

NOTES FOR THE DESIGNER

1. ADDITIONAL DESIGN GUIDANCE PROVIDED IN BIORETENTION TECHNICAL SPECIFICATIONS DOCUMENT.
2. CAPTURE AND CONVEY OVERFLOW TO STORM DRAIN SYSTEM, DETAIL 140 OR BROOKS STYLE GRATED CURB VALVE BOX OR CATCH BASIN. ALTERNATIVELY, CONVEY OVERFLOW TO APPROVED DISCHARGE LOCATION THROUGH OTHER OVERLAND METHODS (IE. CURB CUTS, SIDEWALK UNDERDRAIN, WEIR, ETC.).
3. PROVIDE SPOT ELEVATIONS AT INLETS ON CIVIL PLANS (FE,OE, GIE, SIE), PER DETAIL 120.
4. SITE CONDITIONS WILL VARY FOR NEW AND RETROFIT PROJECTS. CURB, GUTTER, AND SIDEWALK DETAILS TO BE MODIFIED FOR PROJECT BY CIVIL AND GEOTECHNICAL ENGINEERS.
5. PROVIDE MONITORING WELL IN EACH FACILITY, PER BIORETENTION TECHNICAL SPECIFICATIONS.
6. ON LONGITUDINAL SLOPE, USE CHECK DAMS (DETAILS 130-131)
7. USE AND DEPTH OF AGGREGATE DETERMINED BY FACILITY SIZING. IF CALTRANS CLASS 2 PERMEABLE IS NOT AVAILABLE, SUBSTITUTE CLASS 3 PERMEABLE WITH AN OVERLYING 3" DEEP CHOKING LAYER OF EITHER CALTRANS COURSE AGGREGATE 1/2" (NO. 4) OR 3/4" X (NO.4) OPEN-GRADED AGGREGATE.
8. BIORETENTION SOIL MEDIA (BSM) SPECIFICATION PER BIORETENTION TECHNICAL SPECIFICATIONS.
9. PLANT SELECTION PER BIORETENTION TECHNICAL SPECIFICATIONS.
10. MULCH PER BIORETENTION TECHNICAL SPECIFICATIONS.
11. LOCATE ENERGY DISSIPATION AS SPECIFIED IN INLET DETAILS, (120-123) - AVOID DECORATIVE USE.

CONSTRUCTION NOTES

1. MAINTAIN UNDISTURBED NATIVE SOIL BENCH TO SUPPORT ADJACENT SIDEWALK/ROAD. SEQUENCE WORK TO CONSTRUCT CURBS BEFORE EXCAVATING BIORETENTION AREA FOR AGGREGATE AND SOIL.
2. SCARIFY SUBGRADE BEFORE INSTALLING BIORETENTION AREA AGGREGATE AND BSM.
3. FACILITY EXCAVATION TO ALLOW FOR SPECIFIED AGGREGATE, SOIL, AND MULCH DEPTHS TO ACHIEVE FINISHED ELEVATIONS ON CIVIL PLANS.
4. INSTALL UNDERDRAIN WITH HOLES FACING DOWN. TOP OF UNDERDRAIN 6" BELOW TOP OF AGGREGATE LAYER. UNDERDRAIN SLOPE MAY BE FLAT.
5. COMPACT EACH 6" LIFT OF BSM WITH LANDSCAPE ROLLER OR BY LIGHTLY WETTING. IF WETTING, LET DRY OVERNIGHT BEFORE PLANTING.
6. DO NOT WORK WITHIN BIORETENTION AREA DURING RAIN OR UNDER WET CONDITIONS.
7. KEEP HEAVY MACHINERY OUTSIDE BIORETENTION AREA LIMITS.

LOW IMPACT DEVELOPMENT STORMWATER MANAGEMENT STANDARD DETAILS

VERSION: 6/23/2016

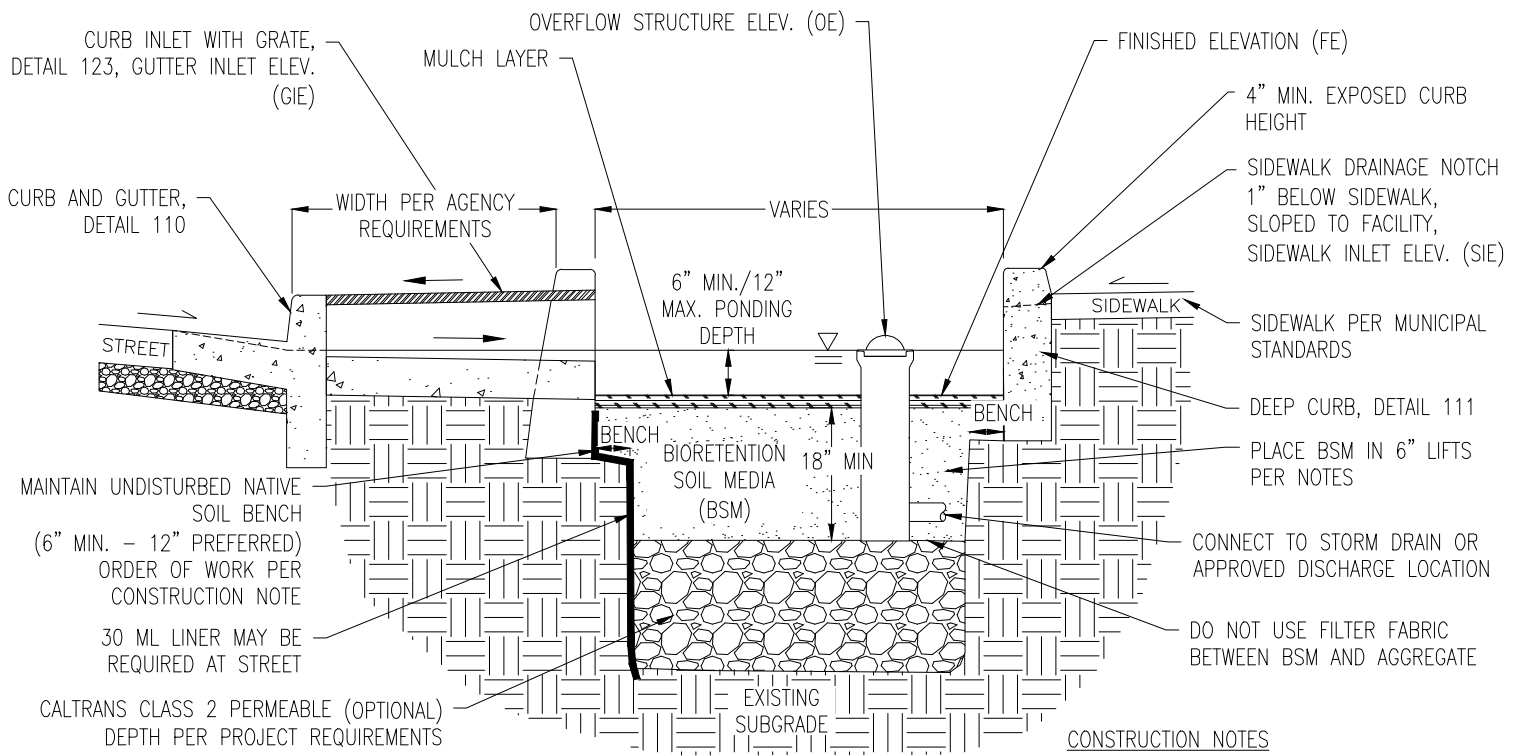
detail number

Street Bioretention Facility

(flat/planter, no on-street parking, sidewalk, without underdrain)

100

Municipality
Department Name



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7. KEEP HEAVY MACHINERY OUTSIDE BIORETENTION AREA LIMITS.

LOW IMPACT DEVELOPMENT STORMWATER MANAGEMENT STANDARD DETAILS

VERSION: 6/23/2016

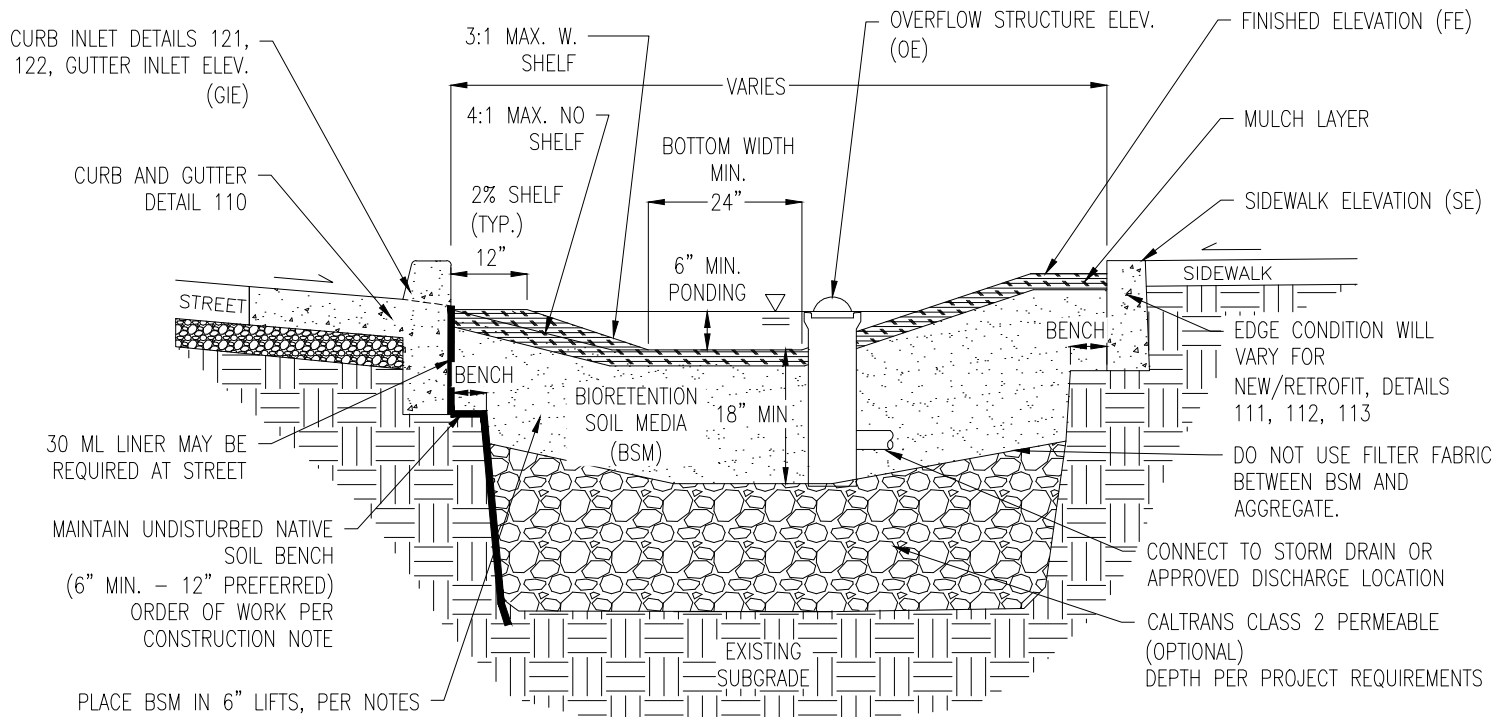
detail number

Street Bioretention Facility

(flat/planter, on-street parking, sidewalk, without underdrain)

101

Municipality
Department Name



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LOW IMPACT DEVELOPMENT STORMWATER MANAGEMENT STANDARD DETAILS

VERSION: 6/23/2016

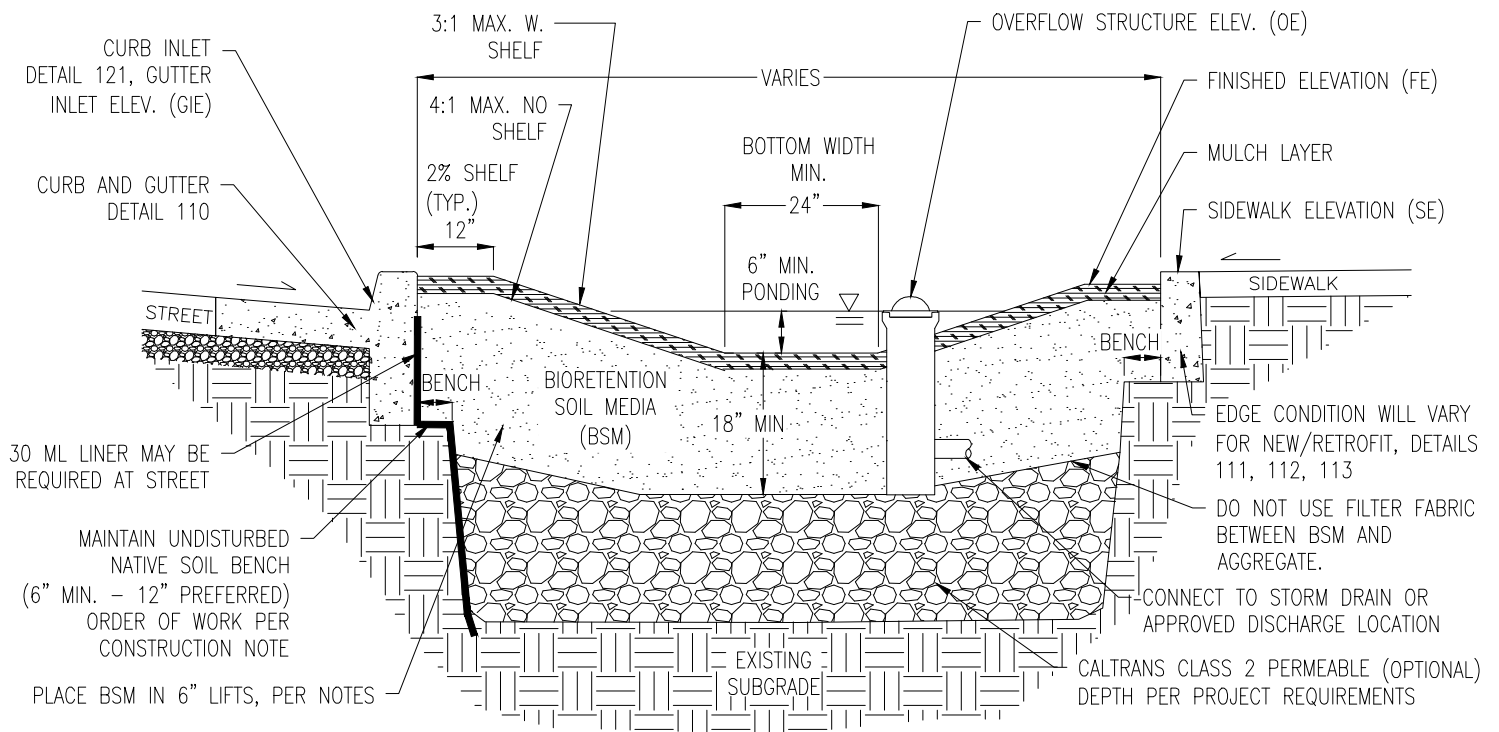
detail number

Street Bioretention Facility

(sloped sided, no on-street parking, sidewalk, without underdrain)

