**Design Notes**

1. Additional design guidance provided in bioretention facility figure 4.1 & 4.2 of the BASMAA Post-construction manual.

2. Overflow structure required for in-line systems without overflow bypass, see detail SWQ-140.

3. Provide spot elevations at inlets on civil plans (FE, OE, GIE, SIE). See detail SWQ-120.

4. Edge condition will vary for new and retrofit projects. Curb, wall, and sidewalk details may be modified for project by civil and geotechnical engineers and approved by public works department.

5. If check dams are needed, see concrete check dam detail SWQ-131.

6. If Caltrans Class 2 permeable is not available, substitute Class 3 permeable with an overlying 3" deep layer of 3/4" (No.4) open-graded aggregate. (Verify with city of Napa Construction Division)


8. Planting design and irrigation per BASMAA post-construction manual - Plant matrix appendix F.

9. Mulch (optional) per BASMAA post-construction manual - Plant matrix appendix F.

10. Locate energy dissipation cobble only as specified in inlet details - Avoid decorative use.

**Construction Notes**

1. Scarify subgrade before installing bioretention area aggregate and BSM.

2. Facility excavation to allow for specified soil and mulch depths to achieve finished elevations on civil plans.

3. Compact each 6" lift of BSM with landscape roller or by lightly wetting. If wetting, allow to dry overnight before planting.

4. Do not work within bioretention area during rain or under wet conditions.

5. Keep heavy machinery outside bioretention area limits.
DESIGN NOTES
1. ADDITIONAL DESIGN GUIDANCE PROVIDED IN BIORETENTION FACILITY FIGURE 4.1 & 4.2 OF THE BASMAA POST-CONSTRUCTION MANUAL.

2. OVERFLOW STRUCTURE REQUIRED FOR IN-LINE SYSTEMS WITHOUT OVERFLOW BYPASS, SEE DETAIL, SWQ-140.

3. PROVIDE SPOT ELEVATIONS AT INLETS ON CIVIL PLANS (FE, OE, GIE, SIE), SEE DETAIL SWQ-120.

4. EDGE CONDITION WILL VARY FOR NEW AND RETROFIT PROJECTS. CURB, WALL, AND SIDEWALK DETAILS MAY BE MODIFIED FOR PROJECT BY CIVIL AND GEOTECHNICAL ENGINEERS AND APPROVED BY PUBLIC WORKS DEPARTMENT.

5. IF CHECK DAMS ARE NEEDED, SEE CONCRETE CHECK DAM DETAIL, SWQ-131.

6. IF CALTRANS CLASS 2 PERMEABLE IS NOT AVAILABLE, SUBSTITUTE CLASS 3 PERMEABLE WITH AN OVERLYING 3" DEEP LAYER OF 3/4" (NO. 4) OPEN-GRADED AGGREGATE. (VERIFY WITH CITY OF NAPA CONSTRUCTION DIVISION)

7. BIORETENTION SOIL MEDIA (BSM) SPECIFICATION PER BASMAA POST-CONSTRUCTION MANUAL.

8. PLANTING DESIGN AND IRRIGATION PER BASMAA POST-CONSTRUCTION MANUAL - PLANT MATRIX APPENDIX F.

9. MULCH (OPTIONAL) PER BASMAA POST-CONSTRUCTION MANUAL - PLANT MATRIX APPENDIX F.

10. LOCATE ENERGY DISSIPATION COBBLE ONLY AS SPECIFIED IN INLET DETAILS - AVOID DECORATIVE USE.

CONSTRUCTION NOTES
1. SCARIFY SUBGRADE BEFORE INSTALLING BIORETENTION AREA AGGREGATE AND BSM.

2. FACILITY EXCAVATION TO ALLOW FOR SPECIFIED SOIL AND MULCH DEPTHS TO ACHIEVE FINISHED ELEVATIONS ON CIVIL PLANS.

3. COMPACT EACH 6" LIFT OF BSM WITH LANDSCAPE ROller OR BY LIGHTLY WETTING. IF WETTING, ALLOW TO DRY OVERNIGHT BEFORE PLANTING.

