON DESIGN PLANS	
CHOKER LAYER	MDOT 34G, AASHTO #8 OR APPROVED EQUIVALENT.	4 INCH
RESERVOIR LAYER	MDOT 4AA OR 6AA, AASHTO #3, #5 OR #57 OR APPROVED EQUIVALENT.	__ INCH
FILTER LAYER	MDOT 34G, AASHTO #8, OR APPROVED EQUIVALENT.	4 INCH
PERFORATED DISTRIBUTION PIPE	PERFORATED PVC OR HDPE PIPE AS SPECIFIED ON DESIGN PLANS. CLEANOUTS AT 100 FOOT MAX SPACING AND AT ALL TERMINAL ENDS PER DWG. NO. G/51.	__ INCH
PIPE OFFSET	OFFSET DISTANCE PERFORATED PIPE SET ABOVE THE FILTER LAYER. 24" MIN.	__ INCH
GEOTEXTILE	GEOTEXTILE CLASS 2, LOCATED ON SIDES OF FACILITY ONLY.	
SUBGRADE	SCARIFY SUBGRADE TO A MINIMUM DEPTH OF 24 INCHES.	

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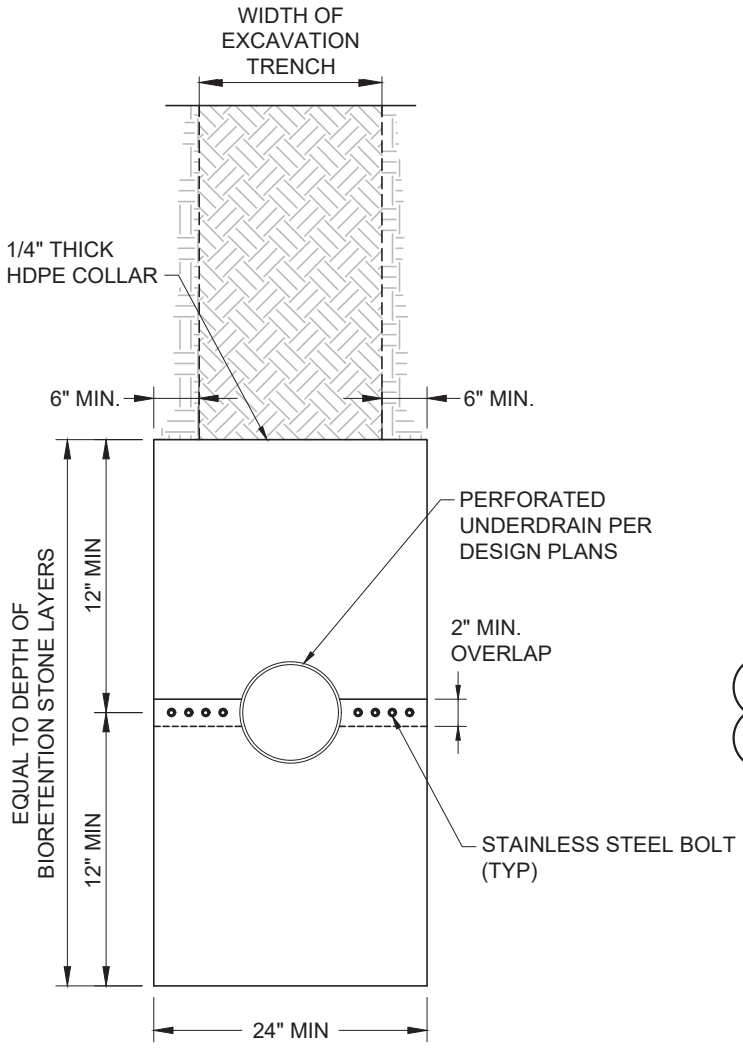
REVISIONS

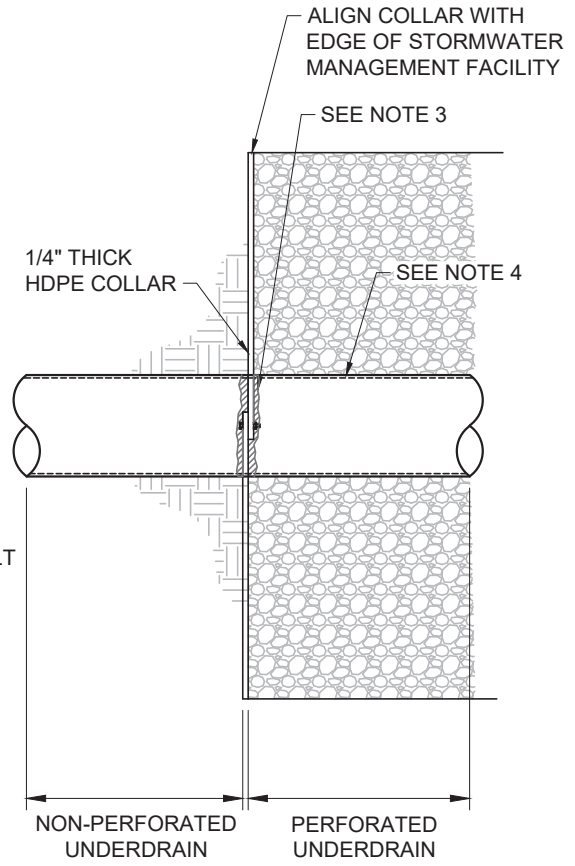
INFILTRATION TRENCH

CITY OF DETROIT
WATER AND SEWERAGE DEPARTMENT
ENGINEERING DIVISION

SCALE NONE	SHEET 1 OF 1
DATE 12/2018	DWG. No. G/55



SECTION
ANTI-SEEP COLLAR



DETAIL A
UNDERDRAIN CONNECTION WITH ANTI-SEEP COLLAR

NOTES:
1. DIMENSION "H" SHALL BE MINIMUM OF 3X THE DIAMETER OF THE INTERSECTION PIPE.
2. COLLAR SHALL BE CONSTRUCTED OF HDPE. BOLTS SHALL BE GRADE 304 STAINLESS STEEL.
3. SEAL SURFACE OF PIPE AND ANTI-SEEP COLLAR WITH NON-SHRINK FLEXIBLE SEALANT THAT WILL ADHERE TO PIPE.
4. PIPE MATERIAL AND SI□ING WILL VARY BY FUNCTION.
5. THE PURPOSE OF THE ANTI-SEEP COLLAR IS TO PREVENT WATER STORED IN THE RESERVOIR LAYER FROM EXITING THE STORMWATER FACILITY THROUGH THE TRENCH BACKFILL AND RE-INFILTRATING INTO THE SEWER MAIN.