102

Municipality
Department Name



NOTES FOR THE DESIGNER

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LOW IMPACT DEVELOPMENT STORMWATER MANAGEMENT STANDARD DETAILS

VERSION: 6/23/2016

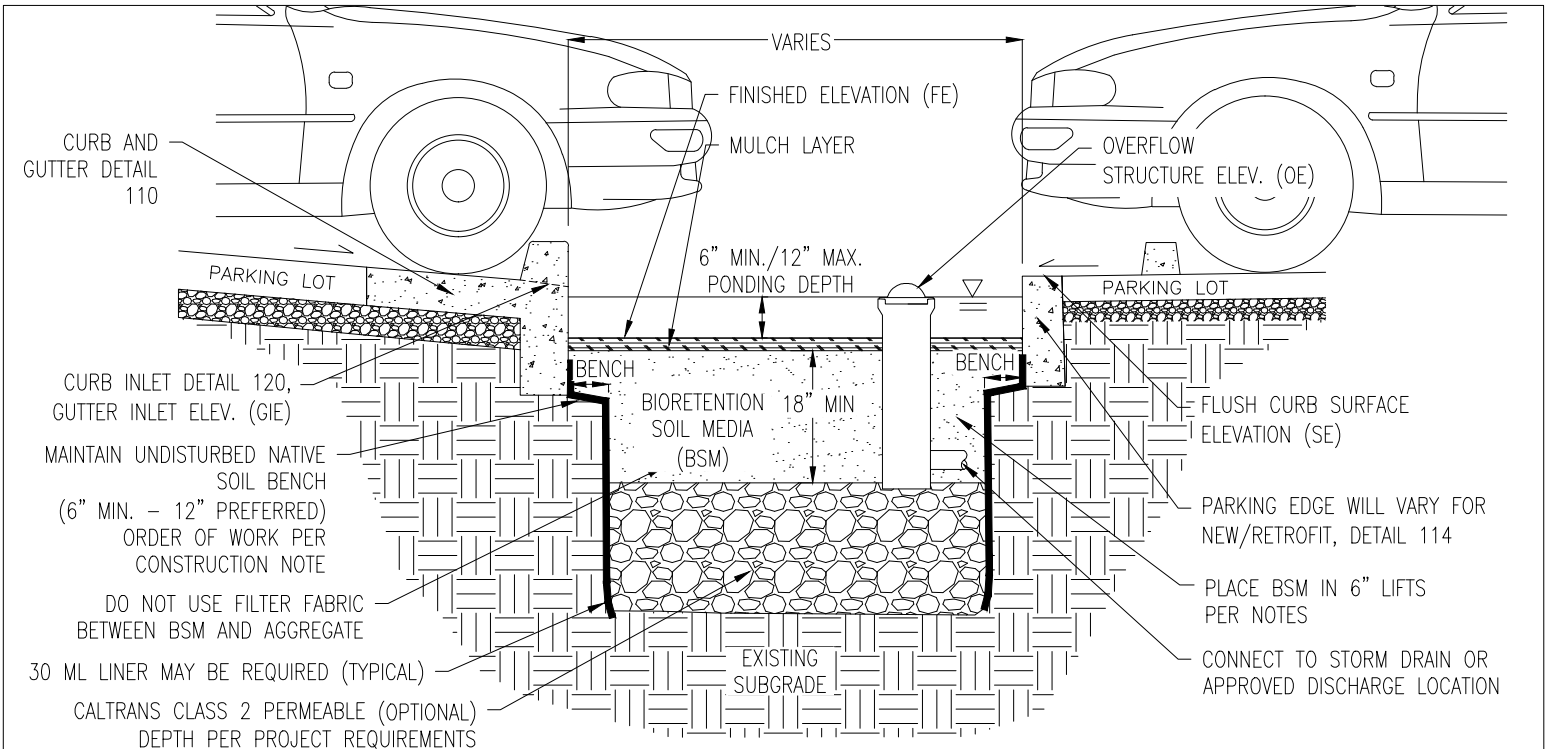
detail number

Street Bioretention Facility

(sloped sided, with on-street parking, sidewalk, without underdrain)

103

Municipality
Department Name



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7. KEEP HEAVY MACHINERY OUTSIDE BIORETENTION AREA LIMITS.

LOW IMPACT DEVELOPMENT STORMWATER MANAGEMENT STANDARD DETAILS

VERSION: 6/23/2016

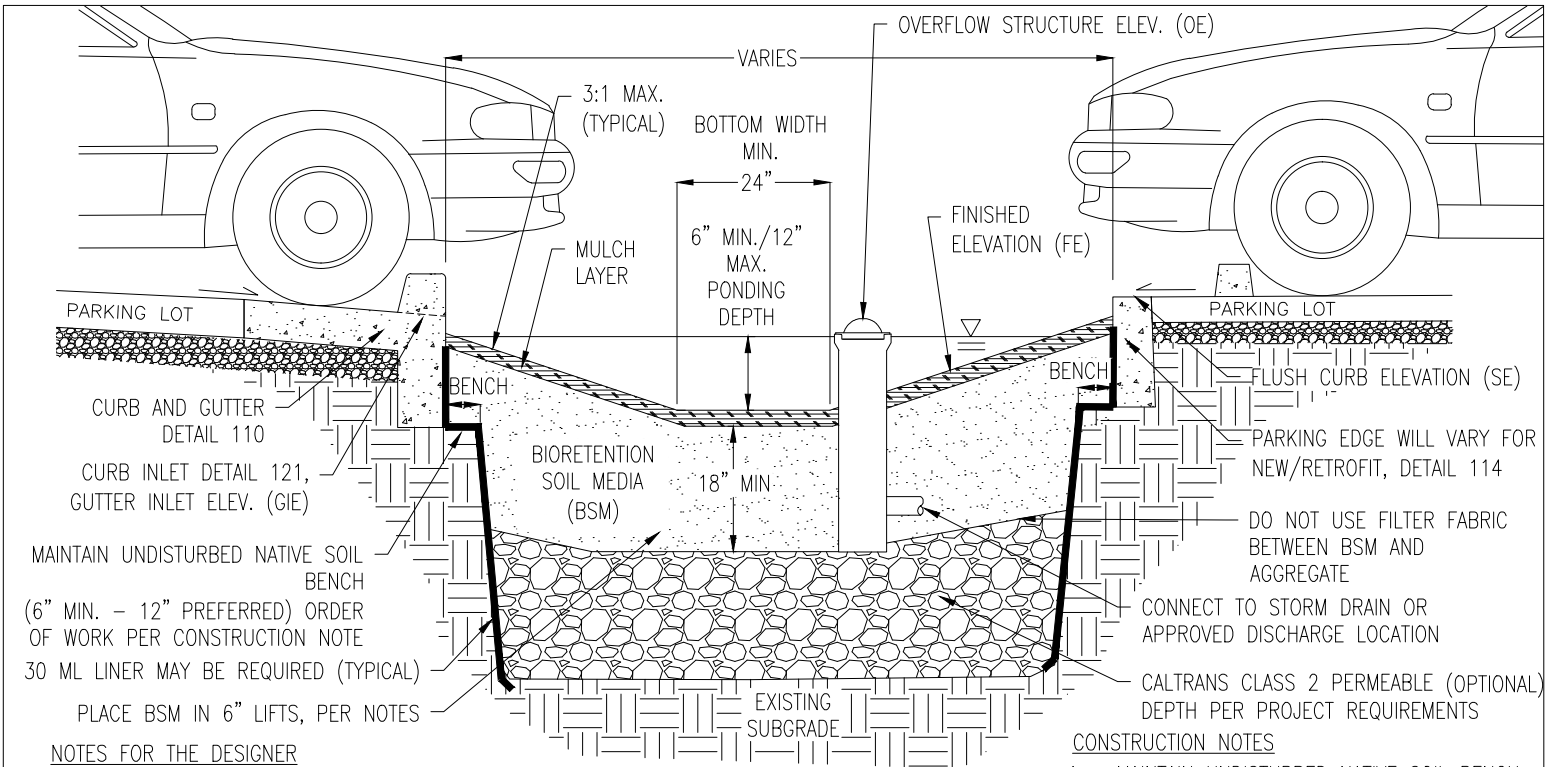
detail number

Parking Lot Bioretention Facility

(flat/planter, without underdrain)

104

Municipality
Department Name



MAINTAIN UNDISTURBED NATIVE SOIL BENCH (6" MIN. - 12" PREFERRED) ORDER OF WORK PER CONSTRUCTION NOTE 30 ML LINER MAY BE REQUIRED (TYPICAL)

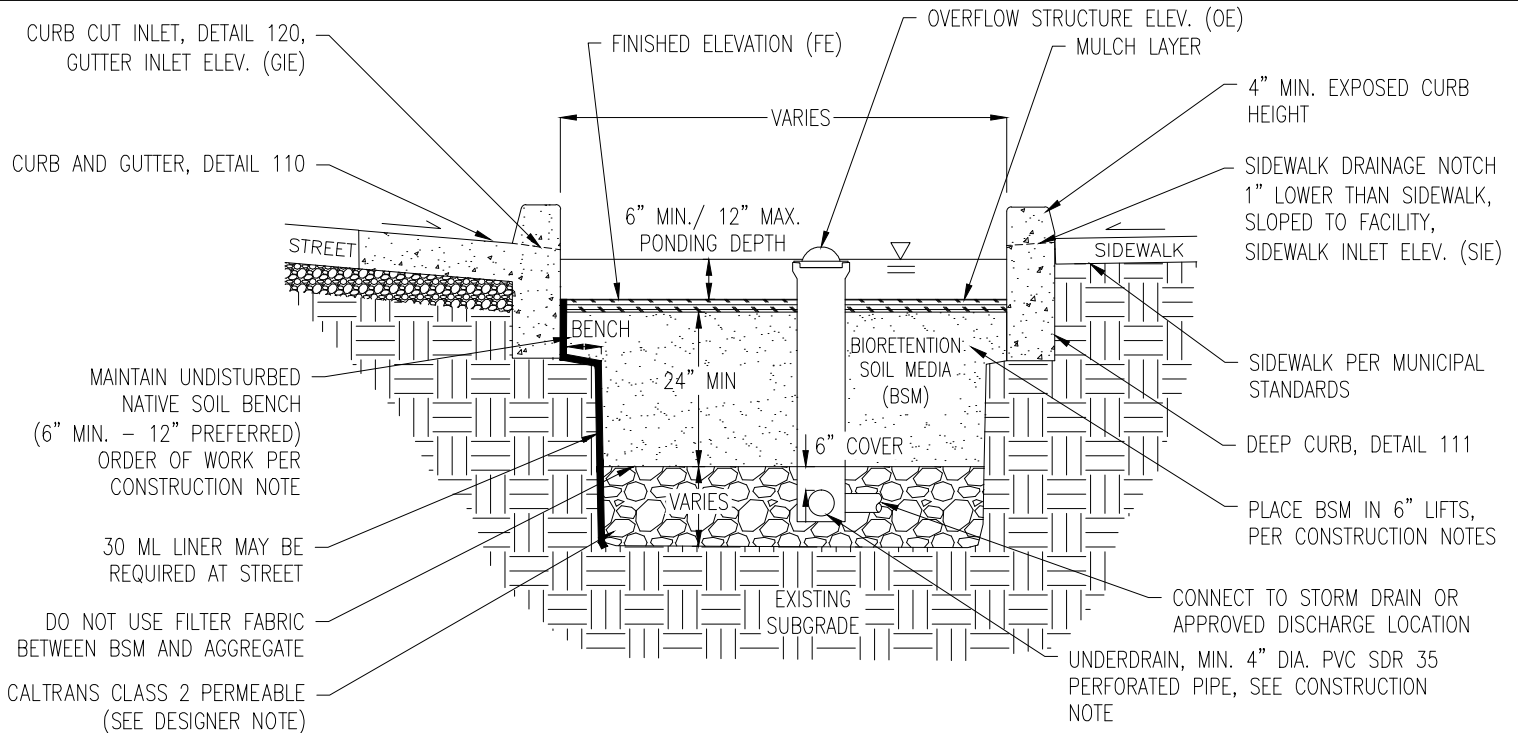
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LOW IMPACT DEVELOPMENT STORMWATER MANAGEMENT STANDARD DETAILS	VERSION: 6/23/2016	detail number
<h1 style="margin: 0;">Parking Lot Bioretention Facility</h1> <p style="margin: 0;">(sloped sided, without underdrain)</p>		<h1 style="margin: 0;">105</h1>
Municipality Department Name		



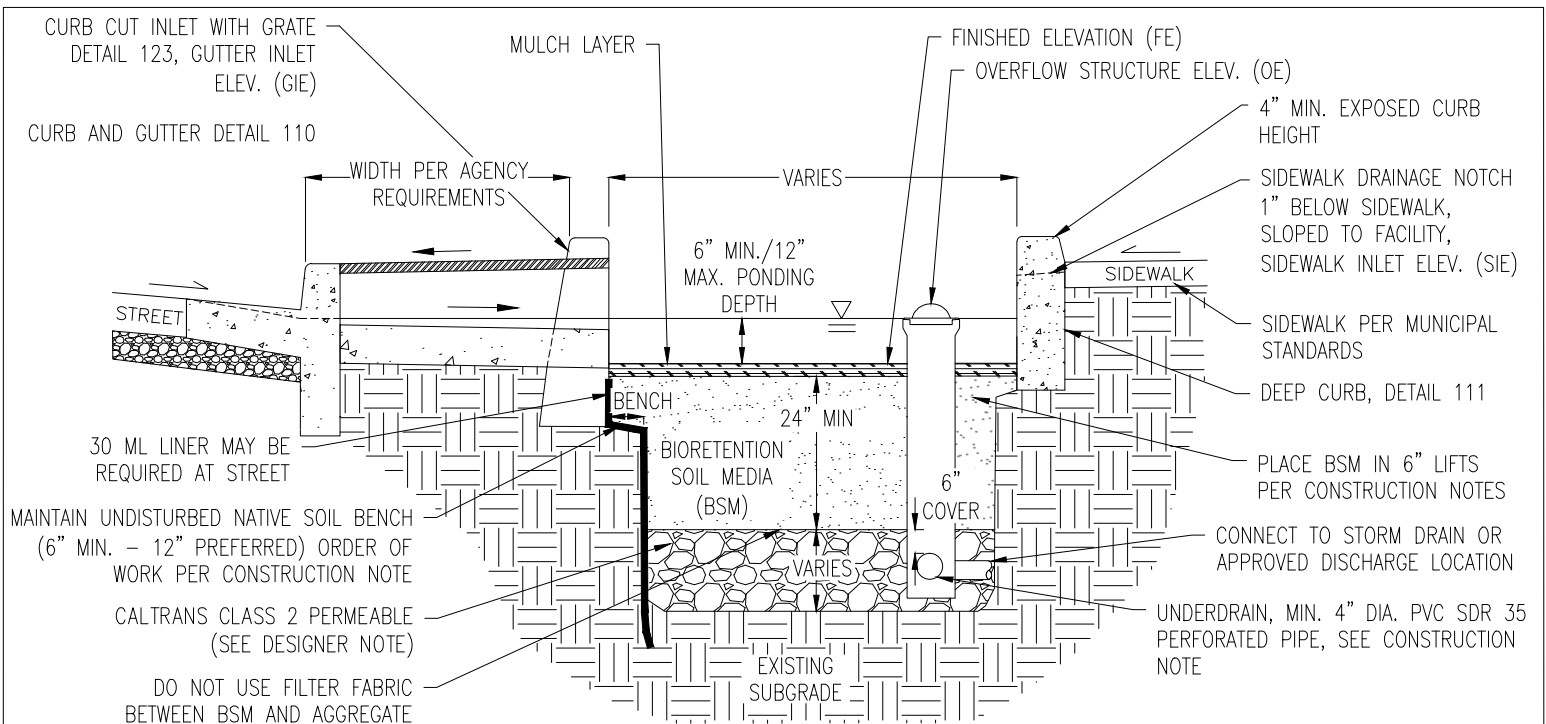
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LOW IMPACT DEVELOPMENT STORMWATER MANAGEMENT STANDARD DETAILS	VERSION: 6/23/2016	detail number
<h1 style="margin: 0;">Street Bioretention Facility</h1> <p style="margin: 0;">(flat/planter, no on-street parking, sidewalk, with underdrain)</p>		<h1 style="margin: 0;">200</h1>
Municipality Department Name		