4. DO NOT WORK WITHIN BIORETENTION AREA DURING RAIN OR UNDER WET CONDITIONS.

5. KEEP HEAVY MACHINERY OUTSIDE BIORETENTION AREA LIMITS.

CITY OF NAPA
STREET BIORETENTION FACILITY
(FAT/PLANTER, ON-STREET PARKING, SIDEWALK, WITHOUT UNDERDRAIN)

PUBLIC WORKS DEPARTMENT

DRAWN BY: LJM
CHECKED BY: GM
DATE: 3/2017
APPROVED BY: JRL
SCALE: NONE
DRAWING NO: SWQ-101
FIELD NOTES:
DESIGN NOTES
1. ADDITIONAL DESIGN GUIDANCE PROVIDED IN BIORETENTION FACILITY FIGURE 4.1 & 4.2 OF BASMAA POST-CONSTRUCTION MANUAL.
2. OVERFLOW STRUCTURE REQUIRED FOR IN-LINE SYSTEMS WITHOUT OVERFLOW BYPASS, DETAIL SWQ-140.
4. MAX. LONGITUDINAL SLOPE 6% WITH CHECK DAMS. SEE DETAILS SWQ-130, SWQ-131.
5. EDGE CONDITION WILL VARY FOR NEW AND RETROFIT PROJECTS. CURB AND SIDEWALK DETAILS MAY BE MODIFIED FOR PROJECT BY CIVIL AND GEOTECHNICAL ENGINEERS AND APPROVED BY PUBLIC WORKS DEPARTMENT.
6. IF CALTRANS CLASS 2 PERMEABLE IS NOT AVAILABLE, SUBSTITUTE CLASS 3 PERMEABLE WITH AN OVERLAYING 3" DEEP LAYER OF 3/4" (NO. 4) OPEN-GRADED AGGREGATE. (VERIFY WITH CITY OF NAPA CONSTRUCTION DIVISION)
7. BIORETENTION SOIL MEDIA (BSM) SPECIFICATION PER BASMAA POST-CONSTRUCTION MANUAL.
8. PLANTING DESIGN AND IRRIGATION PER BASMAA POST-CONSTRUCTION MANUAL APPENDIX F - PLANT MATRIX.
9. MULCH (OPTIONAL) PER BASMAA POST-CONSTRUCTION MANUAL APPENDIX F - PLANT MATRIX.
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CONSTRUCTION NOTES
1. SCARIFY SUBGRADE BEFORE INSTALLING BIORETENTION AREA AGGREGATE AND BSM.
2. FACILITY EXCAVATION TO ALLOW FOR SPECIFIED SOIL AND MULCH DEPTHS TO ACHIEVE FINISHED ELEVATIONS ON CIVIL PLANS.
3. COMPACT EACH 6" LIFT OF BSM WITH LANDSCAPE ROLLER OR BY LIGHTLY WETTING. IF WETTING, ALLOW TO DRY OVERNIGHT BEFORE PLANTING.
4. DO NOT WORK WITHIN BIORETENTION AREA DURING RAIN OR UNDER WET CONDITIONS.
5. KEEP HEAVY MACHINERY OUTSIDE BIORETENTION AREA LIMITS.
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1. ADDITIONAL DESIGN GUIDANCE PROVIDED IN BIORETENTION FACILITY FIGURE 4.1 & 4.2 OF THE BASMAA POST-CONSTRUCTION MANUAL.

2. OVERFLOW STRUCTURE REQUIRED FOR IN-LINE SYSTEMS WITHOUT OVERFLOW BYPASS, DETAIL SWQ-140.

3. PROVIDE SPOT ELEVATIONS AT INLETS ON CIVIL PLANS (FE, OE, GIE, SE). SEE DETAIL SWQ-121.

4. MAX. LONGITUDINAL SLOPE 6% WITH CHECK DAMS. SEE DETAILS SWQ-130, SWQ-131.

5. EDGE CONDITION WILL VARY FOR NEW AND RETROFIT PROJECTS. CURB AND SIDEWALK DETAILS MAY BE MODIFIED FOR PROJECT BY CIVIL AND GEOTECHNICAL ENGINEERS AND APPROVED BY PUBLIC WORKS DEPARTMENT.