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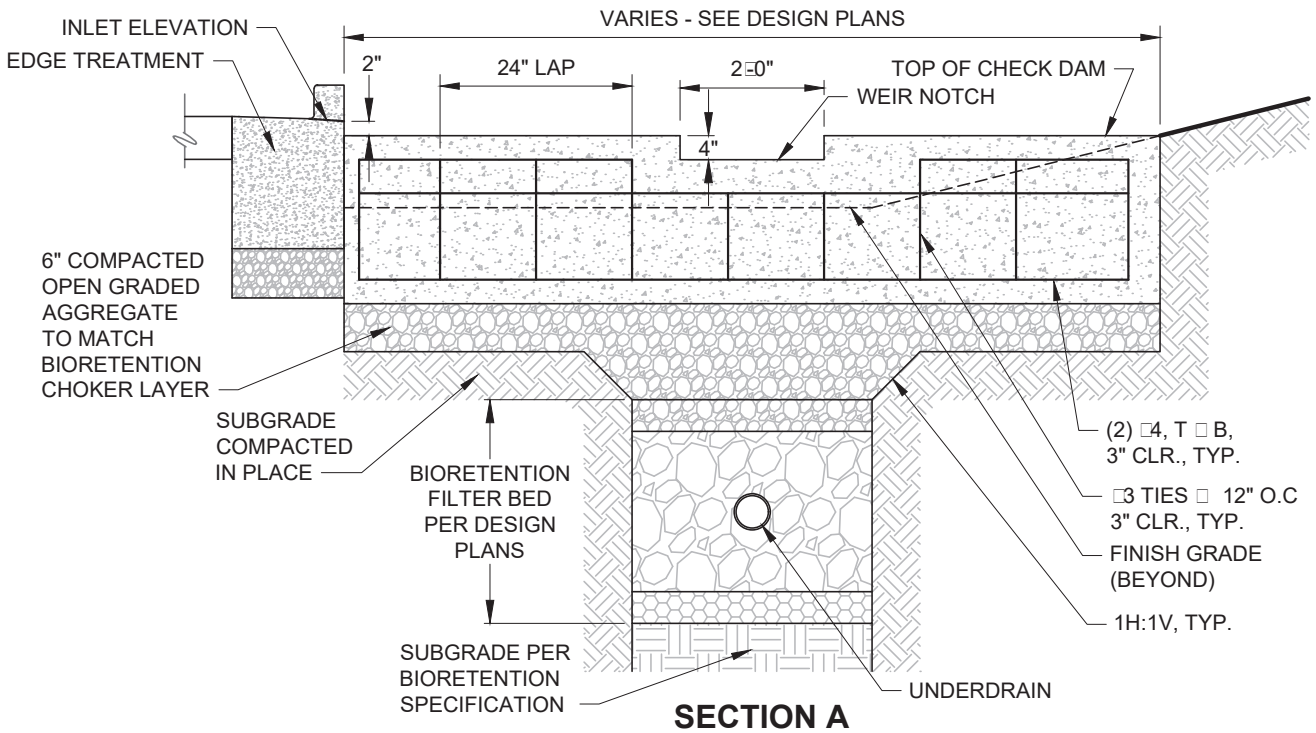
REVISIONS

STORMWATER FACILITY ANTI-SEEP COLLAR

CITY OF DETROIT
WATER AND SEWERAGE DEPARTMENT
ENGINEERING DIVISION

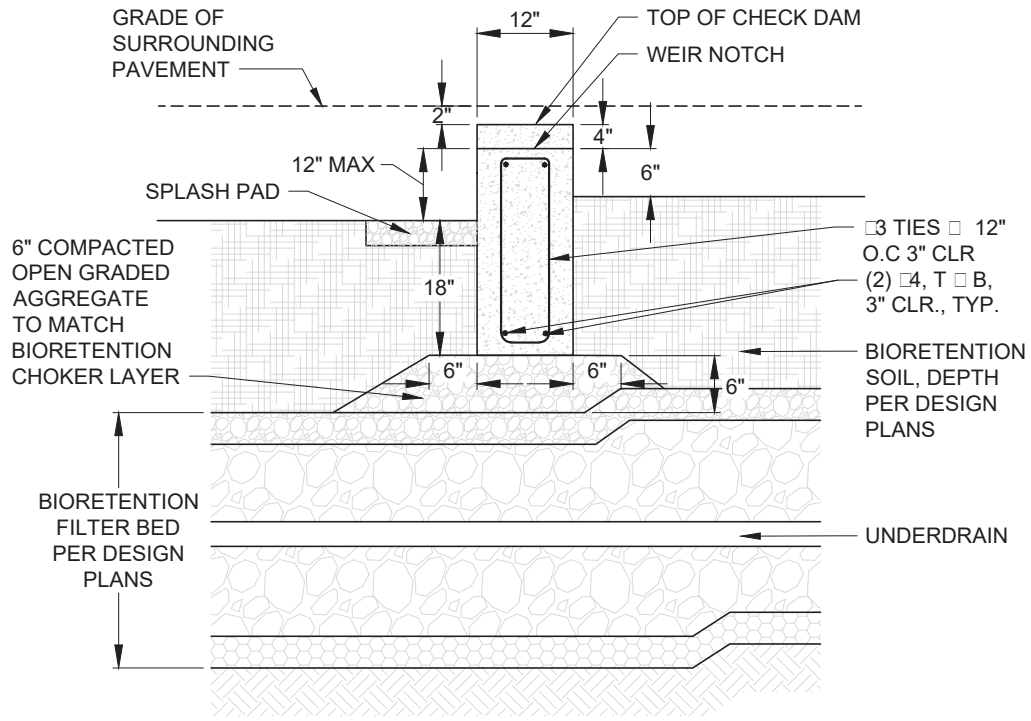
SCALE NONE	SHEET 1 OF 1
DATE 12/2018	DWG. No. G/56



SECTION A

NOTES:

1. THIS CHECK DAM MAY BE USED IN PLANTERS OR CURB BULB-OUTS OR LINEAR BIORETENTION. EDGE CONDITIONS MAY VARY BY DESIGN.
2. CONCRETE SHALL BE 4000 PSI MINIMUM. CONCRETE IS TO BE AIR ENTRAINED 6□ □/- 1□ . PRECAST OR CAST IN PLACE AS SPECIFIED IN DESIGN PLANS.
3. LOCATIONS, HEIGHTS, AND WIDTHS OF CHECK DAMS TO BE SPECIFIED IN THE DESIGN PLANS.
4. CONCRETE CHECK DAM SHALL BE CONTINUOUS (NO □OINTS).
5. PROTECT OPEN GRADED AGGREGATES FROM CONTAMINATION DURING CHECK DAM CONSTRUCTION.
6. TOP OF CHECK DAM AND WEIR SHALL BE LEVEL SUCH THAT WATER SPILLS EVENLY OVERTOP OF STRUCTURE.