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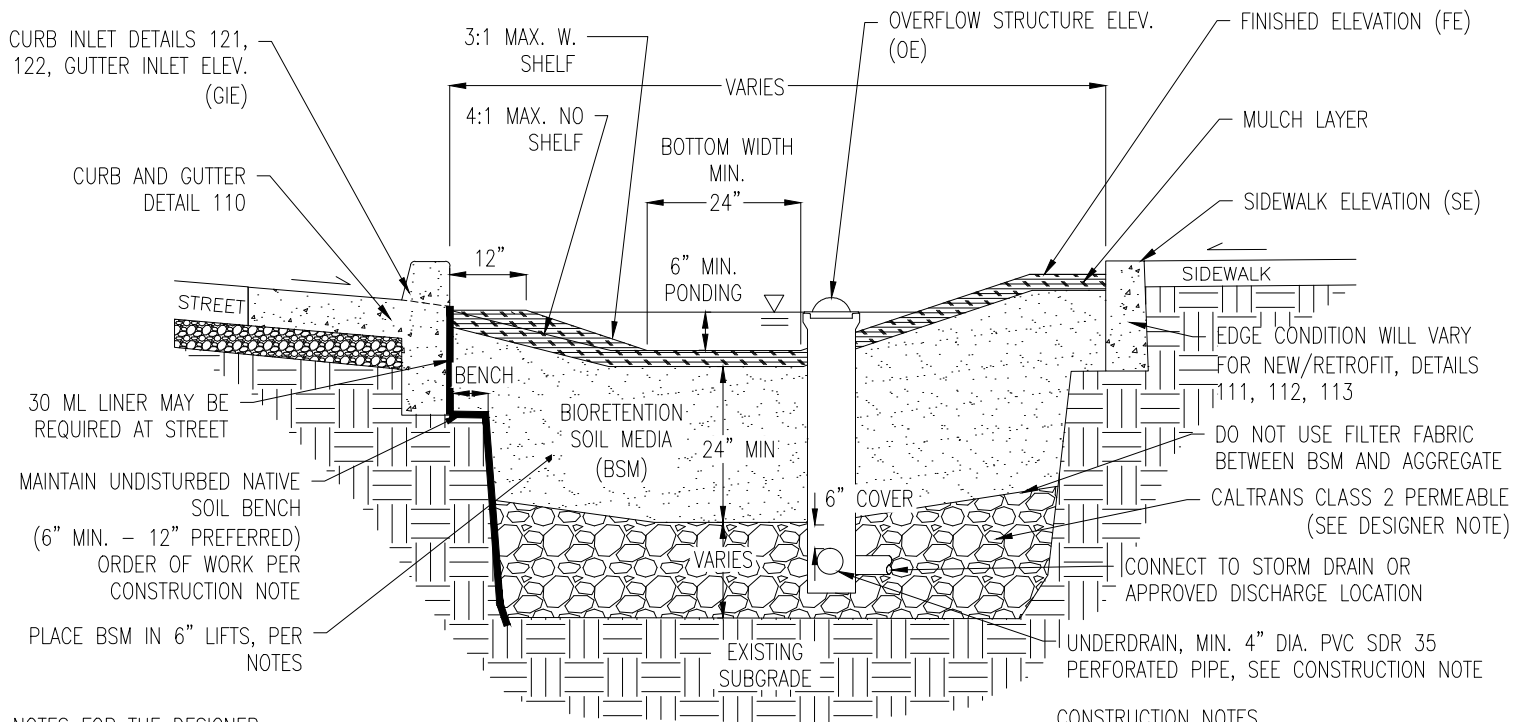
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NOTES FOR THE DESIGNER

1. ADDITIONAL DESIGN GUIDANCE PROVIDED IN BIORETENTION TECHNICAL SPECIFICATIONS DOCUMENT.
2. CAPTURE AND CONVEY OVERFLOW TO STORM DRAIN SYSTEM, DETAIL 140 OR BROOKS STYLE GRATED CURB VALVE BOX OR CATCH BASIN. ALTERNATIVELY, CONVEY OVERFLOW TO APPROVED DISCHARGE LOCATION THROUGH OTHER OVERLAND METHODS (IE. CURB CUTS, SIDEWALK UNDERDRAIN, WEIR, ETC.).
3. PROVIDE SPOT ELEVATIONS AT INLETS ON CIVIL PLANS (FE,OE, GIE, SIE), PER DETAIL 120.
4. SITE CONDITIONS WILL VARY FOR NEW AND RETROFIT PROJECTS. CURB, GUTTER, AND SIDEWALK DETAILS TO BE MODIFIED FOR PROJECT BY CIVIL AND GEOTECHNICAL ENGINEERS.
5. PROVIDE CAPPED, THREADED PVC CLEANOUT FOR UNDERDRAIN, 4" MIN. DIA. WITH SWEEP BEND.
6. PROVIDE MONITORING WELL IN EACH FACILITY, PER BIORETENTION TECHNICAL SPECIFICATIONS.
7. ON LONGITUDINAL SLOPE, USE CHECK DAMS (DETAILS 130-131)
8. DEPTH OF AGGREGATE DETERMINED BY FACILITY SIZING. IF CALTRANS CLASS 2 PERMEABLE IS NOT AVAILABLE, SUBSTITUTE CLASS 3 PERMEABLE WITH AN OVERLYING 3" DEEP CHOKING LAYER OF EITHER CALTRANS COURSE AGGREGATE 1/2" (NO. 4) OR 3/4" X (NO.4) OPEN-GRADED AGGREGATE.
9. BIORETENTION SOIL MEDIA (BSM) SPECIFICATION PER BIORETENTION TECHNICAL SPECIFICATIONS.
10. PLANT SELECTION PER BIORETENTION TECHNICAL SPECIFICATIONS.
11. MULCH PER BIORETENTION TECHNICAL SPECIFICATIONS.
12. LOCATE ENERGY DISSIPATION AS SPECIFIED IN INLET DETAILS, (120-123) - AVOID DECORATIVE USE.

CONSTRUCTION NOTES

1. MAINTAIN UNDISTURBED NATIVE SOIL BENCH TO SUPPORT ADJACENT SIDEWALK/ROAD. SEQUENCE WORK TO CONSTRUCT CURBS BEFORE EXCAVATING BIORETENTION AREA FOR AGGREGATE AND SOIL.
2. SCARIFY SUBGRADE BEFORE INSTALLING BIORETENTION AREA AGGREGATE AND BSM.
3. FACILITY EXCAVATION TO ALLOW FOR SPECIFIED AGGREGATE, SOIL, AND MULCH DEPTHS TO ACHIEVE FINISHED ELEVATIONS ON CIVIL PLANS.
4. INSTALL UNDERDRAIN WITH HOLES FACING DOWN. TOP OF UNDERDRAIN 6" BELOW TOP OF AGGREGATE LAYER. UNDERDRAIN SLOPE MAY BE FLAT.
5. COMPACT EACH 6" LIFT OF BSM WITH LANDSCAPE ROLLER OR BY LIGHTLY WETTING. IF WETTING, LET DRY OVERNIGHT BEFORE PLANTING.
6. DO NOT WORK WITHIN BIORETENTION AREA DURING RAIN OR UNDER WET CONDITIONS.
7. KEEP HEAVY MACHINERY OUTSIDE BIORETENTION AREA LIMITS.

LOW IMPACT DEVELOPMENT STORMWATER MANAGEMENT STANDARD DETAILS VERSION: 6/23/2016

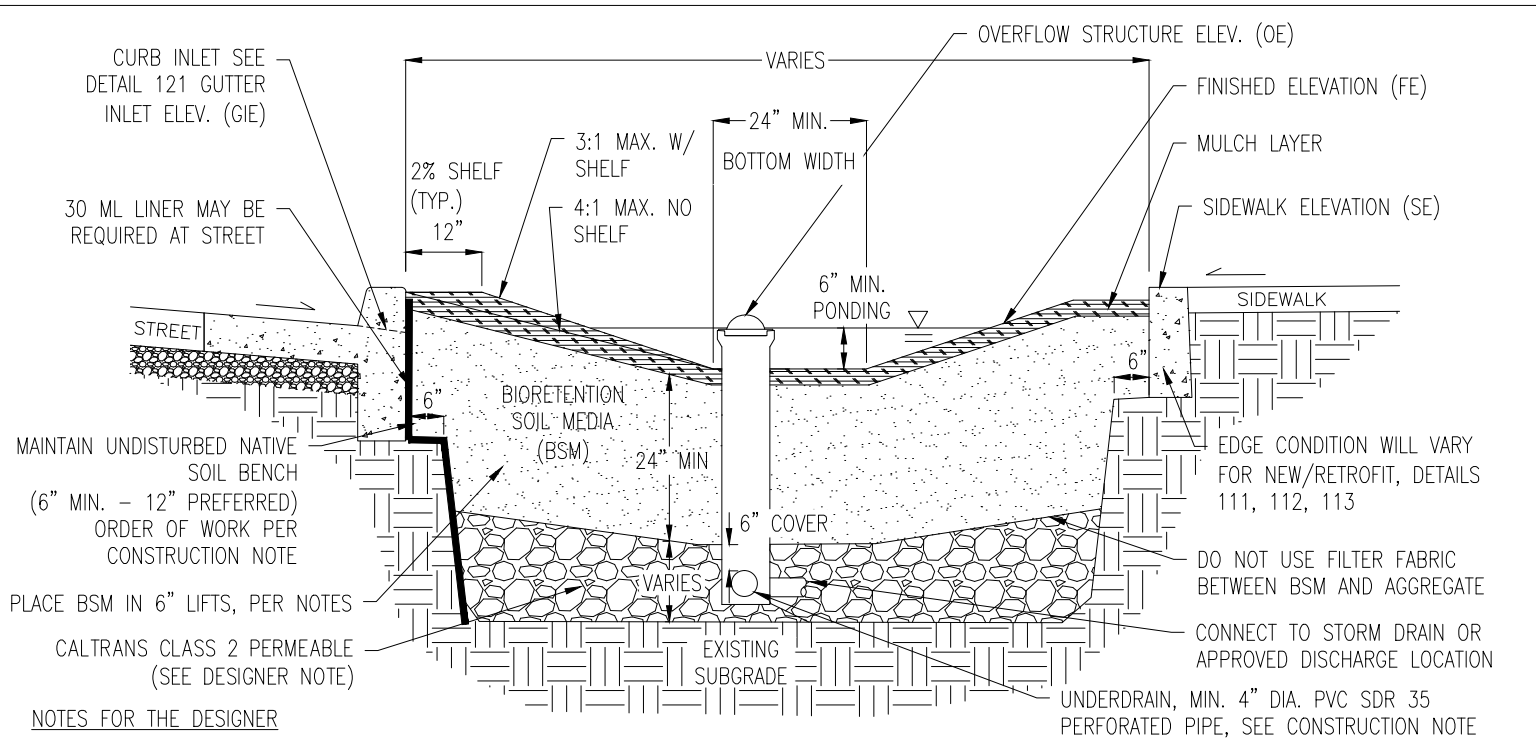
detail number

Street Bioretention Facility

(sloped sided, no on-street parking, sidewalk, with underdrain)

202

Municipality
Department Name



NOTES FOR THE DESIGNER

1. ADDITIONAL DESIGN GUIDANCE PROVIDED IN BIORETENTION TECHNICAL SPECIFICATIONS DOCUMENT.
2. CAPTURE AND CONVEY OVERFLOW TO STORM DRAIN SYSTEM, DETAIL 140 OR BROOKS STYLE GRATED CURB VALVE BOX OR CATCH BASIN. ALTERNATIVELY, CONVEY OVERFLOW TO APPROVED DISCHARGE LOCATION THROUGH OTHER OVERLAND METHODS (IE. CURB CUTS, SIDEWALK UNDERDRAIN, WEIR, ETC.).
3. PROVIDE SPOT ELEVATIONS AT INLETS ON CIVIL PLANS (FE,OE, GIE, SIE), PER DETAIL 120.
4. SITE CONDITIONS WILL VARY FOR NEW AND RETROFIT PROJECTS. CURB, GUTTER, AND SIDEWALK DETAILS TO BE MODIFIED FOR PROJECT BY CIVIL AND GEOTECHNICAL ENGINEERS.
5. PROVIDE CAPPED, THREADED PVC CLEANOUT FOR UNDERDRAIN, 4" MIN. DIA. WITH SWEEP BEND.
6. PROVIDE MONITORING WELL IN EACH FACILITY, PER BIORETENTION TECHNICAL SPECIFICATIONS.
7. ON LONGITUDINAL SLOPE, USE CHECK DAMS (DETAILS 130-131)
8. DEPTH OF AGGREGATE DETERMINED BY FACILITY SIZING. IF CALTRANS CLASS 2 PERMEABLE IS NOT AVAILABLE, SUBSTITUTE CLASS 3 PERMEABLE WITH AN OVERLYING 3" DEEP CHOKING LAYER OF EITHER CALTRANS COURSE AGGREGATE 1/2" (NO. 4) OR 3/4" X (NO.4) OPEN-GRADED AGGREGATE.
9. BIORETENTION SOIL MEDIA (BSM) SPECIFICATION PER BIORETENTION TECHNICAL SPECIFICATIONS.
10. PLANT SELECTION PER BIORETENTION TECHNICAL SPECIFICATIONS.
11. MULCH PER BIORETENTION TECHNICAL SPECIFICATIONS.
12. LOCATE ENERGY DISSIPATION AS SPECIFIED IN INLET DETAILS, (120-123) - AVOID DECORATIVE USE.

CONSTRUCTION NOTES

1. MAINTAIN UNDISTURBED NATIVE SOIL BENCH TO SUPPORT ADJACENT SIDEWALK/ROAD. SEQUENCE WORK TO CONSTRUCT CURBS BEFORE EXCAVATING BIORETENTION AREA FOR AGGREGATE AND SOIL.
2. SCARIFY SUBGRADE BEFORE INSTALLING BIORETENTION AREA AGGREGATE AND BSM.
3. FACILITY EXCAVATION TO ALLOW FOR SPECIFIED AGGREGATE, SOIL, AND MULCH DEPTHS TO ACHIEVE FINISHED ELEVATIONS ON CIVIL PLANS.
4. INSTALL UNDERDRAIN WITH HOLES FACING DOWN. TOP OF UNDERDRAIN 6" BELOW TOP OF AGGREGATE LAYER. UNDERDRAIN SLOPE MAY BE FLAT.
5. COMPACT EACH 6" LIFT OF BSM WITH LANDSCAPE ROLLER OR BY LIGHTLY WETTING. IF WETTING, LET DRY OVERNIGHT BEFORE PLANTING.
6. DO NOT WORK WITHIN BIORETENTION AREA DURING RAIN OR UNDER WET CONDITIONS.
7. KEEP HEAVY MACHINERY OUTSIDE BIORETENTION AREA LIMITS.