6. IF CALTRANS CLASS 2 PERMEABLE IS NOT AVAILABLE, SUBSTITUTE CLASS 3 PERMEABLE WITH AN OVERLAYING 3" DEEP LAYER OF 3/4" (NO. 4) OPEN-GRATED AGGREGATE. [VERIFY WITH CITY OF NAPA CONSTRUCTION DIVISION]

7. BIORETENTION SOIL MEDIA (BSM). SPECIFICATION PER BASMAA POST-CONSTRUCTION MANUAL.

8. PLANTING DESIGN AND IRRIGATION PER BASMAA POST-CONSTRUCTION MANUAL APPENDIX F - PLANT MATRIX.

9. MULCH (OPTIONAL) PER BASMAA POST-CONSTRUCTION MANUAL APPENDIX F - PLANT MATRIX.

10. LOCATE ENERGY DISSIPATION COBBLE ONLY AS SPECIFIED IN INLET DETAILS - AVOID DECORATIVE USE.

CONSTRUCTION NOTES

1. SCARIFY SUBGRADE BEFORE INSTALLING BIORETENTION AREA AGGREGATE AND BSM.

2. FACILITY EXCAVATION TO ALLOW FOR SPECIFIED SOIL AND MULCH DEPTHS TO ACHIEVE FINISHED ELEVATIONS ON CIVIL PLANS.

3. COMPACT EACH 6'-LIFT OF BSM WITH LANDSCAPE ROLLER OR BY LIGHTLY WETTING. IF WETTING, ALLOW TO DRY OVERNIGHT BEFORE PLANTING.

4. DO NOT WORK WITHIN BIORETENTION AREA DURING RAIN OR UNDER WET CONDITIONS.

5. KEEP HEAVY MACHINERY OUTSIDE BIORETENTION AREA LIMITS.
**DESIGN NOTES**

1. ADDITIONAL DESIGN GUIDANCE PROVIDED IN BIORETENTION FACILITY FIGURE 4.1 & 4.2 OF THE BASMAA POST-CONSTRUCTION MANUAL.

2. OVERFLOW STRUCTURE REQUIRED FOR IN-LINE SYSTEMS WITHOUT OVERFLOW BYPASS, DETAIL SWQ-140.

3. PROVIDE SPOT ELEVATIONS AT INLET ON CIVIL PLANS (FE, OE, GIE, SE). SEE DETAIL SWQ-120.

4. EDGE CONDITION WILL VARY FOR PARKING LOT PROJECTS. SEE PARKING LOT EDGE OPTIONS DETAILS SWQ-114. CURB AND FLUSH EDGE DETAILS MAY BE MODIFIED FOR PROJECT BY CIVIL AND GEOTECHNICAL ENGINEERS AND APPROVED BY PUBLIC WORKS DEPARTMENT.

5. IF CHECK DAMS ARE NEEDED, SEE CONCRETE CHECK DAM DETAIL SWQ-131.

6. IF CALTRANS CLASS 2 PERMEABLE IS NOT AVAILABLE, SUBSTITUTE CLASS 3 PERMEABLE WITH AN OVERLYING 3” DEEP LAYER OF 3/4” (NO. 4) OPEN-GRADED AGGREGATE. (VERIFY WITH CITY OF NAPA CONSTRUCTION DIVISION)