SECTION B

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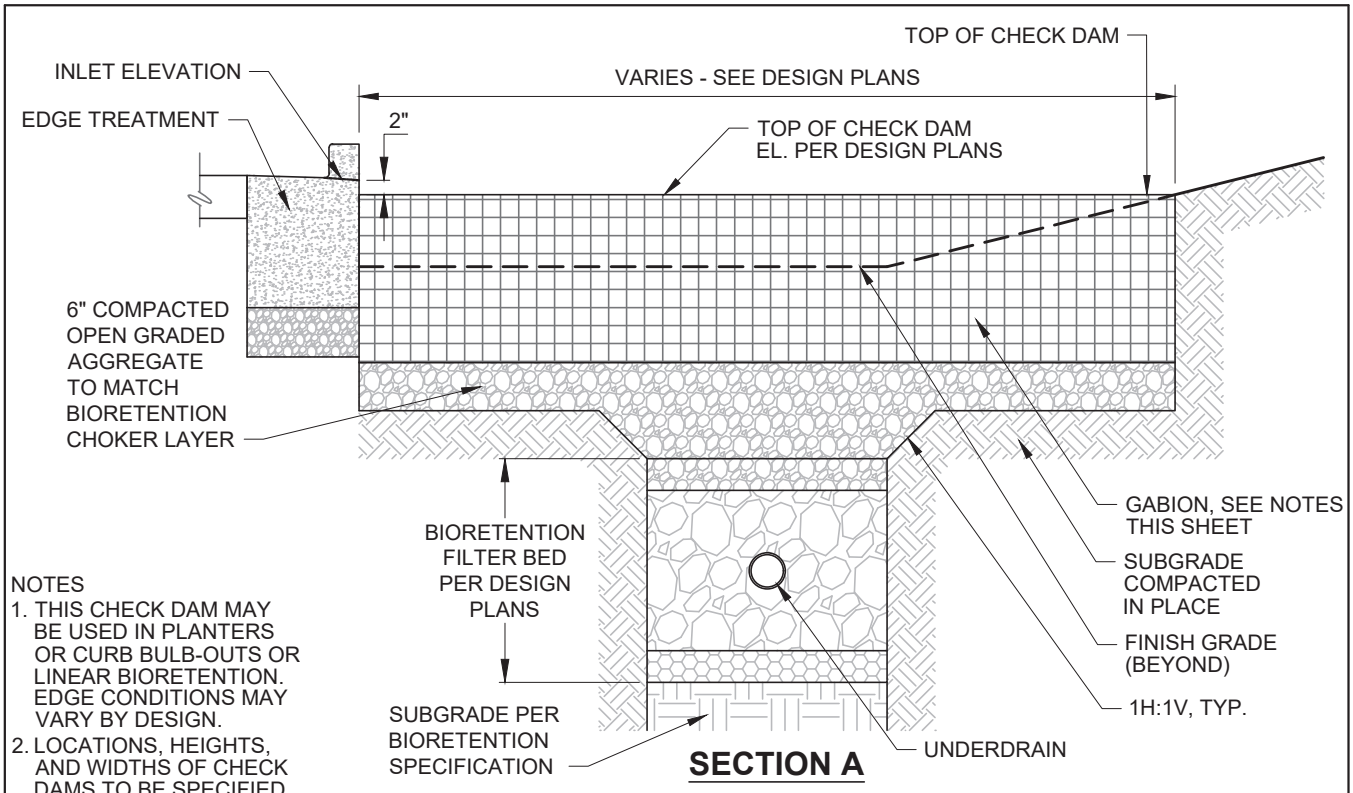
REVISIONS

CONCRETE CHECK DAM

CITY OF DETROIT
WATER AND SEWERAGE DEPARTMENT
ENGINEERING DIVISION

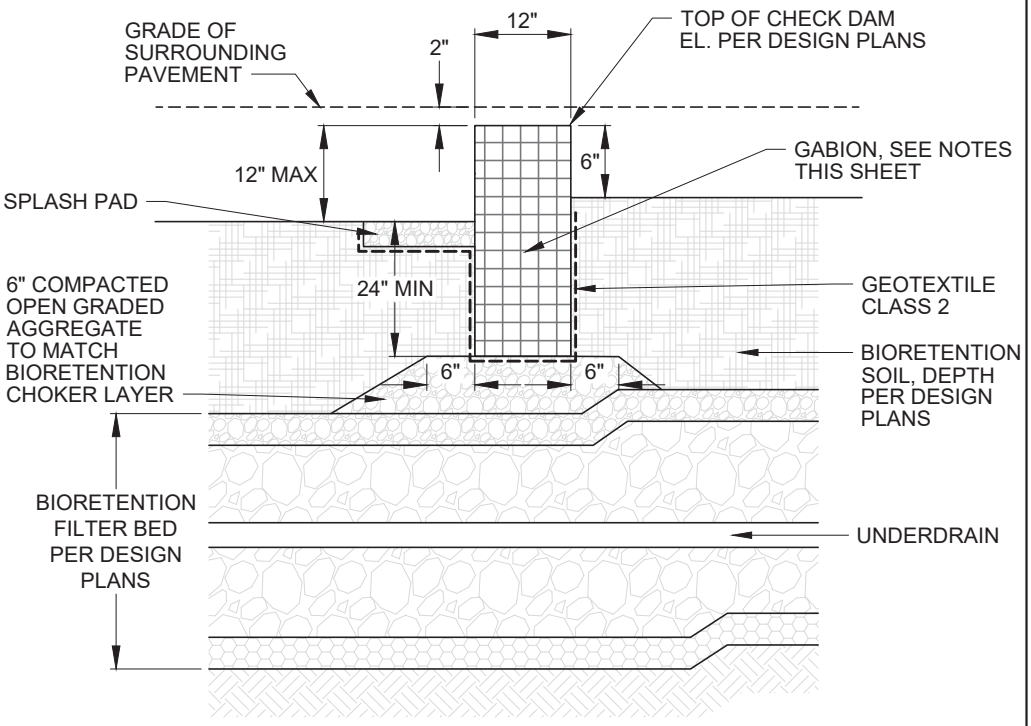
SCALE NONE	SHEET 1 OF 1
DATE 12/2018	DWG. No. G/60



SECTION A

NOTES

1. THIS CHECK DAM MAY BE USED IN PLANTERS OR CURB BULB-OUTS OR LINEAR BIORETENTION. EDGE CONDITIONS MAY VARY BY DESIGN.
2. LOCATIONS, HEIGHTS, AND WIDTHS OF CHECK DAMS TO BE SPECIFIED IN THE DESIGN PLANS.
3. GABIONS SHALL BE CONSTRUCTED OF RIGID, 4 GAUGE, GALVANI□ED AFTER WELL, WELDED WIRE MESH WITH 3" X 3" GRID SPACING. GABION SI□ES SHALL BE SPECIFIED ON DESIGN PLANS.
4. GABION INFILL MATERIALS SHALL BE SPECIFIED BY DESIGN PLANS. RIVER COBBLE, SALVAGED CONCRETE, CUT STONES, BRICK, OR APPROVED EQUAL.
5. TOP OF CHECK DAM AND WEIR SHALL BE LEVEL..
6. SECURELY ATTACH AD□ACENT GABIONS WITH GALVANI□ED HOG RINGS.