LOW IMPACT DEVELOPMENT STORMWATER MANAGEMENT STANDARD DETAILS

VERSION: 6/23/2016

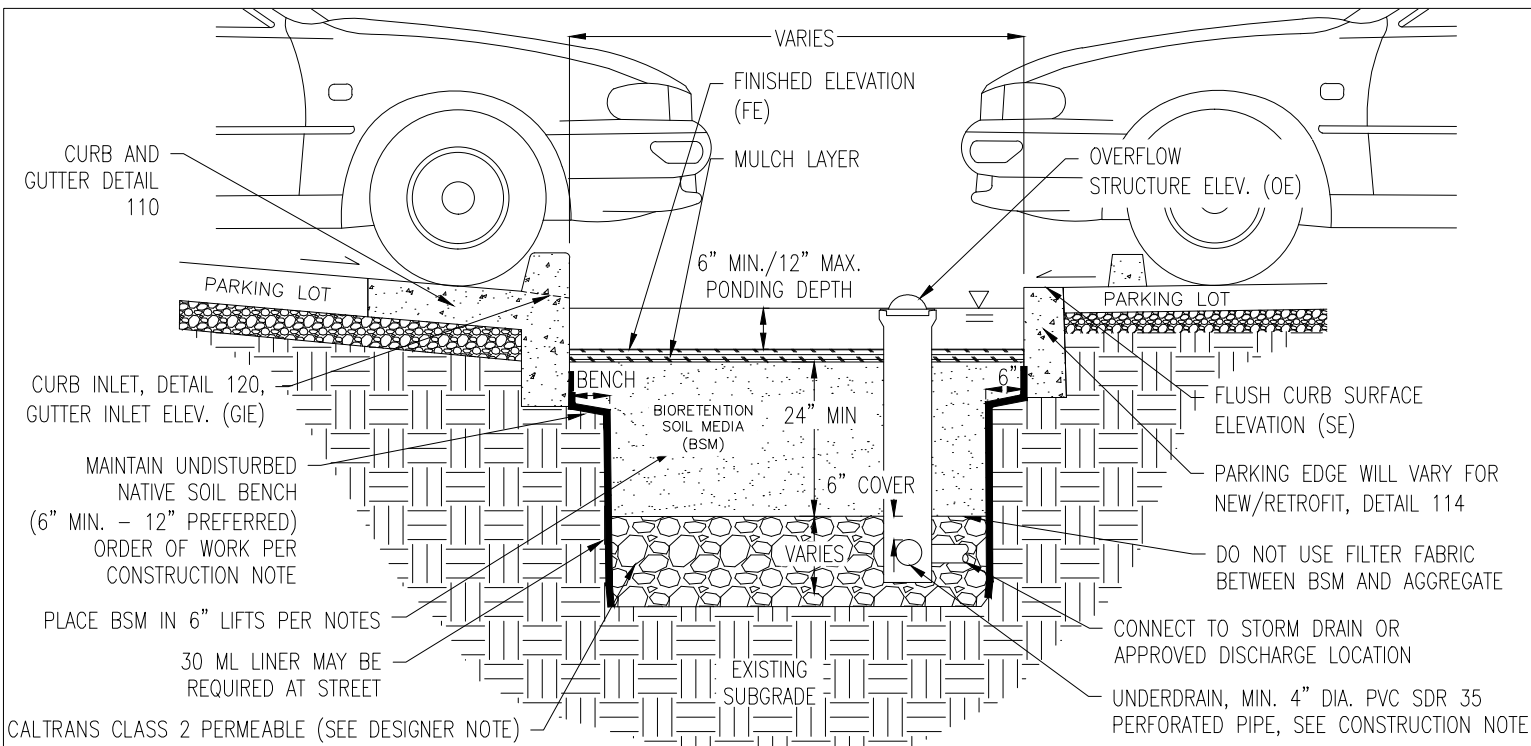
detail number

Street Bioretention Facility

(sloped sided, with on-street parking, sidewalk, with underdrain)

203

Municipality
Department Name



NOTES FOR THE DESIGNER

1. ADDITIONAL DESIGN GUIDANCE PROVIDED IN BIORETENTION TECHNICAL SPECIFICATIONS DOCUMENT.
2. CAPTURE AND CONVEY OVERFLOW TO STORM DRAIN SYSTEM, DETAIL 140 OR BROOKS STYLE GRATED CURB VALVE BOX OR CATCH BASIN. ALTERNATIVELY, CONVEY OVERFLOW TO APPROVED DISCHARGE LOCATION THROUGH OTHER OVERLAND METHODS (IE. CURB CUTS, SIDEWALK UNDERDRAIN, WEIR, ETC.).
3. PROVIDE SPOT ELEVATIONS AT INLETS ON CIVIL PLANS (FE,OE, GIE, SIE), PER DETAIL 120.
4. SITE CONDITIONS WILL VARY FOR NEW AND RETROFIT PROJECTS. CURB, GUTTER, AND SIDEWALK DETAILS TO BE MODIFIED FOR PROJECT BY CIVIL AND GEOTECHNICAL ENGINEERS.
5. PROVIDE CAPPED, THREADED PVC CLEANOUT FOR UNDERDRAIN, 4" MIN. DIA. WITH SWEEP BEND.
6. PROVIDE MONITORING WELL IN EACH FACILITY, PER BIORETENTION TECHNICAL SPECIFICATIONS.
7. ON LONGITUDINAL SLOPE, USE CHECK DAMS (DETAILS 130-131)
8. DEPTH OF AGGREGATE DETERMINED BY FACILITY SIZING. IF CALTRANS CLASS 2 PERMEABLE IS NOT AVAILABLE, SUBSTITUTE CLASS 3 PERMEABLE WITH AN OVERLYING 3" DEEP CHOKING LAYER OF EITHER CALTRANS COURSE AGGREGATE 1/2" (NO. 4) OR 3/4" X (NO.4) OPEN-GRADED AGGREGATE.
9. BIORETENTION SOIL MEDIA (BSM) SPECIFICATION PER BIORETENTION TECHNICAL SPECIFICATIONS.
10. PLANT SELECTION PER BIORETENTION TECHNICAL SPECIFICATIONS.
11. MULCH PER BIORETENTION TECHNICAL SPECIFICATIONS.
12. LOCATE ENERGY DISSIPATION AS SPECIFIED IN INLET DETAILS, (120-123) - AVOID DECORATIVE USE.

CONSTRUCTION NOTES

1. MAINTAIN UNDISTURBED NATIVE SOIL BENCH TO SUPPORT ADJACENT SIDEWALK/ROAD. SEQUENCE WORK TO CONSTRUCT CURBS BEFORE EXCAVATING BIORETENTION AREA FOR AGGREGATE AND SOIL.
2. SCARIFY SUBGRADE BEFORE INSTALLING BIORETENTION AREA AGGREGATE AND BSM.
3. FACILITY EXCAVATION TO ALLOW FOR SPECIFIED AGGREGATE, SOIL, AND MULCH DEPTHS TO ACHIEVE FINISHED ELEVATIONS ON CIVIL PLANS.
4. INSTALL UNDERDRAIN WITH HOLES FACING DOWN. TOP OF UNDERDRAIN 6" BELOW TOP OF AGGREGATE LAYER. UNDERDRAIN SLOPE MAY BE FLAT.
5. COMPACT EACH 6" LIFT OF BSM WITH LANDSCAPE ROLLER OR BY LIGHTLY WETTING. IF WETTING, LET DRY OVERNIGHT BEFORE PLANTING.
6. DO NOT WORK WITHIN BIORETENTION AREA DURING RAIN OR UNDER WET CONDITIONS.
7. KEEP HEAVY MACHINERY OUTSIDE BIORETENTION AREA LIMITS.

LOW IMPACT DEVELOPMENT STORMWATER MANAGEMENT STANDARD DETAILS

VERSION: 6/23/2016

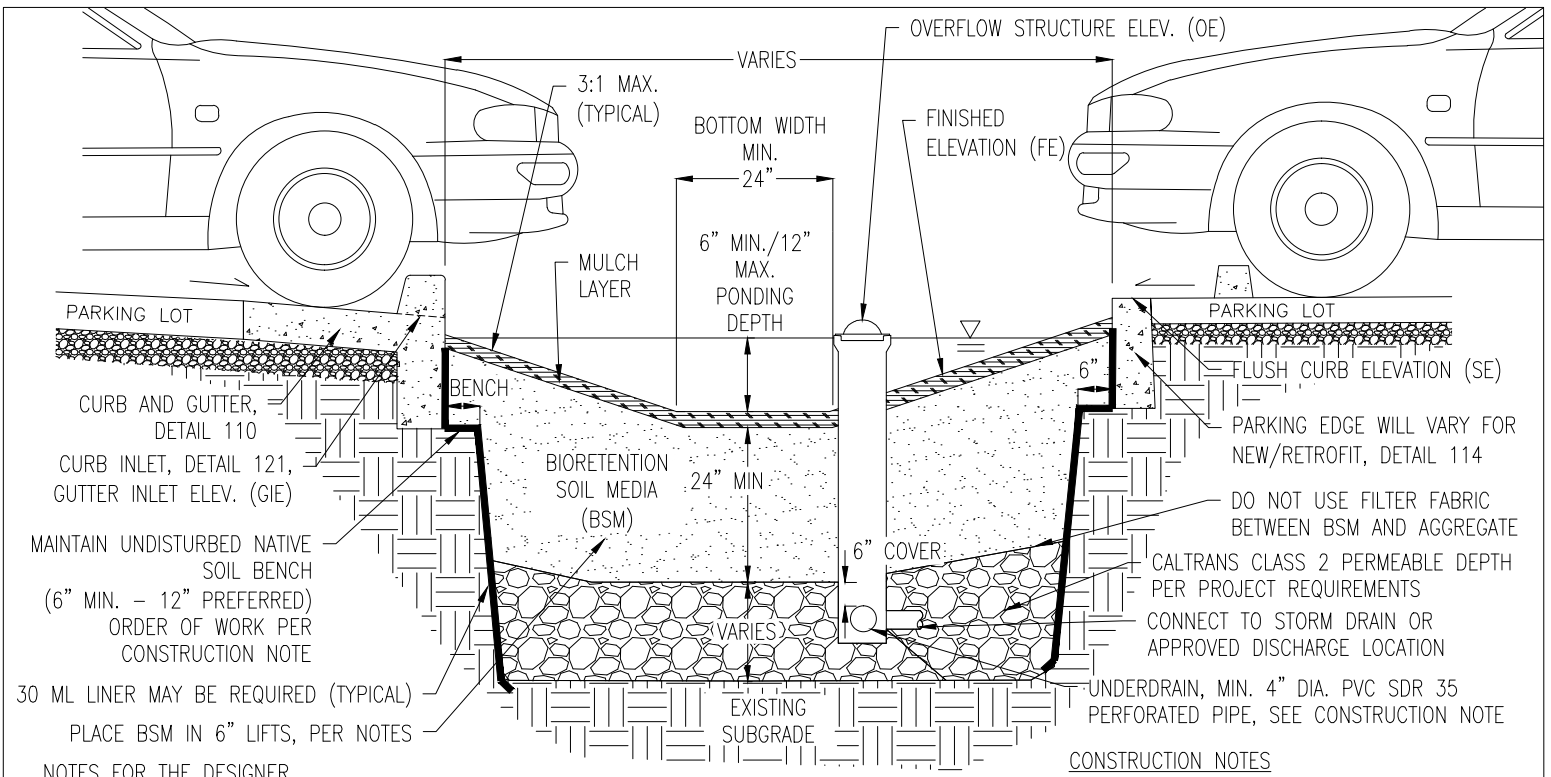
detail number

Parking Lot Bioretention Facility

(flat/planter, with underdrain)

204

Municipality
Department Name



NOTES FOR THE DESIGNER

1. ADDITIONAL DESIGN GUIDANCE PROVIDED IN BIORETENTION TECHNICAL SPECIFICATIONS DOCUMENT.
2. CAPTURE AND CONVEY OVERFLOW TO STORM DRAIN SYSTEM, DETAIL 140 OR BROOKS STYLE GRATED CURB VALVE BOX OR CATCH BASIN. ALTERNATIVELY, CONVEY OVERFLOW TO APPROVED DISCHARGE LOCATION THROUGH OTHER OVERLAND METHODS (IE. CURB CUTS, SIDEWALK UNDERDRAIN, WEIR, ETC.).
3. PROVIDE SPOT ELEVATIONS AT INLETS ON CIVIL PLANS (FE,OE, GIE, SIE), PER DETAIL 120.
4. SITE CONDITIONS WILL VARY FOR NEW AND RETROFIT PROJECTS. CURB, GUTTER, AND SIDEWALK DETAILS TO BE MODIFIED FOR PROJECT BY CIVIL AND GEOTECHNICAL ENGINEERS.
5. PROVIDE CAPPED, THREADED PVC CLEANOUT FOR UNDERDRAIN, 4" MIN. DIA. WITH SWEEP BEND.
6. PROVIDE MONITORING WELL IN EACH FACILITY, PER BIORETENTION TECHNICAL SPECIFICATIONS.
7. ON LONGITUDINAL SLOPE, USE CHECK DAMS (DETAILS 130-131)
8. DEPTH OF AGGREGATE DETERMINED BY FACILITY SIZING. IF CALTRANS CLASS 2 PERMEABLE IS NOT AVAILABLE, SUBSTITUTE CLASS 3 PERMEABLE WITH AN OVERLYING 3" DEEP CHOKING LAYER OF EITHER CALTRANS COURSE AGGREGATE 1/2" (NO. 4) OR 3/4" X (NO.4) OPEN-GRADED AGGREGATE.
9. BIORETENTION SOIL MEDIA (BSM) SPECIFICATION PER BIORETENTION TECHNICAL SPECIFICATIONS.
10. PLANT SELECTION PER BIORETENTION TECHNICAL SPECIFICATIONS.
11. MULCH PER BIORETENTION TECHNICAL SPECIFICATIONS.
12. LOCATE ENERGY DISSIPATION AS SPECIFIED IN INLET DETAILS, (120-123) - AVOID DECORATIVE USE.

CONSTRUCTION NOTES

1. MAINTAIN UNDISTURBED NATIVE SOIL BENCH TO SUPPORT ADJACENT SIDEWALK/ROAD. SEQUENCE WORK TO CONSTRUCT CURBS BEFORE EXCAVATING BIORETENTION AREA FOR AGGREGATE AND SOIL.
2. SCARIFY SUBGRADE BEFORE INSTALLING BIORETENTION AREA AGGREGATE AND BSM.
3. FACILITY EXCAVATION TO ALLOW FOR SPECIFIED AGGREGATE, SOIL, AND MULCH DEPTHS TO ACHIEVE FINISHED ELEVATIONS ON CIVIL PLANS.
4. INSTALL UNDERDRAIN WITH HOLES FACING DOWN. TOP OF UNDERDRAIN 6" BELOW TOP OF AGGREGATE LAYER. UNDERDRAIN SLOPE MAY BE FLAT.
5. COMPACT EACH 6" LIFT OF BSM WITH LANDSCAPE ROLLER OR BY LIGHTLY WETTING. IF WETTING, LET DRY OVERNIGHT BEFORE PLANTING.
6. DO NOT WORK WITHIN BIORETENTION AREA DURING RAIN OR UNDER WET CONDITIONS.
7. KEEP HEAVY MACHINERY OUTSIDE BIORETENTION AREA LIMITS.