7. BIORETENTION SOIL MEDIA (BSM) SPECIFICATION PER BASMAA POST-CONSTRUCTION MANUAL.

8. PLANTING DESIGN AND IRRIGATION PER BASMAA POST-CONSTRUCTION MANUAL APPENDIX F-PLANT MATRIX.

9. MULCH (OPTIONAL) PER BASMAA POST-CONSTRUCTION MANUAL APPENDIX F-PLANT MATRIX.

10. LOCATE ENERGY DISSIPATION COBBLE ONLY AS SPECIFIED IN INLET DETAILS—AVOID DECORATIVE USE.

**CONSTRUCTION NOTES**

1. SCARIFY SUBGRADE BEFORE INSTALLING BIORETENTION AREA AGGREGATE AND BSM.

2. FACILITY EXCAVATION TO ALLOW FOR SPECIFIED SOIL AND MULCH DEPTHS TO ACHIEVE FINISHED ELEVATIONS ON CIVIL PLANS.

3. COMPACT EACH 6” LIFT OF BSM WITH LANDSCAPE ROLLER OR BY LIGHTLY WETTING. IF WETTING, ALLOW TO DRY OVERNIGHT BEFORE PLANTING.

4. DO NOT WORK WITHIN BIORETENTION AREA DURING RAIN OR UNDER WET CONDITIONS.

5. KEEP HEAVY MACHINERY OUTSIDE BIORETENTION AREA LIMITS.
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1. ADDITIONAL DESIGN GUIDANCE PROVIDED IN BIORETENTION FACILITY FIGURE 4.1 & 4.2 OF THE BASMAA POST-CONSTRUCTION MANUAL.
2. OVERFLOW STRUCTURE REQUIRED FOR IN-LINE SYSTEMS WITHOUT OVERFLOW BYPASS, DETAIL SWQ-140.
3. PROVIDE SPOT ELEVATIONS AT INLETS ON CIVIL PLANS (FE, OE, GIE, SE). SEE DETAIL SWQ-121.
4. MAX. LONGITUDINAL SLOPE 6% WITH CHECK DAMS, SEE DETAILS SWQ-130, SWQ-131.
5. EDGE CONDITION WILL VARY FOR PARKING LOT PROJECTS. SEE PARKING LOT EDGE OPTIONS DETAILS, SWQ-114. CURB AND FLUSH EDGE DETAILS MAY BE MODIFIED FOR PROJECT BY CIVIL AND GEOTECHNICAL ENGINEERS AND APPROVED BY PUBLIC WORKS DEPARTMENT.
6. IF CALTRANS CLASS 2 PERMEABLE IS NOT AVAILABLE, SUBSTITUTE CLASS 3 PERMEABLE WITH AN OVERLAYING 3" DEEP LAYER 3/4" (NO. 4) OPEN- GRADED AGGREGATE. (VERIFY WITH CITY OF NAPA CONSTRUCTION DIVISION)
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3. COMPACT EACH 6" LIFT OF BSM WITH LANDSCAPE ROLLER OR BY LIGHTLY WETTING. IF WETTING, ALLOW TO DRY OVERNIGHT BEFORE PLANTING.
4. DO NOT WORK WITHIN BIORETENTION AREA DURING RAIN OR UNDER WET CONDITIONS.
5. KEEP HEAVY MACHINERY OUTSIDE BIORETENTION AREA LIMITS.
DESIGN NOTES

1. Special design consideration or structural review may be required for longer planter wall spans. Steel reinforcement or additional concrete check dams may be needed for stability.

2. Edge condition will vary for new and retrofit projects. Curb, gutter, and wall details may be modified by civil and geotechnical engineers and approved by Public Works Department. Note that 24" gutter provides greater curb stability, but may not match City of Napa gutter standards.

3. Concrete and expansion joints shall meet the requirements of the municipality.

CONSTRUCTION NOTES

1. Finish all exposed concrete surfaces.
1. SPECIAL DESIGN CONSIDERATION OR STRUCTURAL REVIEW MAY BE REQUIRED FOR LONGER SWALE EDGE SPANS. STEEL REINFORCEMENT OR ADDITIONAL CONCRETE CHECK DAMS MAY BE NEEDED FOR STABILITY.

2. 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.

3. CONCRETE AND EXPANSION JOINTS SHALL MEET THE REQUIREMENTS OF THE CITY OF NAPA.

CONSTRUCTION NOTES

1. FINISH ALL EXPOSED CONCRETE SURFACES.
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 CITY OF NAPA.

CONSTRUCTION NOTES

1. FINISH ALL EXPOSED CONCRETE SURFACES.
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 AND APPROVED BY PUBLIC WORKS DEPARTMENT.