SECTION B

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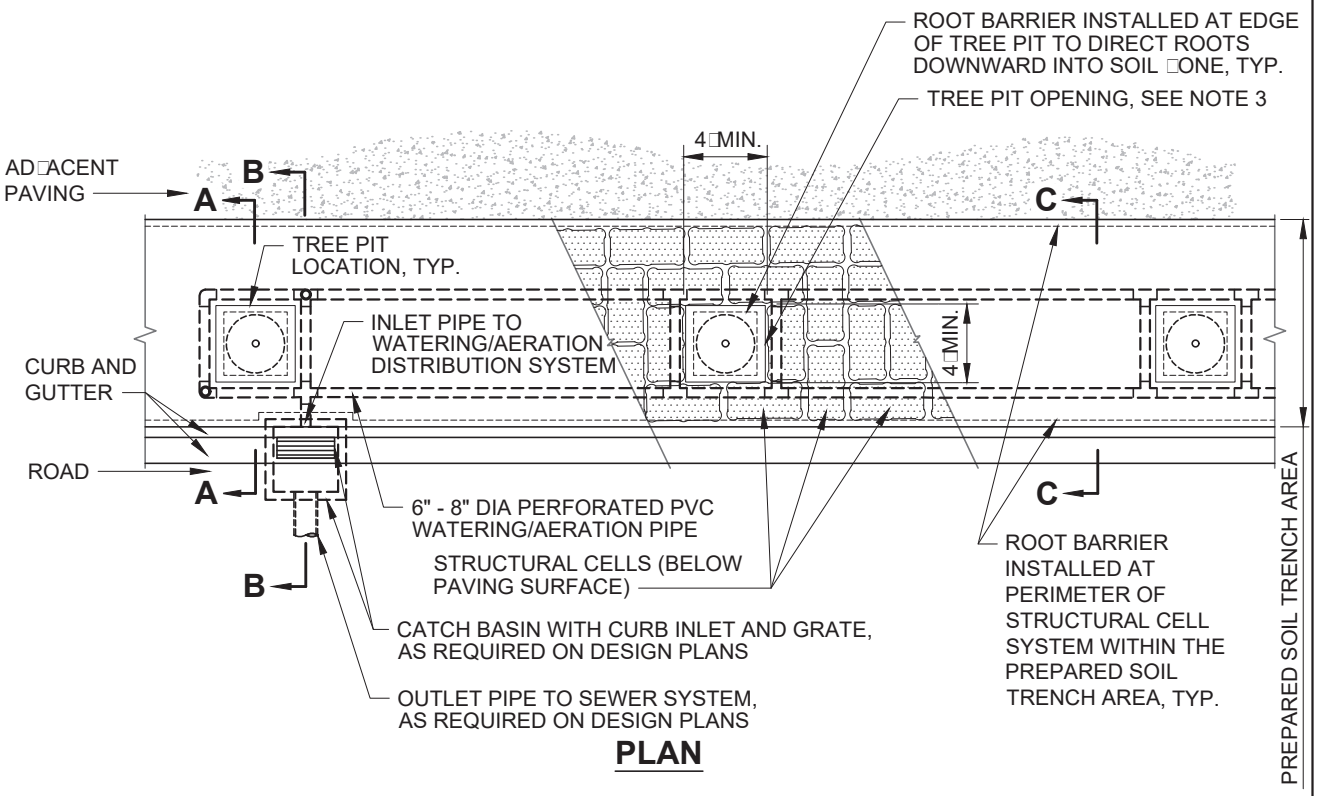
REVISIONS

GABION CHECK DAM

CITY OF DETROIT
WATER AND SEWERAGE DEPARTMENT
ENGINEERING DIVISION

SCALE NONE	SHEET 1 OF 1
DATE 12/2018	DWG. No. G/62



PLAN

NOTES:

1. STRUCTURAL CELLS ARE A MODULAR PAVEMENT SUPPORT SYSTEM TO ALLOW FOR THE GROWTH OF THE TREE ROOTS INTO UNCOMPACTED SOILS.
2. STRUCTURAL CELLS WILL TYPICALLY BE USED TO LINK MULTIPLE TREE PITS TOGETHER.
3. MAINTAIN A 4□X 4□MINIMUM CLEAR OPENING IN STRUCTURAL CELL PLACEMENT AT EACH TREE PIT PLANTING LOCATION, WITHIN THE PREPARED SOIL TRENCH AREA,TYP.
4. INSTALL STRUCTURAL CELLS PER MANUFACTURER SPECIFICATIONS.
5. STORMWATER MANAGEMENT REQUIREMENTS SHALL BE DESIGNED AND SI□ED BY A PROFESSIONAL ENGINEER LICENSED IN THE STATE OF MICHIGAN.
6. SEE TABLE ON DWG. NO. G/65 (3 OF 5) FOR MORE INFORMATION.

RECOMMENDED SOIL VOLUMES:

SMALL TREE (□35□MATURE HEIGHT): 600 CF

MEDIUM TREE (35-50□MATURE HEIGHT): 1000 CF

LARGE TREE (□50□HEIGHT): 1500 CF

NOTE: UP TO 25□ OF THE REQUIRED SOIL VOLUME PER TREE CAN BE SHARED BETWEEN AD□ACENT TREES.

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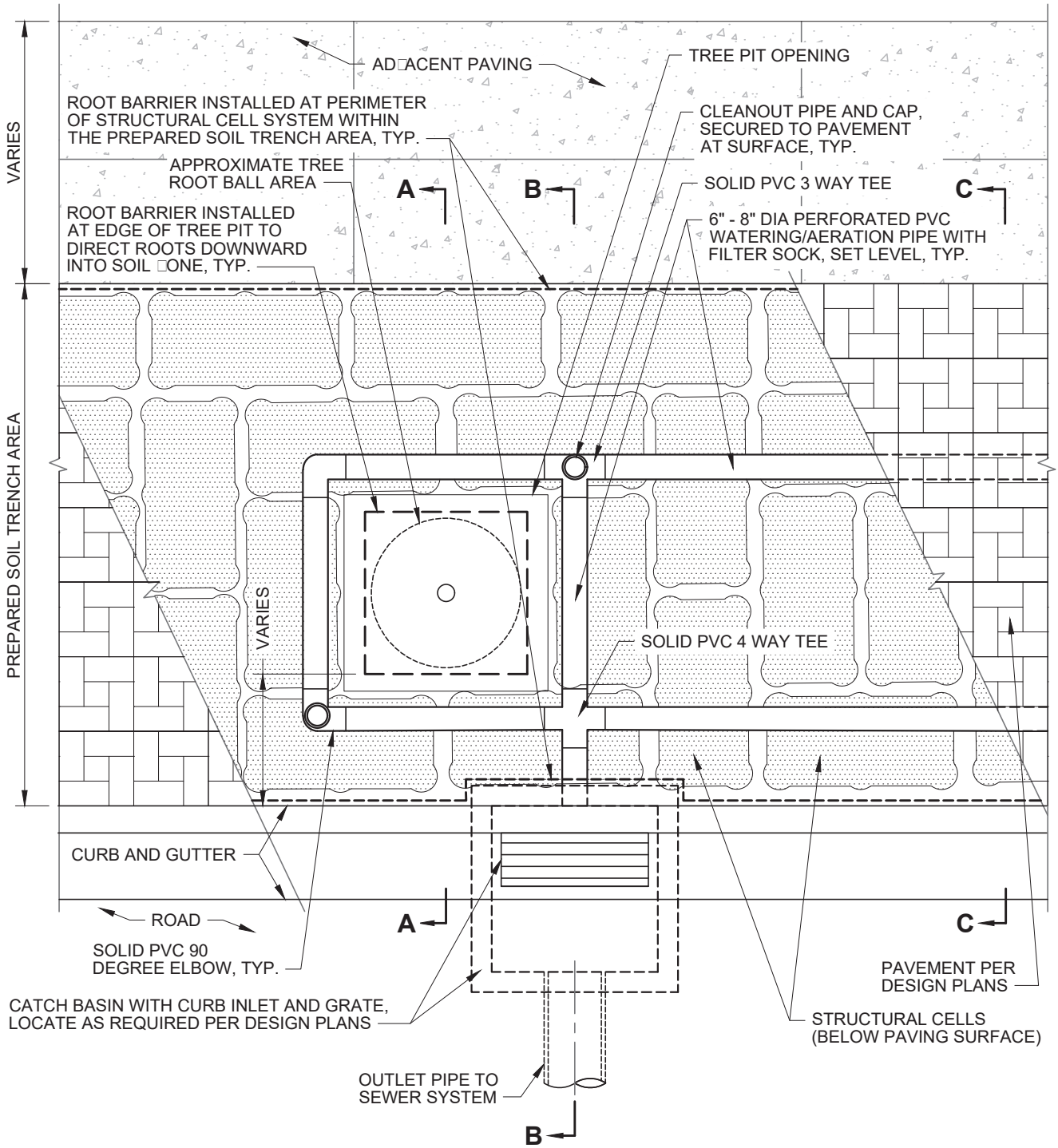
REVISIONS