LOW IMPACT DEVELOPMENT STORMWATER MANAGEMENT STANDARD DETAILS VERSION: 6/23/2016

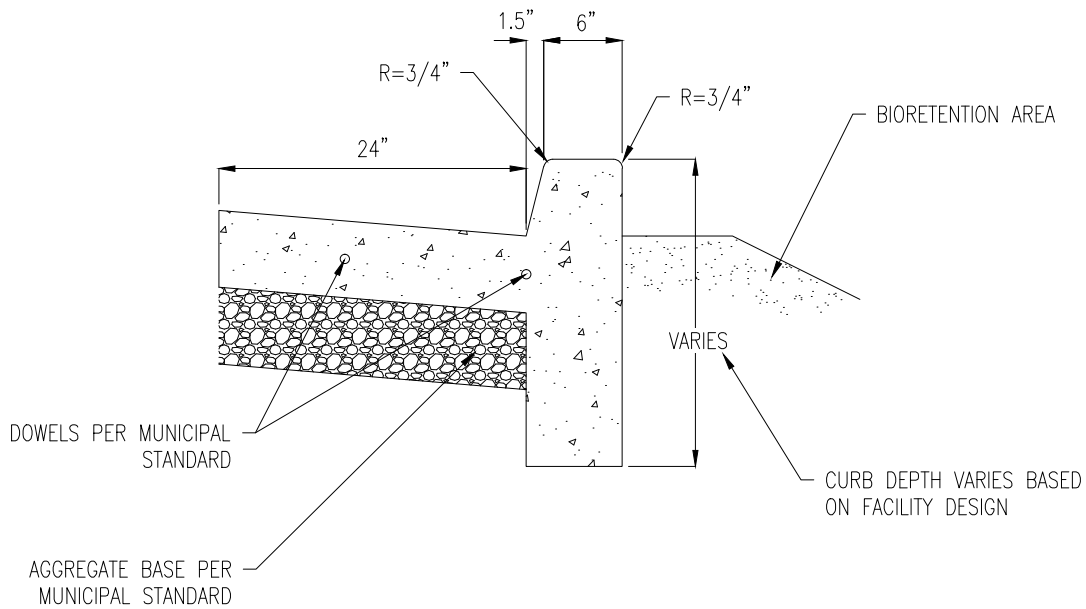
detail number

Parking Lot Bioretention Facility

(sloped sided, with underdrain)

205

Municipality
Department Name



NOTES FOR THE DESIGNER

1. THIS CURB DETAIL IS AN EXAMPLE. ACTUAL DETAIL TO BE DESIGNED FOR SITE AND FACILITY CONDITIONS BY THE PROJECT CIVIL AND GEOTECHNICAL ENGINEERS.
2. SPECIAL DESIGN CONSIDERATION OR STRUCTURAL REVIEW MAY BE REQUIRED FOR LONGER PLANTER WALL SPANS.
3. EDGE CONDITION WILL VARY FOR NEW AND RETROFIT PROJECTS. CURB, GUTTER, AND WALL DETAILS MAY BE MODIFIED BY CIVIL AND GEOTECHNICAL ENGINEERS. NOTE THAT 24" GUTTER PROVIDES GREATER CURB STABILITY, BUT MAY NOT MATCH MUNICIPAL GUTTER STANDARDS.
4. CONCRETE AND EXPANSION JOINTS SHALL MEET THE REQUIREMENTS OF THE MUNICIPALITY.
5. STEEL REINFORCEMENT OR ADDITIONAL CONCRETE CHECK DAMS MAY BE NEEDED FOR STABILITY.

CONSTRUCTION NOTES

1. FINISH ALL EXPOSED CONCRETE SURFACES.

CURB AND GUTTER

N.T.S.

110

LOW IMPACT DEVELOPMENT STORMWATER MANAGEMENT STANDARD DETAILS

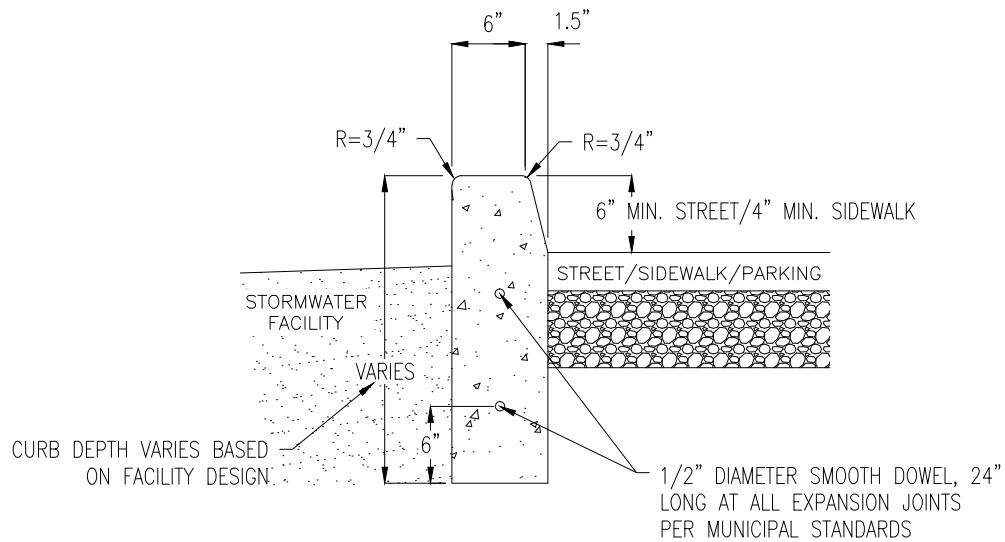
VERSION: 6/23/2016

detail number

Curb and Gutter

110

Municipality
Department Name



DESIGN NOTES

1. THIS CURB DETAIL IS AN EXAMPLE. ACTUAL DETAIL TO BE DESIGNED FOR SITE AND FACILITY CONDITIONS BY THE PROJECT CIVIL AND GEOTECHNICAL ENGINEERS.
2. SPECIAL DESIGN CONSIDERATION OR STRUCTURAL REVIEW MAY BE REQUIRED FOR LONGER SWALE EDGE SPANS.
3. WHEN SIDEWALK DRAINS TO PLANTER, PROVIDE 4" – 6" WIDE NOTCH OPENINGS, 1" BELOW SIDEWALK, SLOPED TO FACILITY, PER BIORETENTION PLANTER DETAILS. SPACE OPENINGS TO CONVEY FLOWS. PROVIDE MINIMUM 2" COVER BETWEEN DRAINAGE NOTCH OPENING AND DOWELS.
4. CONCRETE AND EXPANSION JOINTS SHALL MEET THE REQUIREMENTS OF THE MUNICIPALITY.
5. STEEL REINFORCEMENT OR ADDITIONAL CONCRETE CHECK DAMS MAY BE NEEDED FOR STABILITY.

CONSTRUCTION NOTES

1. FINISH ALL EXPOSED CONCRETE SURFACES.

DEEP CURB

N.T.S.

111

LOW IMPACT DEVELOPMENT STORMWATER MANAGEMENT STANDARD DETAILS

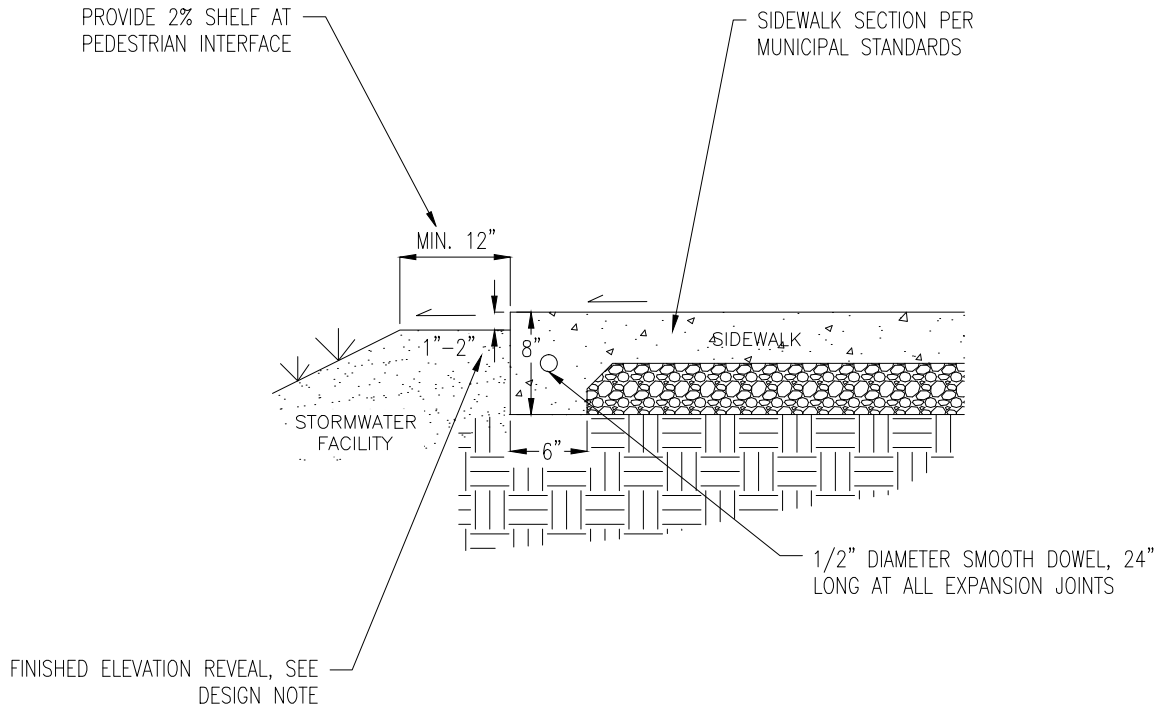
VERSION: 6/23/2016

detail number

Deep Curb

111

Municipality
Department Name



DESIGN NOTES

1. SPECIAL DESIGN CONSIDERATION OR STRUCTURAL REVIEW MAY BE REQUIRED FOR LONGER FACILITY EDGE SPANS. STEEL REINFORCEMENT OR ADDITIONAL CONCRETE CHECK DAMS MAY BE NEEDED FOR STABILITY.
3. FINISHED ELEVATION REVEAL – WHERE SIDEWALK CONVEYS SHEET FLOW TO FACILITY, A 1”-2” REVEAL SHOULD BE MAINTAINED BETWEEN SIDEWALK AND FACILITY FINISHED GRADE TO AVOID MULCH OR PLANT BUILDUP FROM BLOCKING FLOWS.
4. CONCRETE AND EXPANSION JOINTS SHALL MEET THE REQUIREMENTS OF THE MUNICIPALITY.

CONSTRUCTION NOTES

1. FINISH ALL EXPOSED CONCRETE SURFACES.

THICKENED EDGE SIDEWALK
N.T.S.

112

LOW IMPACT DEVELOPMENT STORMWATER MANAGEMENT STANDARD DETAILS

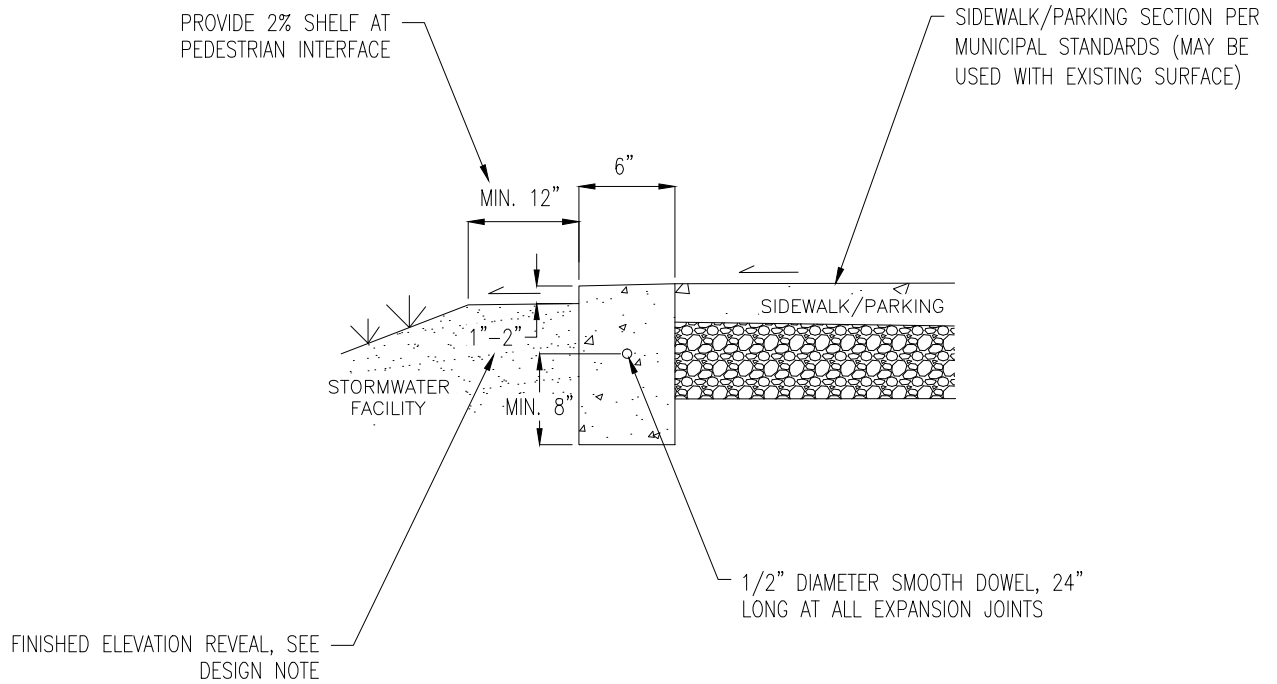
VERSION: 6/23/2016

detail number

Thickened Edge Sidewalk

112

Municipality
Department Name



DESIGN NOTES

1. SPECIAL DESIGN CONSIDERATION OR STRUCTURAL REVIEW MAY BE REQUIRED FOR LONGER FACILITY EDGE SPANS. STEEL REINFORCEMENT OR ADDITIONAL CONCRETE CHECK DAMS MAY BE NEEDED FOR STABILITY.
2. EDGE CONDITION WILL VARY FOR PROJECTS. CURB DETAILS MAY BE MODIFIED BY CIVIL AND GEOTECHNICAL ENGINEERS.
3. CONCRETE AND EXPANSION JOINTS SHALL MEET THE REQUIREMENTS OF THE MUNICIPALITY.
4. FINISHED ELEVATION REVEAL AT SIDEWALK – WHERE SIDEWALK CONVEYS SHEET FLOW TO FACILITY, A 1”-2” REVEAL SHOULD BE MAINTAINED BETWEEN SIDEWALK AND FACILITY FINISHED GRADE TO AVOID MULCH OR PLANT BUILDUP FROM BLOCKING FLOWS AND REDUCE DROP AT PEDESTRIAN INTERFACE.

CONSTRUCTION NOTES

1. FINISH ALL EXPOSED CONCRETE SURFACES.

FLUSH CURB AT SIDEWALK

N.T.S.