3. CONCRETE AND EXPANSION JOINTS SHALL MEET THE REQUIREMENTS OF THE CITY OF NAPA.

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.
DEEP CURB DETAIL SWQ-111

STORMWATER FACILITY

PARKING LOT

DEEP CURB

CURB AND GUTTER DETAIL SWQ-110

STORMWATER FACILITY

PARKING LOT

CURB AND GUTTER

FLUSH CURB DETAIL SWQ-113

STORMWATER FACILITY

PARKING LOT

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.
DESIGN NOTES
1. FOR USE WITH STORMWATER FACILITIES WITH FLAT BOTTOMS.

2. PROVIDE SPOT ELEVATIONS ON PLANS (FE, OE, GI, IE). SEE DETAIL SWQ-100.

3. CURB AND WALL DETAILS MAY BE MODIFIED BY CIVIL AND GEOTECHNICAL ENGINEERS AND APPROVED BY PUBLIC WORKS DEPARTMENT.

4. CURB HEIGHT MAY BE REDUCED TO 4-INCHES WHERE ADJACENT TO A SIDEWALK. SEE DETAILS SWQ-110 & SWQ-111.

CONSTRUCTION NOTES
1. AFTER CONSTRUCTION PLACE SAND BAGS AT GUTTER OPENINGS TO KEEP STORM FLOWS FROM ENTERING FACILITY UNTIL VEGETATION IS ESTABLISHED.
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 AND APPROVED BY PUBLIC WORKS DEPARTMENT.

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 SWQ-110 & SWQ-111.

CONSTRUCTION NOTES

1. AFTER CONSTRUCTION, PLACE SAND BAGS AT GUTTER OPENINGS TO KEEP STORM FLOWS FROM ENTERING FACILITY UNTIL VEGETATION IS ESTABLISHED.
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, 161.

3. DROP FROM INLET TO AGGREGATE PAD WILL BE GREATER FOR PLANTERS.

4. CURB AND WALL DETAILS MAY BE MODIFIED BY CIVIL AND GEOTECHNICAL ENGINEERS AND APPROVED BY PUBLIC WORKS DEPARTMENT.

5. 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.
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 SWQ-100, SWQ-101.

3. REFER TO CITY OF NAPA 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 CITY OF NAPA STANDARDS.

CONSTRUCTION NOTES

1. AFTER CONSTRUCTION PLACE SAND BAGS AT GUTTER OPENINGS TO KEEP STORM FLOWS FROM ENTERING FACILITY UNTIL VEGETATION IS ESTABLISHED.
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 SWQ-100, SWQ-101.
3. REFER TO CITY OF NAPA 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 CITY OF NAPA STANDARDS.

CONSTRUCTION NOTES
1. AFTER CONSTRUCTION PLACE GRAVEL BAGS AT GUTTER OPENINGS TO KEEP STORM FLOWS FROM ENTERING FACILITY UNTIL VEGETATION IS ESTABLISHED.
2. GALVANIZED STEEL TO BE 1/4" THICK.
3. ALL CONCRETE SHALL BE CLASS "A" (6 SACK PER CUBIC YARD).
4. GALVANIZED STEEL BOX TO BE DESIGNED PER CITY STD. D-3B.
BIORETENTION DESIGN NOTES
1. FOR USE WITH STORMWATER FACILITIES WITH SLOPED SIDES.
2. BEST SUITTED FOR FACILITIES WITH < OF <= 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.
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.
SPECIFY GRATE OVERFLOW ELEVATION TO ACHIEVE DESIGN PONDING DEPTH (GPD)

PONDING DEPTH

ADJACENT STORMWATER FACILITY PLANTING SURFACE

#4 REBAR U-BOLT

CONNECT TO APPROVED DISCHARGED POINT

GROUT AT CONNECTION

3000 PSI COMMERCIAL GRADE CONCRETE

PRECAST OR Poured IN PLACE 6" MIN. DEPTH

MANHOLE FRAME, SEE BELOW

EPOXY MANHOLE FRAME TO STD. REINF. CONC. PIPE CLASS III

STD. REINF. CONC. PIPE CLASS III

SLOPE TO DRAIN

GROUT PIPE AT BASE

MANHOLE RING AND BEEHIVE GRATE MH25BH BY OLYMPIC FOUNDRY OR APPROVED EQUAL

BEEHIVE GRATE

24"x4" REVERSIBLE MANHOLE FRAME

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 SWQ-141.