STRUCTURAL CELLS FOR URBAN TREE PLANTING (1 OF 5)

CITY OF DETROIT
WATER AND SEWERAGE DEPARTMENT
ENGINEERING DIVISION

SCALE NONE	SHEET 1 OF 5
DATE 12/2018	DWG. No. G/65



PLAN

NOTES:
1. INSTALL STRUCTURAL CELLS PER MANUFACTURER SPECIFICATIONS.
2. SEE TABLE ON DWG. NO. G/65 (3 OF 5) FOR MORE INFORMATION.

REV	DESCRIPTION	DATE
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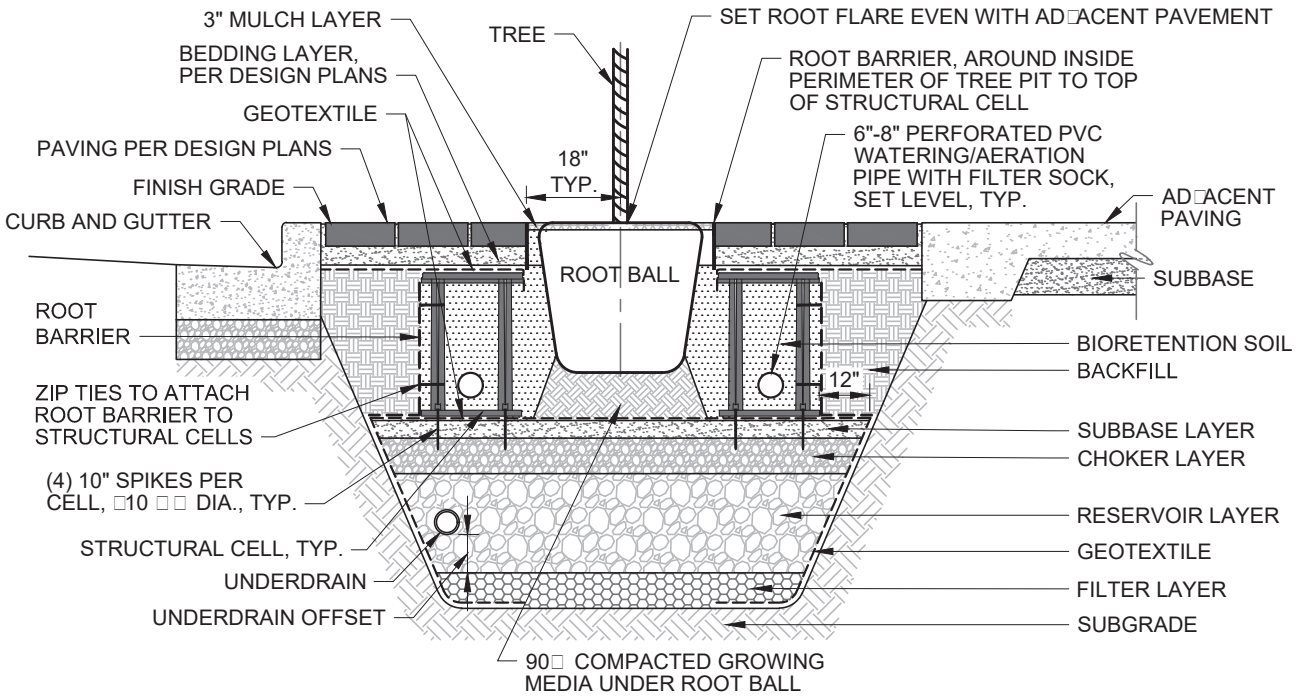
REVISIONS

STRUCTURAL CELLS FOR URBAN TREE PLANTING (2 OF 5)

CITY OF DETROIT
WATER AND SEWERAGE DEPARTMENT
ENGINEERING DIVISION

SCALE NONE	SHEET 2 OF 5
DATE 12/2018	DWG. No. G/65



SECTION A-A

NOTE: SEE DWG NO. G/65 (1 OF 5) FOR SECTION LOCATION.

ITEM	MATERIAL	LAYER THICKNESS
PAVEMENT	PAVING PER DESIGN PLANS.	3 INCH MIN.
BEDDING LAYER	AS SPECIFIED PER DESIGN PLANS.	__ INCH
BIORETENTION SOIL IN STRUCTURAL CELLS	BIORETENTION SOIL MIX IN STRUCTURAL CELLS, INSTALLED PER MANUFACTURER SPECIFICATIONS. STRUCTURAL CELLS MAY BE STACKED ON TOP OF EACH OTHER IN 1, 2 OR 3 LAYERS, PER DESIGN PLANS.	__ INCH
WATERING/AERATION DISTRIBUTION SYSTEM	PERFORATED PVC PIPE WITH FILTER FILTER SOCK. CLEANOUTS PER DESIGN PLANS. SOLID PVC CLEANOUT WITH IRON OR STAINLESS STEEL ADA COMPLIANT SLOTTED OR PERFORATED GRATE CAP WITH REMOVABLE BOLTS OR SCREWS.	6-8 INCH
BACKFILL MATERIAL	COMPACTED MDOT GRANULAR MATERIAL CLASS II.	
GEOTEXTILE	GEOTEXTILE CLASS 2, LOCATED ON SIDES OF FACILITY. GEOTEXTILE REQUIRED ON TOP AND BELOW SOIL CELL SYSTEM.	
ROOT BARRIER	ROOT BARRIER INSTALLED AT PERIMETER OF STRUCTURAL CELL SYSTEM WITHIN THE PREPARED SOIL TRENCH AREA AND AT EDGE OF TREE PITS. ROOT BARRIERS TO BE MADE OF PLASTIC WITH VERTICAL RIBS TO DIRECT ROOTS DOWNWARD. ROOT BARRIERS SHALL BE SOURCED FROM THE SAME SUPPLIER AS THE STRUCTURAL CELL SYSTEM. INSTALL PER MANUFACTURER'S INSTRUCTIONS.	
SUBBASE LAYER	MDOT CLASS 2.	4 INCH
*CHOKER LAYER	MDOT 6AA, OR AASHTO #57, OR APPROVED EQUIVALENT.	4 INCH
*RESERVOIR LAYER	MDOT 4AA OR 6AA, OR AASHTO #3, #5, #57 OR APPROVED EQUIVALENT.	__INCH
*UNDERDRAIN	PERFORATED HDPE UNDERDRAIN WHEN CALLED FOR PER DESIGN PLANS. CLEANOUT AT TERMINAL ENDS, SEE DWG NO. G/51. PIPE BEDDING AND CATCH BASIN CONNECTION, SEE DWG NO. G/52.	6-8 INCH
*UNDERDRAIN OFFSET	OFFSET DISTANCE UNDERDRAIN SET ABOVE THE FILTER LAYER.	__ INCH
*FILTER LAYER	MDOT 34G, OR AASHTO #8, OR APPROVED EQUIVALENT.	__ INCH
*SUBGRADE	REFER TO SPECIFICATION FOR SUBGRADE PREPARATION. FOR SOFT SOILS, INSTALL GEOGRID PER GEOTECHNICAL ENGINEER RECOMMENDATIONS.	