113

LOW IMPACT DEVELOPMENT STORMWATER MANAGEMENT STANDARD DETAILS

VERSION: 6/23/2016

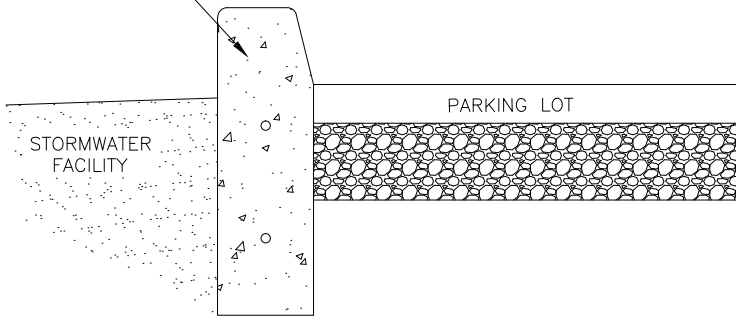
detail number

Flush Curb at Sidewalk

113

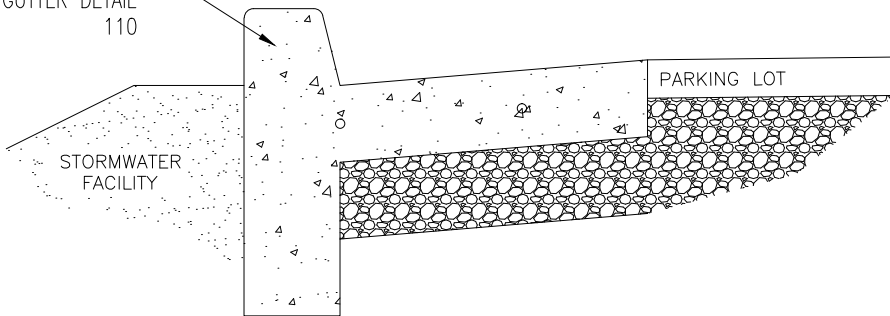
Municipality
Department Name

DEEP CURB
DETAIL 111



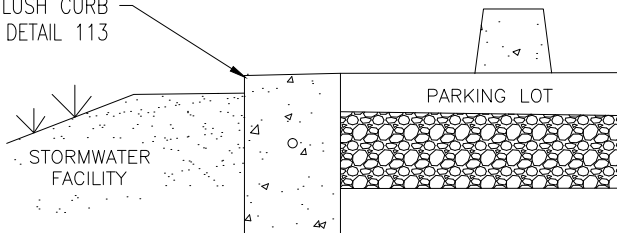
DEEP CURB

CURB AND
GUTTER
DETAIL
110



CURB AND GUTTER

FLUSH CURB
DETAIL 113



FLUSH EDGE/WHEEL STOPS

DESIGN NOTES

1. WHEEL STOPS MAY BE USED ON NON-FLUSH DESIGNS TO KEEP CARS FROM OVERHANGING BIORETENTION FACILITY.
2. VEHICLE OVERHANG CAN BE USED TO REDUCE IMPERVIOUS PAVEMENT AREA.
3. WHERE VEHICLE OVERHANG IS UTILIZED SELECT LOW GROWING PLANTS THAT WILL TOLERATE SHADING.

PARKING LOT EDGE OPTIONS

N.T.S.

114

LOW IMPACT DEVELOPMENT STORMWATER MANAGEMENT STANDARD DETAILS

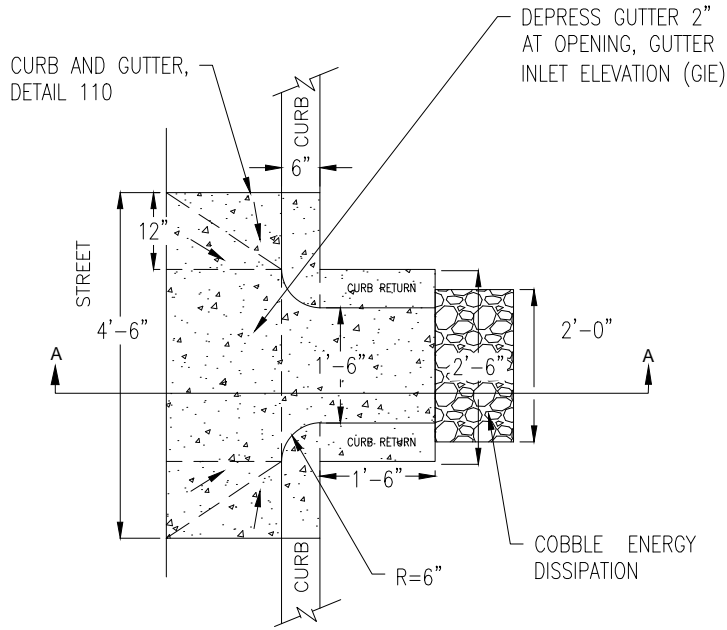
VERSION: 6/23/2016

detail number

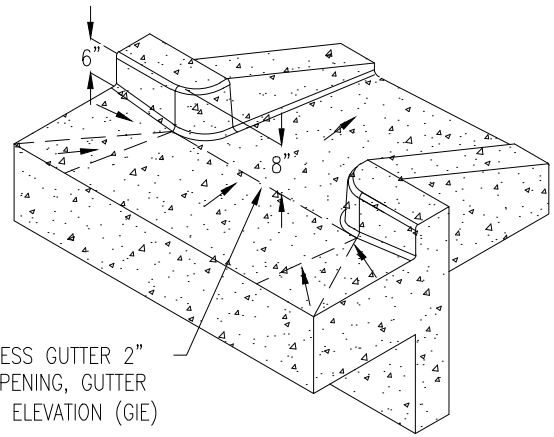
Parking Lot Edge Options

114

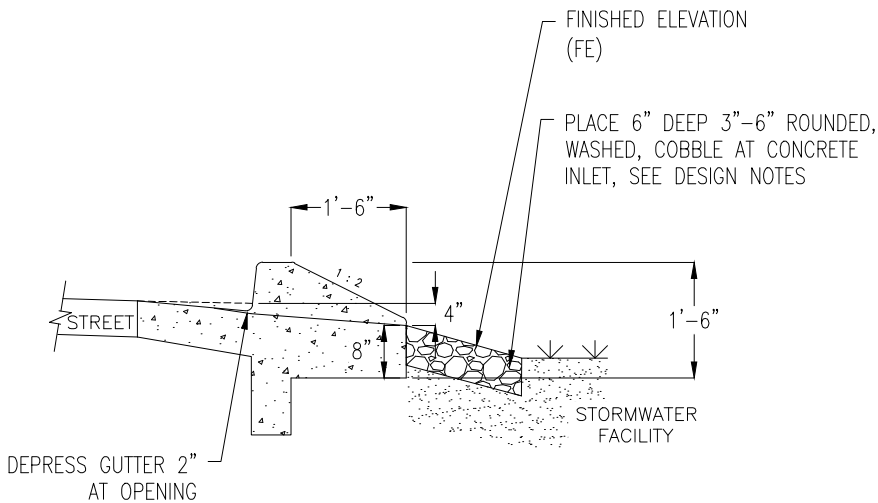
Municipality
Department Name



PLAN VIEW



PERSPECTIVE VIEW



SECTION A-A

BIORETENTION DESIGN NOTES

1. FOR USE WITH STORMWATER FACILITIES WITH SIDE SLOPES.
2. PROVIDE SPOT ELEVATIONS ON PLANS (FE, OE, GIE, IE). SEE DETAIL 100.
3. CURB AND WALL DETAILS MAY BE MODIFIED BY CIVIL AND GEOTECHNICAL ENGINEERS.
4. WHERE INLET FLOW VELOCITY IS HIGH, EXTEND COBBLE INTO FACILITY, BUT AVOID EXCESSIVE USE.
5. CURB HEIGHT MAY BE REDUCED TO 4-INCHES WHERE ADJACENT TO A SIDEWALK. SEE DETAILS 110 & 111.

CONSTRUCTION NOTES

1. AFTER CONSTRUCTION PLACE SAND BAGS AT GUTTER OPENINGS TO KEEP STORM FLOWS FROM ENTERING FACILITY UNTIL VEGETATION IS ESTABLISHED.

CURB CUT TYPE 2

N.T.S.

121

LOW IMPACT DEVELOPMENT STORMWATER MANAGEMENT STANDARD DETAILS

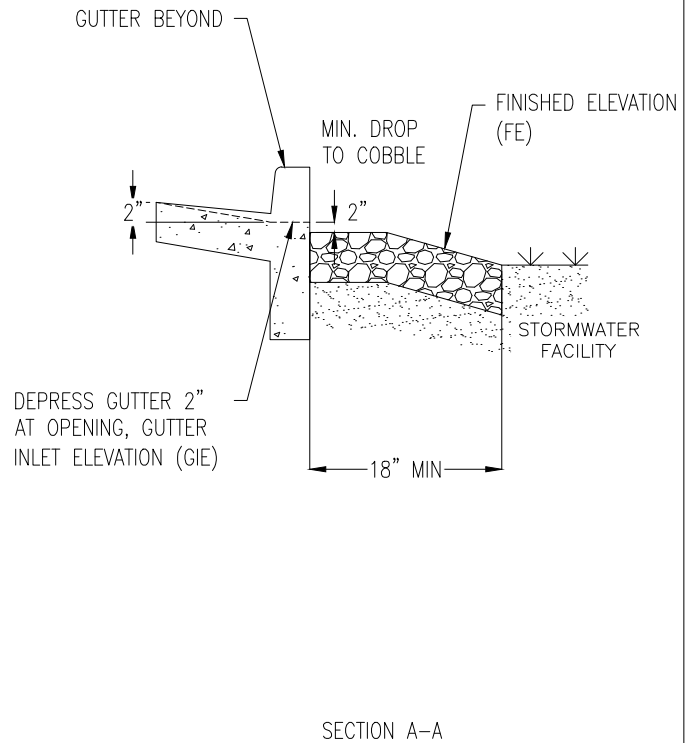
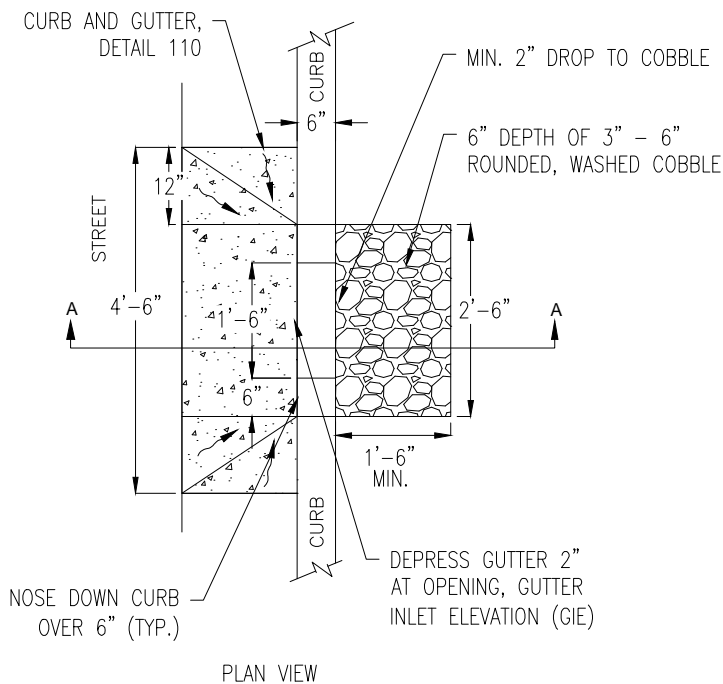
VERSION: 6/23/2016

detail number

Curb Cut Inlet for Side Slopes (rain garden or swale)

121

Municipality
Department Name



BIORETENTION DESIGN NOTES

1. FOR USE WITH STORMWATER FACILITIES WITH SLOPED SIDES OR FLAT BOTTOMS.
2. PROVIDE SPOT ELEVATIONS ON PLANS (FE, OE, GIE, IE). SEE DETAILS 100, 101.
3. DROP FROM INLET TO AGGREGATE PAD WILL BE GREATER FOR PLANTERS.
3. CURB AND WALL DETAILS MAY BE MODIFIED BY CIVIL AND GEOTECHNICAL ENGINEERS.
4. WHERE INLET FLOW VELOCITY IS HIGH, EXTEND COBBLE INTO FACILITY, BUT AVOID EXCESSIVE USE.

CONSTRUCTION NOTES

1. AFTER CONSTRUCTION PLACE SAND BAGS AT GUTTER OPENINGS TO KEEP STORM FLOWS FROM ENTERING FACILITY UNTIL VEGETATION IS ESTABLISHED.

CURB CUT TYPE 3

N.T.S.

122

LOW IMPACT DEVELOPMENT STORMWATER MANAGEMENT STANDARD DETAILS

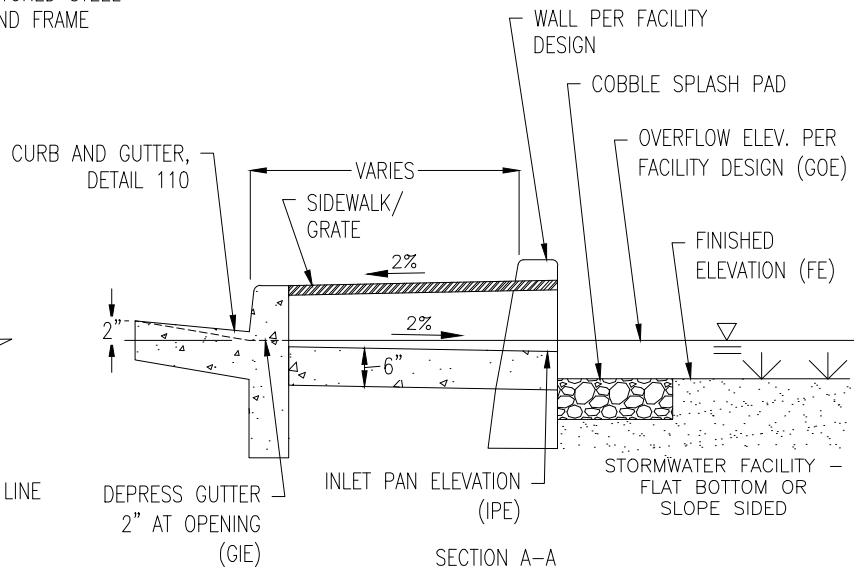
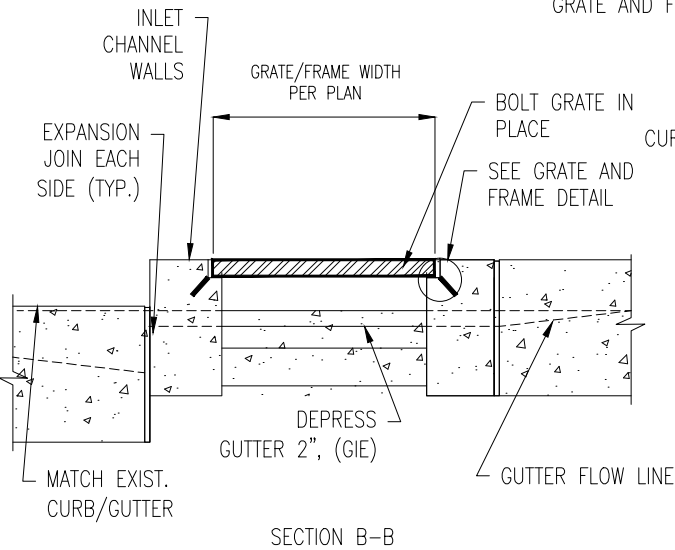
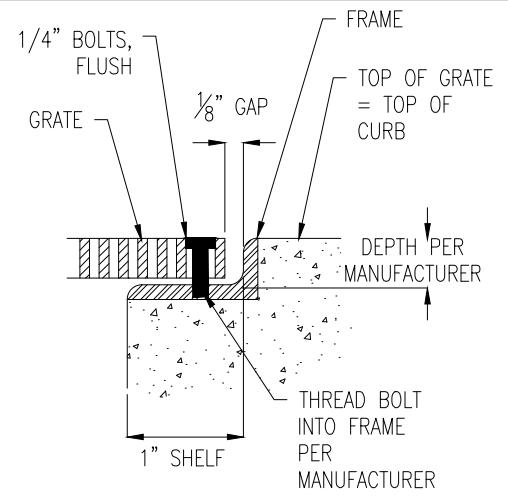
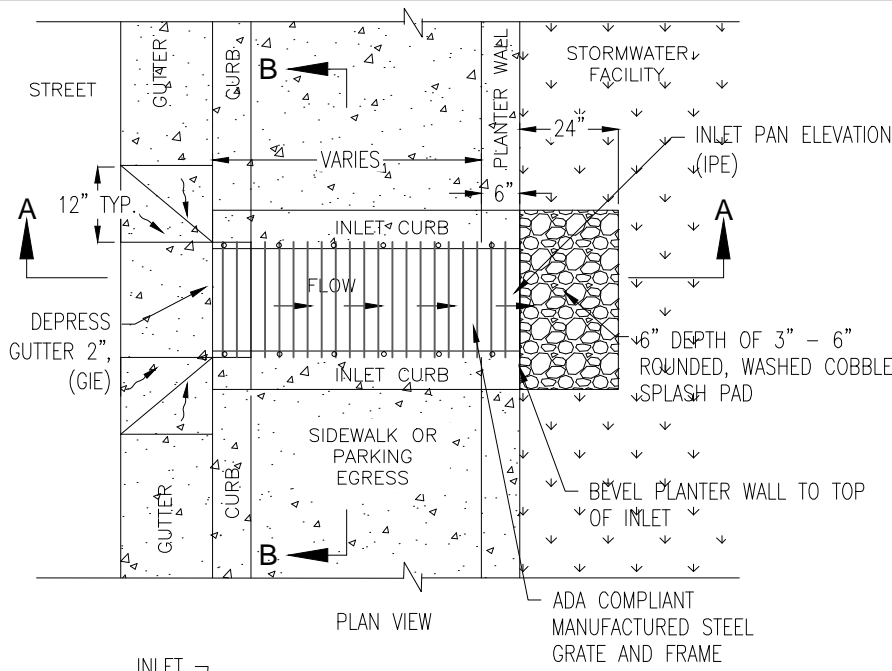
VERSION: 6/23/2016

detail number

Curb Cut Inlet with Gravel Energy Dissipation

122

Municipality
Department Name



BIORETENTION DESIGN NOTES

1. FOR USE WITH STORMWATER FACILITIES WITH SLOPED SIDES OR FLAT BOTTOMS.
2. PROVIDE SPOT ELEVATIONS ON PLANS (FE, OE, GIE, IPE). SEE DETAILS 100, 101.
3. REFER TO MUNICIPAL STANDARD DRAWINGS AND MATCH GUTTER PAN OF ADJACENT CURB AND GUTTER.
4. IF SLOPED SIDES, WHERE INLET FLOW VELOCITY IS HIGH, EXTEND COBBLE INTO FACILITY, BUT AVOID EXCESSIVE USE.
5. BASE MATERIAL FOR CURB, GUTTER, AND SIDEWALK PER MUNICIPAL STANDARDS.

CONSTRUCTION NOTES

1. AFTER CONSTRUCTION PLACE SAND BAGS AT GUTTER OPENINGS TO KEEP STORM FLOWS FROM ENTERING FACILITY UNTIL VEGETATION IS ESTABLISHED.

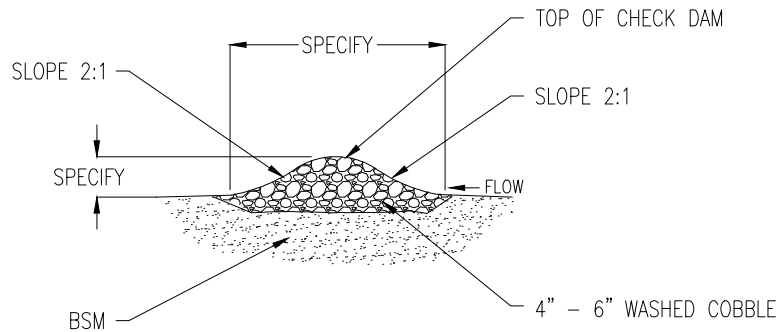
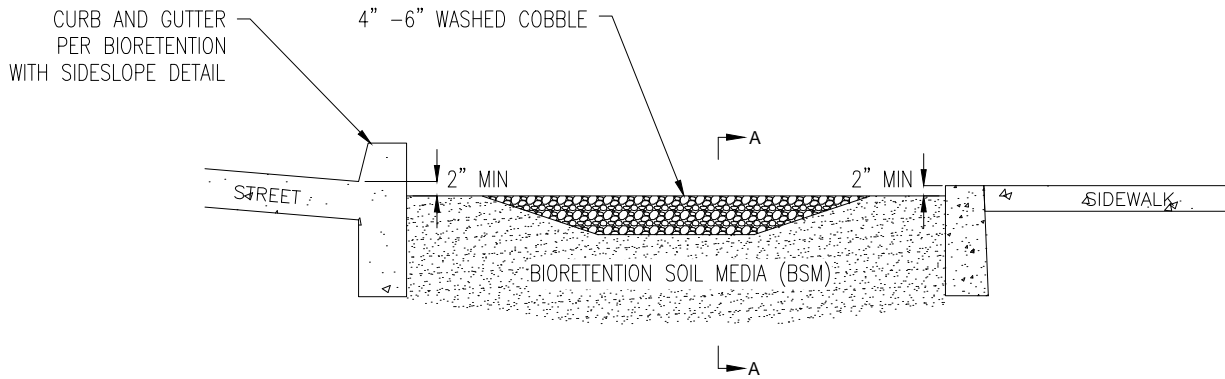
INLET WITH GRATE

N.T.S.

123

Inlet with Grate

123



SECTION A-A

BIORETENTION DESIGN NOTES

1. FOR USE WITH STORMWATER FACILITIES WITH SLOPED SIDES.
2. BEST SUITED FOR FACILITIES WITH $< \text{OF } \leq \text{THAN } 2\%$ LONGITUDINAL SLOPE.
3. PROVIDE ELEVATIONS AND STATIONING AND/OR DIMENSIONING FOR CHECK DAMS.
4. SPACE CHECK DAMS TO MAXIMIZE PONDING ACROSS ENTIRE CELL.
5. ENSURE THAT CHECK DAM ELEVATIONS DO NOT CAUSE STORMWATER TO OVERFLOW TO SIDEWALK.

CONSTRUCTION NOTES

1. DO NOT WORK DURING RAIN OR UNDER WET CONDITIONS.
2. KEEP ALL HEAVY MACHINERY OUTSIDE BIORETENTION AREA LIMITS.

GRAVEL CHECK DAM

N.T.S.

130

LOW IMPACT DEVELOPMENT STORMWATER MANAGEMENT STANDARD DETAILS

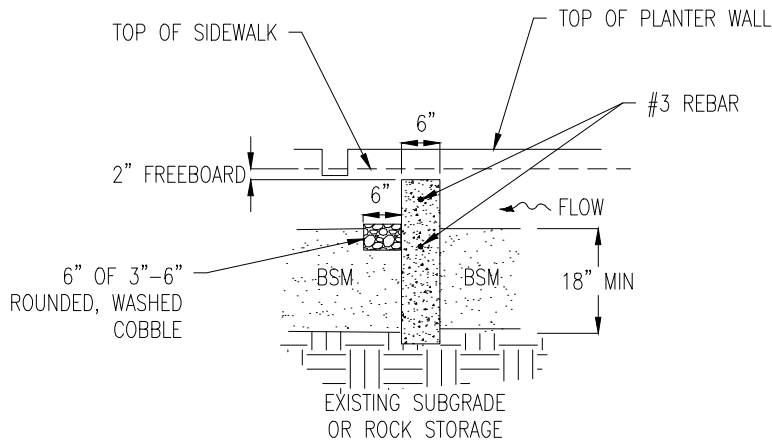
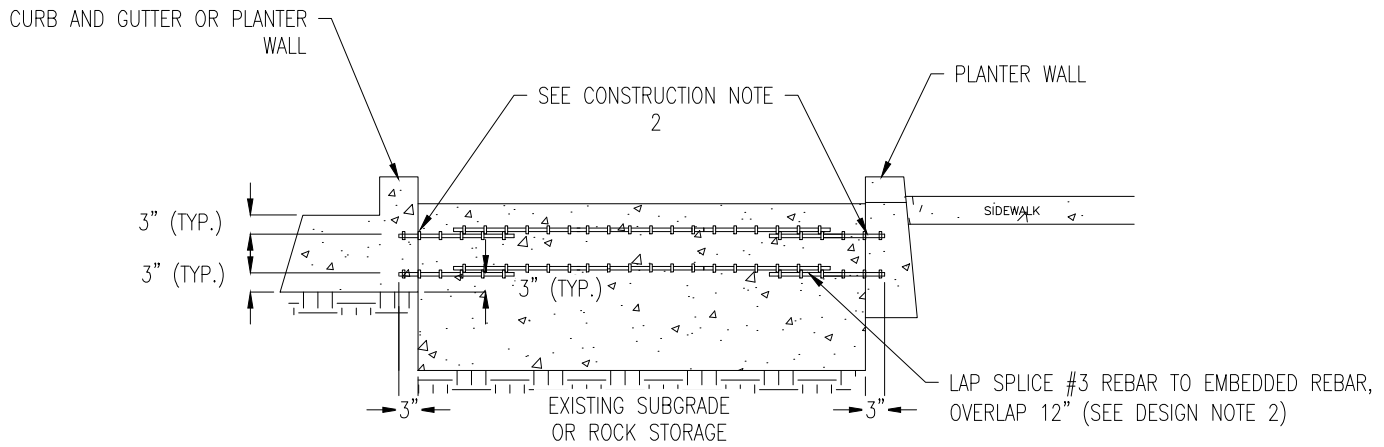
VERSION: 6/23/2016

detail number

Gravel Check Dam

130

Municipality
Department Name



BIORETENTION DESIGN NOTES

1. FOR USE WITH BIORETENTION PLANTERS OR SLOPED SIDED SWALES/RAIN GARDENS.
2. FOR CHECK DAMS LONGER THAN 12' SPECIFY REBAR OVERLAP LENGTH.
3. SPACE CHECK DAMS TO MAXIMIZE PONDING ACROSS CELLS.
4. PROVIDE ELEVATIONS AND STATIONING AND/OR DIMENSIONING FOR CHECK DAMS.
5. ENSURE THAT CHECK DAM ELEVATIONS DO NOT CAUSE STORMWATER TO OVERFLOW TO SIDEWALK.
6. SHOW PLANTER WALL EMBEDDED IN EXISTING SUBGRADE OR DRAINROCK.

CONSTRUCTION NOTES

1. EMBED #3 REBAR 3" INTO CURB AND PLANTER WALL.
2. DO NOT WORK DURING RAIN OR UNDER WET CONDITIONS.
3. KEEP ALL HEAVY MACHINERY OUTSIDE BIORETENTION AREA LIMITS.

CONCRETE CHECK DAM
N.T.S.

131

LOW IMPACT DEVELOPMENT STORMWATER MANAGEMENT STANDARD DETAILS

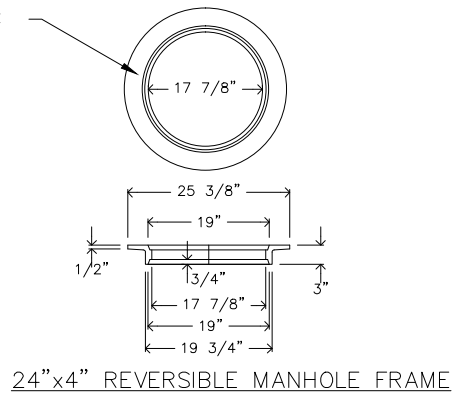
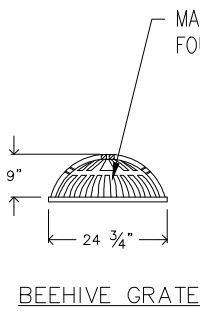
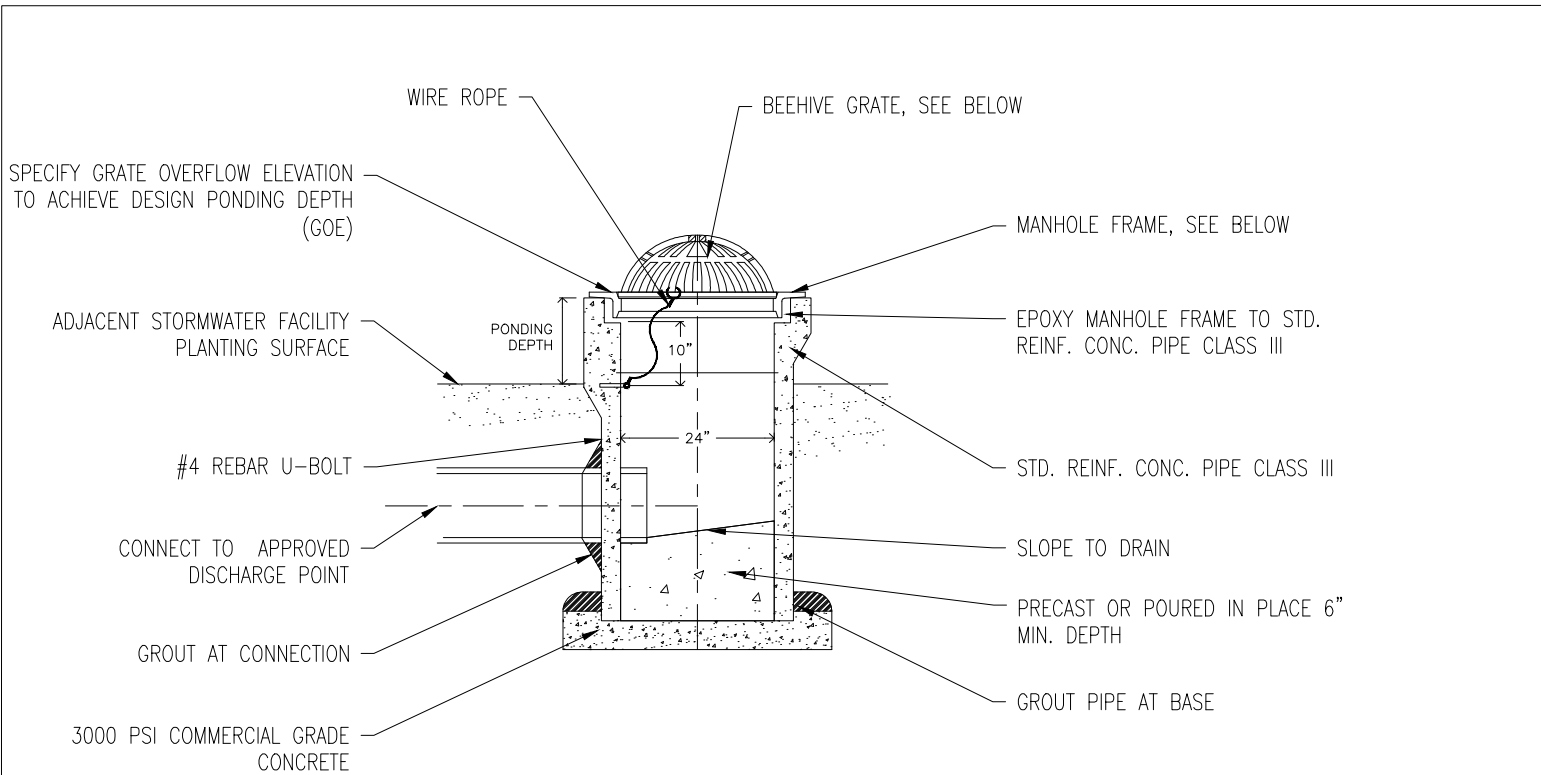
VERSION: 6/23/2016

detail number

Concrete Check Dam

131

Municipality
Department Name



DESIGN NOTES

1. PROVIDE GRATE OVERFLOW ELEVATION ON PLANS.
2. TO INCORPORATE FLEXIBILITY INTO DESIGN OVERFLOW ELEVATION OR CORRECT ELEVATION OF AN EXISTING STRUCTURE, INSTALL OVERFLOW COLLAR, PER DETAIL 141.