□NOTE: OPTIONAL ITEMS, TO BE INSTALLED AS REQUIRED PER DESIGN PLANS.

REV	DESCRIPTION	DATE
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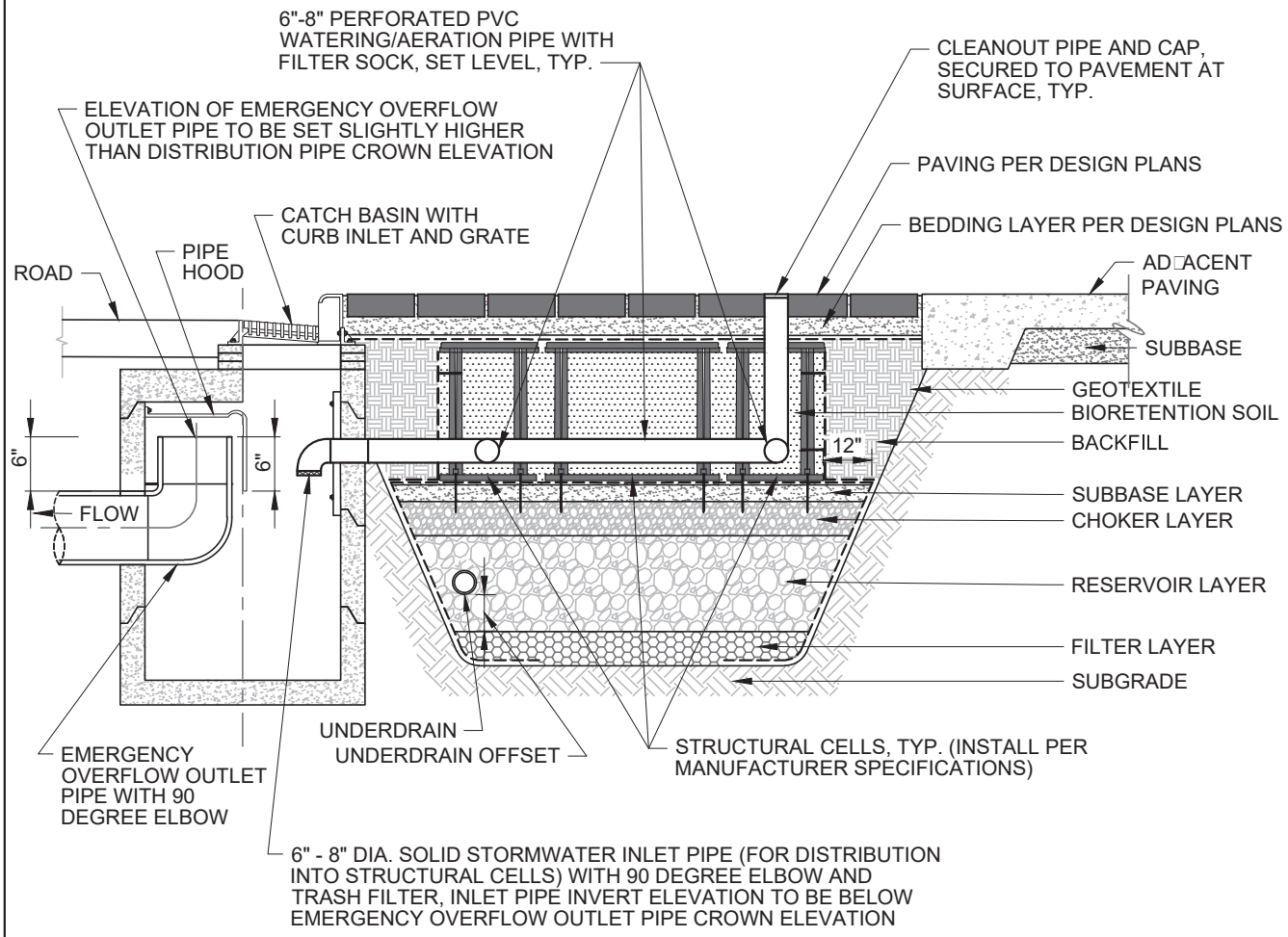
REVISIONS

STRUCTURAL CELLS FOR URBAN TREE PLANTING (3 OF 5)

CITY OF DETROIT
WATER AND SEWERAGE DEPARTMENT
ENGINEERING DIVISION

SCALE NONE	SHEET 3 OF 5
DATE 12/2018	DWG. No. G/65



SECTION B-B

NOTES:

1. SEE DWG NO. G/65 (1 OF 5) FOR SECTION LOCATION.
2. SEE TABLE ON DWG. NO. G/65 (3 OF 5) FOR MORE INFORMATION.

REV	DESCRIPTION	DATE
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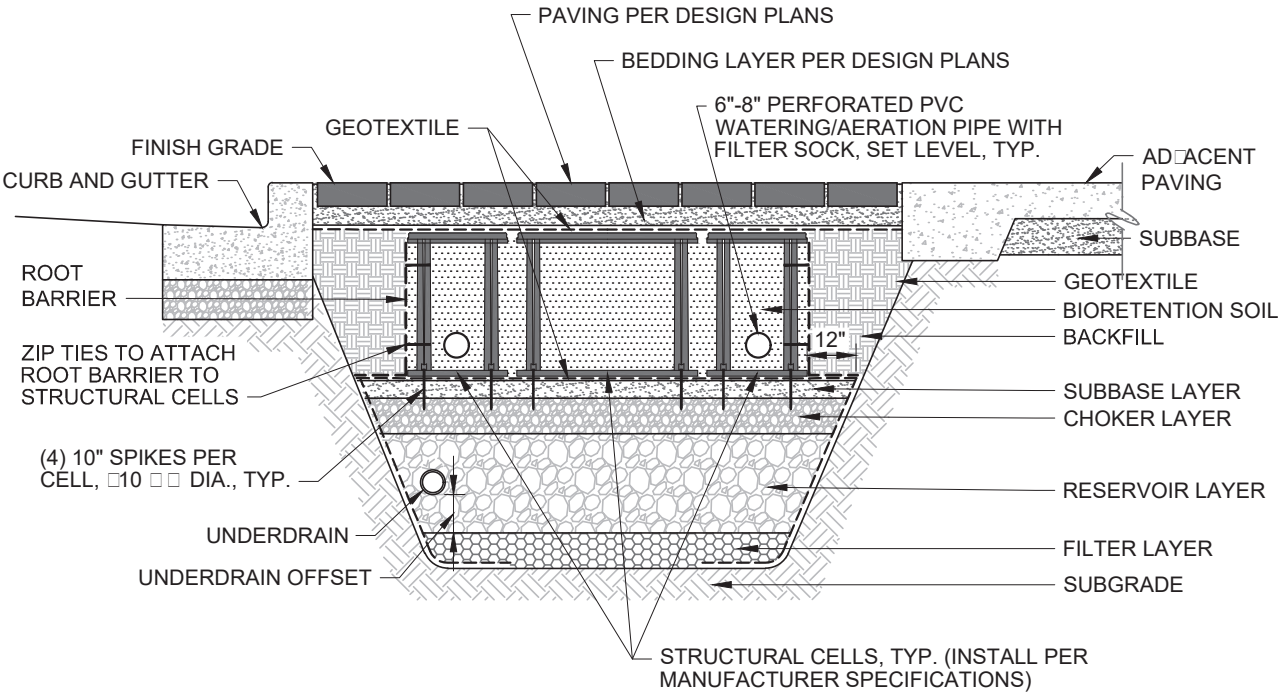
REVISIONS