CONSTRUCTION NOTES

1. DO NOT ADJUST OVERFLOW GRATE ELEVATION, CONSTRUCT AS SHOWN ON PLANS.

OVERFLOW STRUCTURE 140
N.T.S.

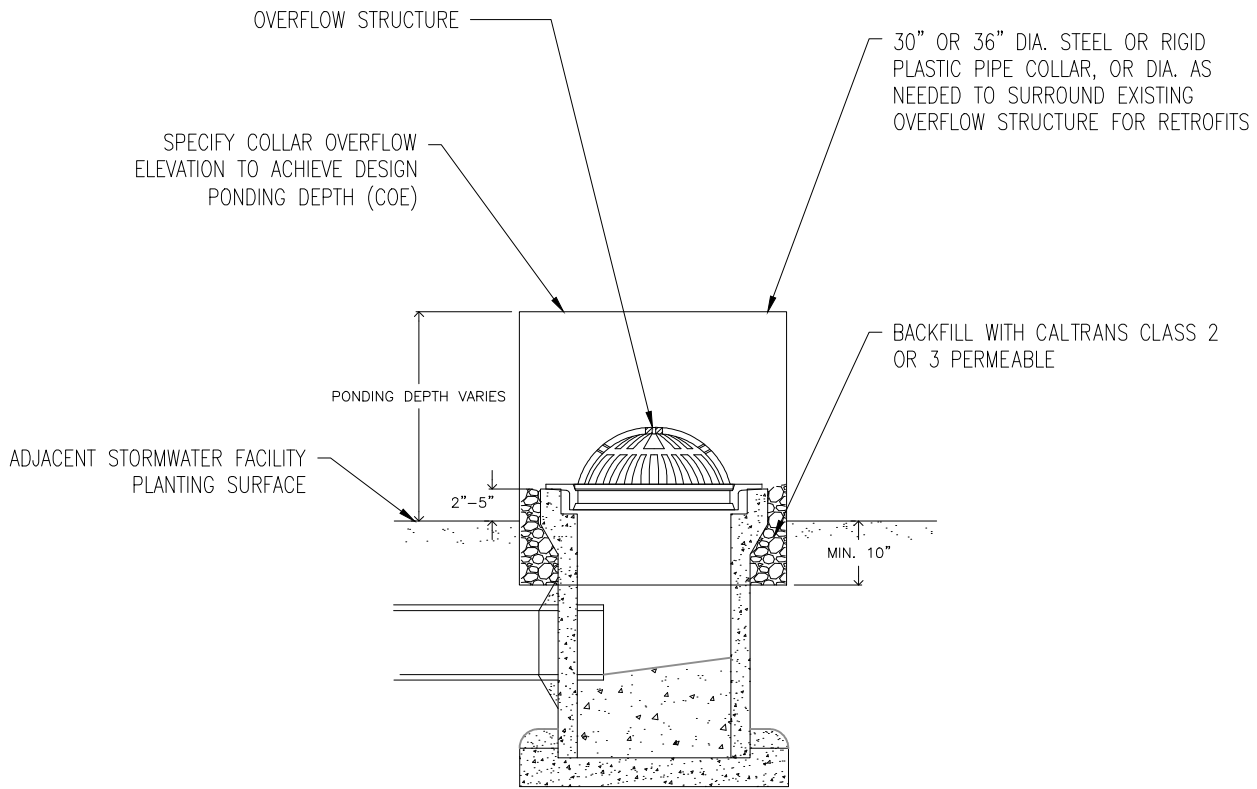
LOW IMPACT DEVELOPMENT STORMWATER MANAGEMENT STANDARD DETAILS VERSION: 6/23/2016

detail number

**Overflow Structure w/
Beehive Grate**

Municipality
Department Name

140



DESIGN NOTES

1. MAY BE USED IN CONJUNCTION WITH OVERFLOW STRUCTURES TO ALLOW FOR FIELD ADJUSTMENT OF OVERFLOW ELEVATION, OR AS RETROFIT TO CORRECT EXISTING STRUCTURE THAT DOES NOT ALLOW PONDING TO OCCUR.
2. PROVIDE COLLAR OVERFLOW ELEVATION (COE) ON PLANS.

CONSTRUCTION NOTES

1. CENTER COLLAR ON OVERFLOW GRATE.

OVERFLOW STRUCTURE COLLAR

N.T.S.

141

LOW IMPACT DEVELOPMENT STORMWATER MANAGEMENT STANDARD DETAILS

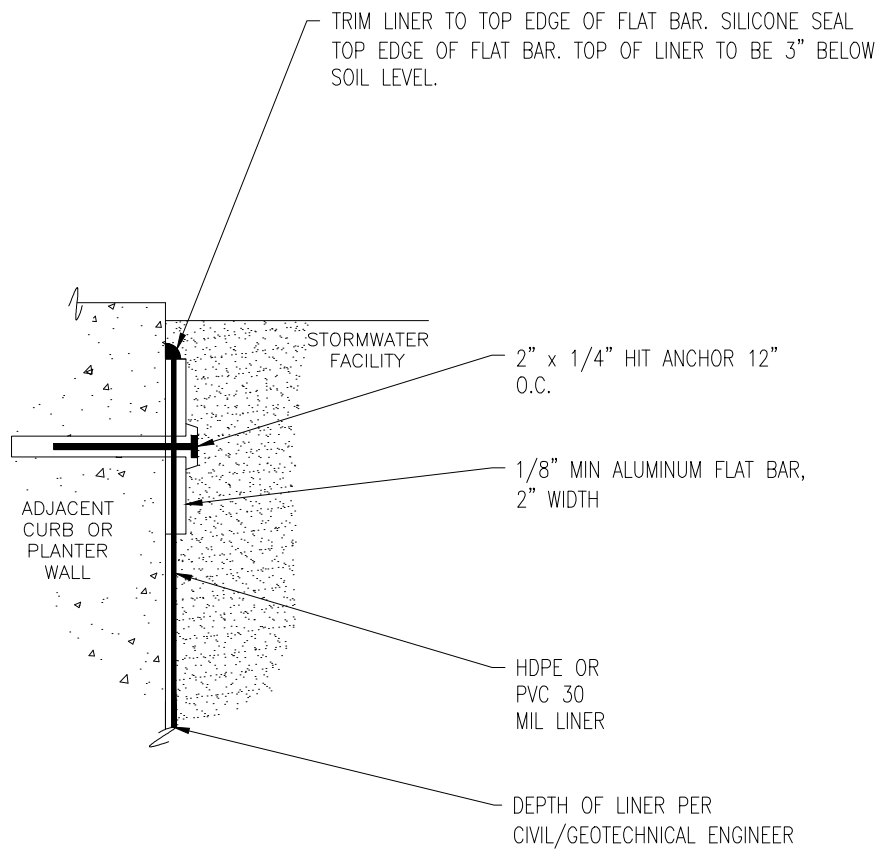
VERSION: 6/23/2016

detail number

Overflow Structure Collar

141

Municipality
Department Name



IMPERMEABLE LAYER

N.T.S.

150

LOW IMPACT DEVELOPMENT STORMWATER MANAGEMENT STANDARD DETAILS

VERSION: 6/23/2016

detail number

Impermeable Layer

150

Municipality
Department Name

TREES

Native	Scientific Name	Common Name	Planting Area	Height	Spread	Exposure	Type	Bioretention Characteristics								Notes
								Plant Inundation Zone A	Plant Inundation Zone B	Small Planting Strips (<5' wide)	Large Planting Strips (>5' wide)	Tolerates Periodic Inundation	Tolerates Prolonged Dry Periods	Requires Good Drainage	Wind Tolerant	
X	Cercis occidentalis	Western Redbud	Small	20'	20'	Full Sun	Deciduous		X	X		X	X			Small tree or large shrub, tolerates clay, winter wet, drought, flowers stronger with frosts
X	Chilopsis linearis	Desert Willow	Small	25'	30'	Full Sun	Deciduous		X		X	X	X		X	Tolerates alkaline soil, sand, clay, seasonal flooding and drought, not coastal conditional
X	Platanus racemosa	California Sycamore	Large	40'-80'	40'-70'	Full Sun	Deciduous		X							Tolerates sand and clay soils, seasonal flooding, needs space to grow, avoid underground water/sewer pipes
X	Quercus agrifolia	Coast Live Oak	Medium	25'-60'	40'-70'	Full Sun- Shade	Deciduous		X		X		X	X	X	Tolerates drought and winter wet conditions, mature trees produce significant litter limiting understory plantings, need space to grow

SHRUBS

Native	Scientific Name	Common Name	Height	Spread	Exposure	Type	Bioretention Characteristics								Notes	
							Plant Inundation Zone A	Plant Inundation Zone B	Small Planting Strips (<5' wide)	Large Planting Strips (>5' wide)	Tolerates Periodic Inundation	Tolerates Prolonged Dry Periods	Requires Good Drainage	Wind Tolerant		
X	Baccharis pilularis consanguinea	Coyote Brush	3'-6'	5'	Sun	Evergreen		X	X	X	X				X	Adaptable evergreen shrub, provides quick cover and bank stabilization, tolerant of coastal conditions, alkaline soil, sand, clay and seasonal wet
X	Heteromeles arbutifolia	Toyon, Christmas Berry	6'-10'	4'-5'	Sun	Evergreen		X		X	X				X	Tolerates sand, clay and serpentine soils, seasonal water with good drainage
X	Iris douglasiana	Douglas Iris	3'	1'-2'	Full Sun- Partial Shade	Grass		X	X		X					Tolerates sand, clay and serpentine soils, seasonal wet (but not soggy) soils and drought
X	Myrica californica	Pacific Wax Myrtle	15'	15'	Sun	Evergreen		X	X		X				X	Large shrub or small tree, tolerates coastal conditions, sand, clay and seasonal inundation
X	Rosa californica	California Rose	3'-6'	3'-5'	Sun-Partial Shade	Deciduous	X	X	X	X	X	X				Tolerates a wide variety of soils, seasonal flooding and some drought, spreads aggressively, avoid edges of walkways because of thorns
X	Sambucus mexicana	Mexican Elderberry	8'-12'	8'	Sun-Partial Shade	Deciduous		X		X	X				X	Large shrub to tree, tolerates clay, seasonal flooding and drought, good wildlife food source
X	Solidago californica	California Goldenrod	1'-4'	1'-4'	Full Sun- Partial Shade	Herbaceous Perennial		X	X	X	X	X				Tolerates poor soils, seasonal wet and drought, can spread aggressively if over irrigated

LID Recommended Plant List

Trees and Shrubs

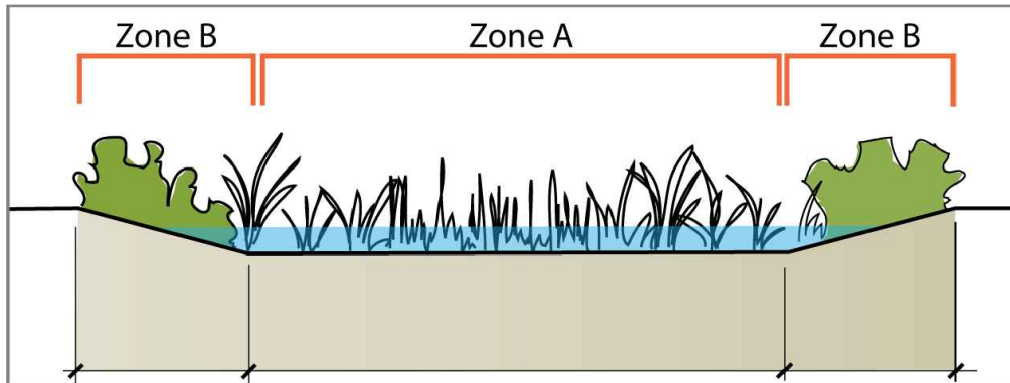
GROUNDCOVER AND VINES

Bioretention Characteristics

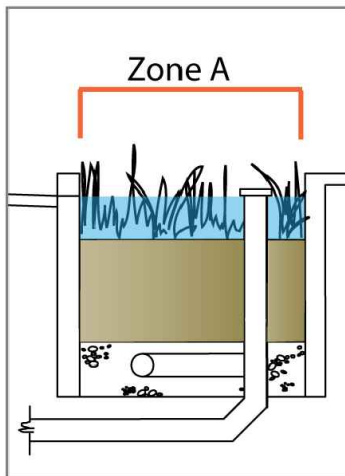
Native	Scientific Name	Common Name	Height	Spread	Exposure	Type	Bioretention Characteristics						Notes
							Plant Inundation Zone A	Plant Inundation Zone B	Tolerates Periodic Inundation	Tolerates Prolonged Dry Periods	Requires Good Drainage	Tolerates Mowing	
	Carex divulsa	Berkeley Sedge, Grey Sedge	12"-18"	12"-18"	Full Sun-Partial Shade	Grass	X	X	X	X			Tolerates foot traffic, some drought and boggy soils
X	Carex pansa	California Meadow Sedge	6"-8"	N/A	Full Sun-Partial Shade	Grass	X	X	X		X		Good lawn substitute, tolerates wide range of growing conditions, seasonal inundation, drought, foot traffic and mowing
X	Carex praegracilis	Clustered Field Sedge	3'-4'	2'-3'	Full Sun-Partial Shade	Grass	X		X	X		X	Useful lawn substitute and bank stabilizer, good planted in masses, tolerates wide range of growing conditions, foot traffic and mowing, may look weedy when mixed with other plants
X	Carex spissa	San Diego Sedge	6"-8"	N/A	Full Sun-Partial Sun	Grass	X	X	X			X	A large grass, tolerates alkaline soil, clay, serpentine, seasonal inundation, and deer
	Chondropetalum tectorum	Small Cape Rush	2'-3'	3'-4'	Full Sun-Partial Sun	Grass	X	X	X	X		X	A tough, attractive reed-like plant, tolerates boggy or clay soils and drought once established, Chondropetalum elephantinum is a much larger species
X	Festuca rubra 'molate'	Molate Red Fescue	Up to 10"	4"-40"	Full Sun-Partial Shade	Evergreen Perennial	X	X	X			X	A tufted, spreading bunchgrass, good lawn substitute, provides erosion control, tolerates wet conditions, but looks best with regular water, tolerates drought once established
X	Juncus effusus	Soft Rush	1'-2'	1'-2'	Full Sun-Partial Shade	Grass	X		X				Tolerates poor drainage, heavy soils, needs more supplemental water than Juncus patens
X	Juncus patens	Wire Grass, Blue Rush	2'-3'	Running	Full Sun	Grass	X		X	X			Strong performance in bioretention areas, tolerates poor drainage, seasonal inundation, drought, shade
X	Leymus condensatus	Canyon Prince Wild Rye	1'-2'	N/A	Partial Shade	Grass		X	X	X			tolerates drought, wet, but not soggy soils, looks best with supplemental irrigation, spreads by rhizomes
X	Muhlenbergia rigens	Deer Grass	6'-8'	6'-8'	Full Sun-Partial Shade	Evergreen Shrub		X	X	X			A large grass, tolerates sandy and clay soils, seasonal inundation, best when cut back annually to remove old thatch

LID Recommended Plant List Groundcover and Vines

Varying slope and ponding levels: Varying slope and ponding levels: This bioretention planting area has sloped edges. Plants in the bottom area will be inundated during storms (**Zone A**). Those planted on the sideslopes are above the level of ponding, but will experience seasonally wet conditions (**Zone B**).



Uniform surface grade: This stormwater planter has a flat bottom with consistent depth of ponding across the structure. All of the plants selected for this design must be tolerant of periodic inundation (**Zone A**).



Planting Inundation Zones

162