STRUCTURAL CELLS FOR URBAN TREE PLANTING (4 OF 5)

CITY OF DETROIT
WATER AND SEWERAGE DEPARTMENT
ENGINEERING DIVISION

SCALE NONE	SHEET 4 OF 5
DATE 12/2018	DWG. No. G/65



SECTION C-C

NOTES:

1. SEE DWG NO. G/65 (1 OF 5) FOR SECTION LOCATION.
2. SEE TABLE ON DWG. NO. G/65 (3 OF 5) FOR MORE INFORMATION.

REV	DESCRIPTION	DATE
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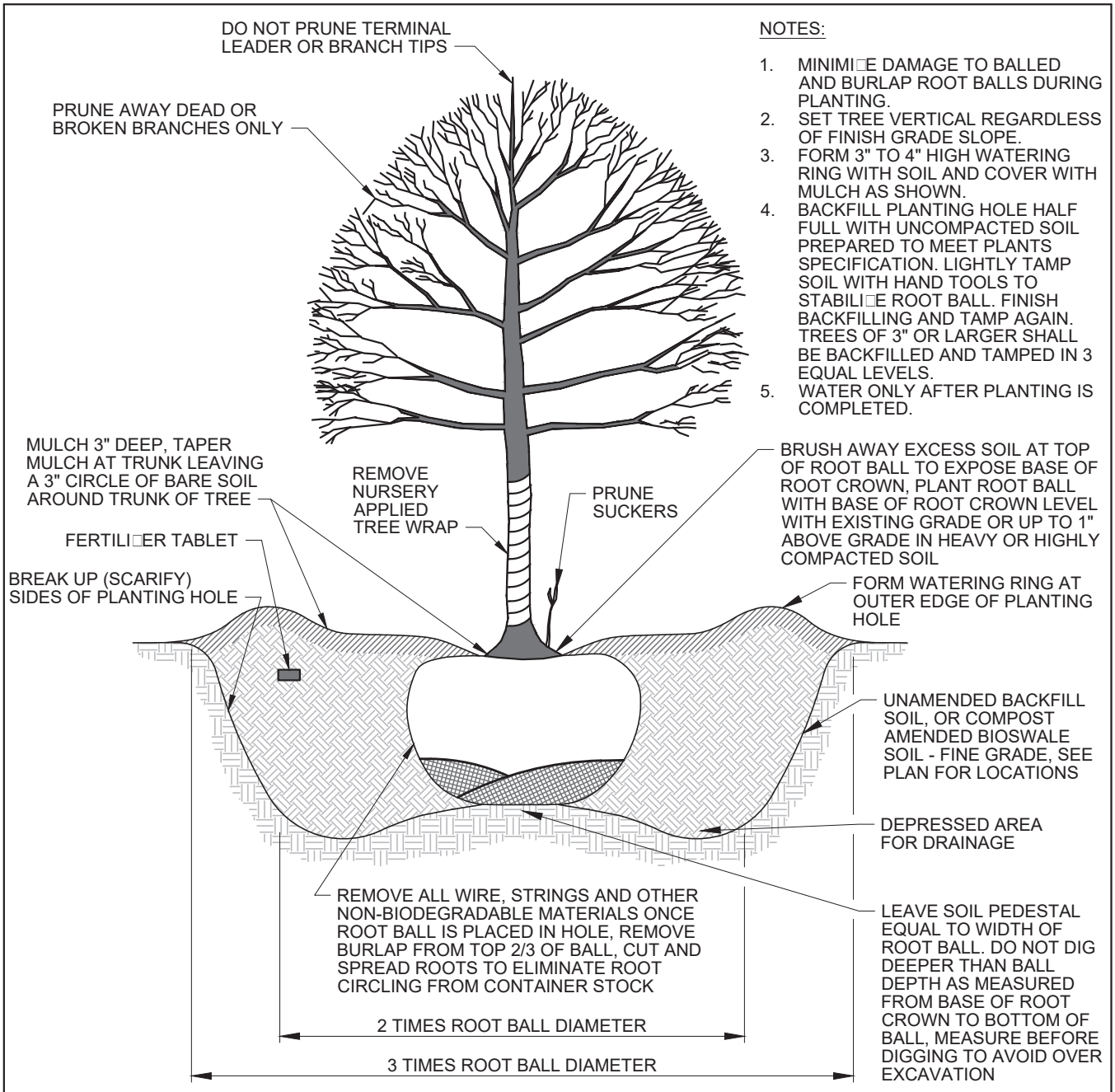
REVISIONS

STRUCTURAL CELLS FOR URBAN TREE PLANTING (5 OF 5)

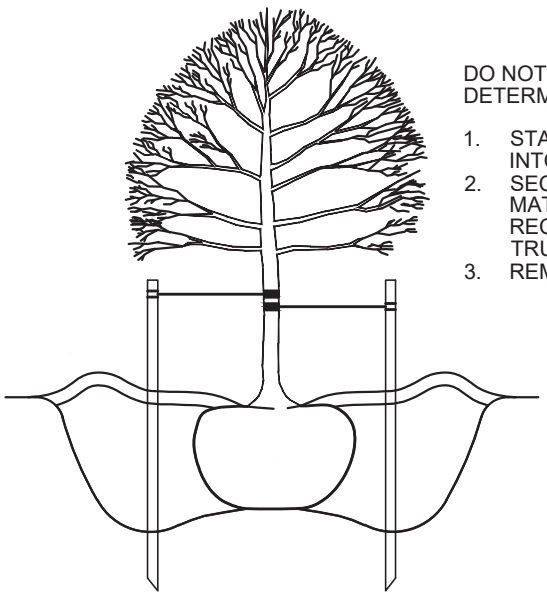
CITY OF DETROIT
WATER AND SEWERAGE DEPARTMENT
ENGINEERING DIVISION

SCALE NONE	SHEET 5 OF 5
DATE 12/2018	DWG. No. G/65



NOTES:

1. MINIMIZE DAMAGE TO BALLED AND BURLAP ROOT BALLS DURING PLANTING.
2. SET TREE VERTICAL REGARDLESS OF FINISH GRADE SLOPE.
3. FORM 3" TO 4" HIGH WATERING RING WITH SOIL AND COVER WITH MULCH AS SHOWN.
4. BACKFILL PLANTING HOLE HALF FULL WITH UNCOMPACTED SOIL PREPARED TO MEET PLANTS SPECIFICATION. LIGHTLY TAMP SOIL WITH HAND TOOLS TO STABILIZE ROOT BALL. FINISH BACKFILLING AND TAMP AGAIN. TREES OF 3" OR LARGER SHALL BE BACKFILLED AND TAMPED IN 3 EQUAL LEVELS.
5. WATER ONLY AFTER PLANTING IS COMPLETED.



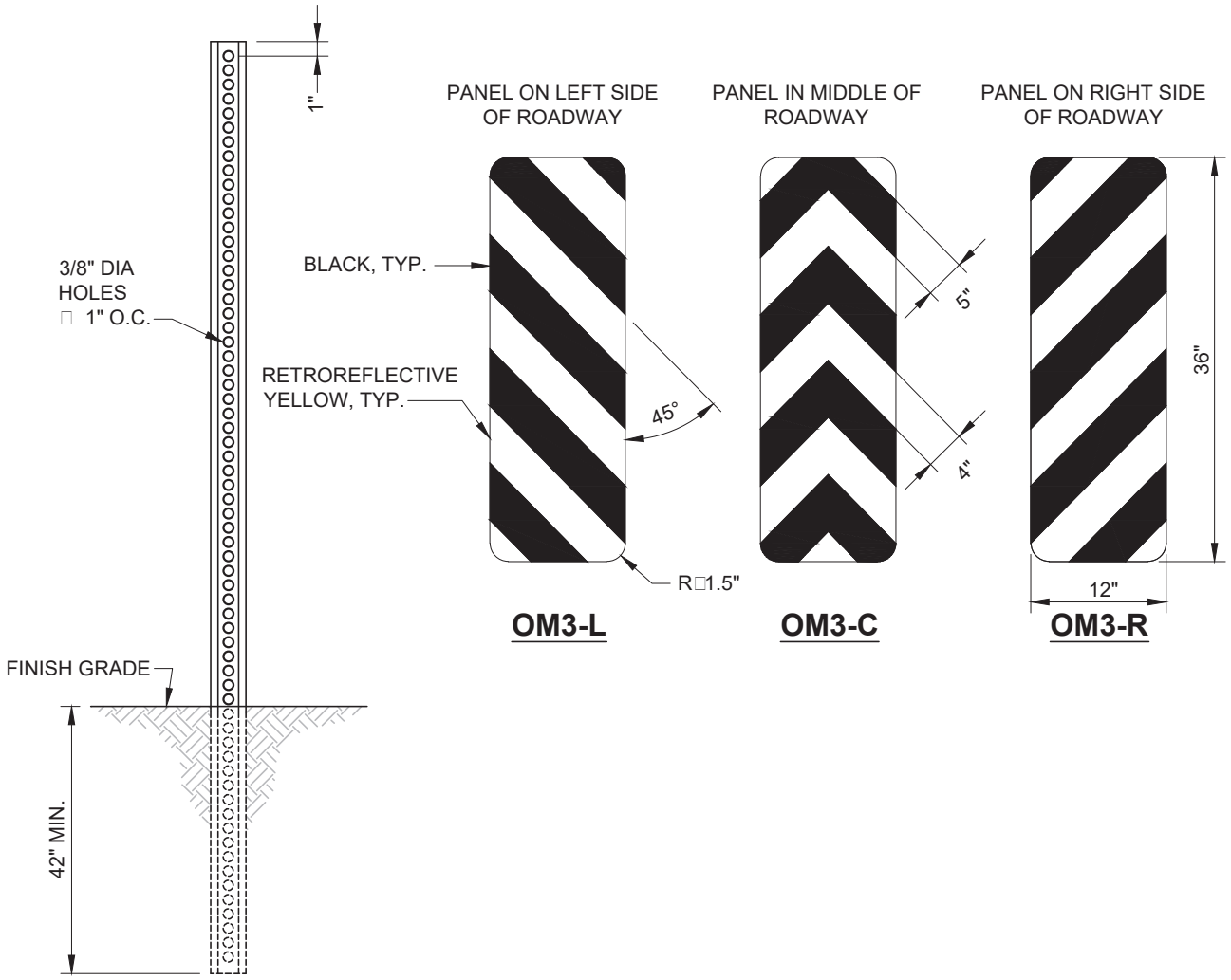
DO NOT STAKE UNLESS IN HEAVY CLAY SOILS OR WINDY CONDITIONS ARE DETERMINED BY LANDSCAPE ARCHITECT. IF STAKING IS REQUIRED:

1. STAKE WITH 2"X2" HARDWOOD STAKES OR APPROVED METAL POST DRIVEN INTO SOIL OUTSIDE OF ROOT BALL, (3) PER TREE.
2. SECURE TO TREE USING 1" "CHAINLOCK" OR ENGINEER APPROVED TREE TIE MATERIAL. SECURE TREE TIE MATERIAL TO STAKE PER MANUFACTURER'S RECOMMENDATIONS. LOOP TIE AROUND TREE TO PROVIDE 1" SLACK FOR TRUNK GROWTH.
3. REMOVE ALL STAKING MATERIAL AFTER (1) YEAR.

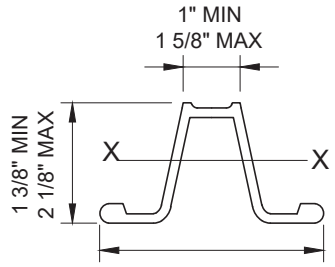
TREE PLANTING

CITY OF DETROIT
WATER AND SEWERAGE DEPARTMENT
ENGINEERING DIVISION

SCALE	1 OF 1
NONE	SHEET
DATE 12/2018	G/70 DWG. No.



ELEVATION



SECTION

3 LBS STEEL POST

WEIGHT □3 LBS/FT MIN.
SECTION MODULES X-X □0.31 IN 3 MIN

NOTES:

1. THE ALTERNATING BLACK AN RETROREFLECTIVE YELLOW STRIPES (OM3-L, OM3-R) SHALL BE SLOPED DOWN AT AN ANGLE OF 45 DEGREES TOWARD THE SIDE WHICH TRAFFIC IS TO PASS THE OBSTRUCTION. IF TRAFFIC CAN PASS TO EITHER SIDE OF THE OBSTRUCTION, THE ALTERNATING BLACK AND RETROREFLECTIVE YELLOW STRIPES (OM3-C) SHALL FORM CHEVRONS THAT POINT UPWARDS.
2. THE MINIMUM MOUNTING HEIGHT MEASURED FROM THE BOTTOM OF THE OB□ECT MARKER TO THE ELEVATION OF THE NEAR EDGE OF THE TRAVELED WAY, SHALL BE 4 FEET.
3. LOCATE IN ALL STORMWATER FACILITIES THAT PROTRUDE INTO THE ROADWAY, SUCH AS BIORETENTION BULB-OUTS. LOCATE 24" INSIDE CURB AT LOCATION SHOWN ON THE DESIGN PLANS.

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REVISIONS

OBJECT MARKER FOR OBSTRUCTION WITHIN ROADWAY

CITY OF DETROIT
WATER AND SEWERAGE DEPARTMENT
ENGINEERING DIVISION

SCALE NONE	SHEET 1 OF 1
DATE 12/2018	DWG. No. G/73