CONSTRUCTION NOTES
1. DO NOT ADJUST OVERFLOW GRATE ELEVATION, CONSTRUCT AS SHOWN ON PLANS.
OVERFLOW STRUCTURE COLLAR

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.
TRIM LINER TO TOP EDGE OF FLAT BAR. SILICONE SEAL TOP EDGE OF FLAT BAR. TOP OF LINER TO BE 3' BELOW SOIL LEVEL.

STORMWATER FACILITY

2" x 1/4" HIT ANCHOR 12" O.C.

1/8" MIN ALUMINUM FLAT BAR, 2" WIDTH

HDPE OR PVC 30 MIL LINER

DEPTH OF LINER PER CIVIL/GEOTECHNICAL ENGINEER
<table>
<thead>
<tr>
<th>Plant Categories</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Grasses and Grass-like Plants</strong></td>
<td>Grass refer to those species that are monocotyledonous plants with slender-leaved herbage.</td>
</tr>
<tr>
<td><strong>Herbaceous Perennials and Groundcovers</strong></td>
<td>Herbaceous refers to those species with soft upper growth rather than woody growth. Some species will die back to the roots at the end of the growing season and grow again at the start of the next season. This list only includes those that are perennial, i.e., live for several years.</td>
</tr>
<tr>
<td><strong>Shrubs</strong></td>
<td>Shrub is a horticultural distinction that refers to those species of woody plants which are distinguished from trees by their multiple stems and lower height. A large number of plants can be either shrubs or trees, depending on the growing conditions they experience.</td>
</tr>
<tr>
<td><strong>Small Tree</strong></td>
<td>Small trees refer to those species of woody plants with a maximum size of 25' tall and wide.</td>
</tr>
<tr>
<td><strong>Tree</strong></td>
<td>Tree refers to those species of woody plants with one main trunk and a distinct and elevated head with a size greater than 25' tall or wide.</td>
</tr>
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<table>
<thead>
<tr>
<th>Water Preference</th>
<th>Details</th>
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</thead>
<tbody>
<tr>
<td><strong>Water Preference-Low/Moderate/High</strong></td>
<td>We have provided recommendations for irrigation. All plants should be watered with more frequency during the first two years after planting. After this establishment period, Low water use plants will only need supplemental irrigation at the hottest and driest sites. Plants with Moderate irrigation needs will be best with occasional supplemental water (once per week to once per month) and plants with High irrigation needs will be best with more frequent watering especially during periods of drought in the cooler seasons.</td>
</tr>
<tr>
<td><strong>Water Preference-Summer Irrigation</strong></td>
<td>Plants with a check in this column will not withstand a long period of summer drought without irrigation. Plants with an 'ok' in this column are tolerant of, but do not require, frequent summer irrigation. Plants with nothing in this column may not tolerate summer irrigation after establishment.</td>
</tr>
</tbody>
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<thead>
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<th>Stress Tolerance</th>
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<tbody>
<tr>
<td><strong>Tolerates Heat</strong></td>
<td>A check in the heat column indicates that the plant will tolerate hot sites. It should not be confused with a plants preference for sun. Absence of the check indicates it should only be used in areas close to the Bay or other cool sites.</td>
</tr>
<tr>
<td><strong>Tolerates Coast</strong></td>
<td>The coast column indicates plants that perform well within 1,000 feet of the ocean or bay. Most of these plants tolerate some amount of salt air, fog, and wind.</td>
</tr>
<tr>
<td><strong>Tolerates Wind</strong></td>
<td>A check in the wind column means that the plant will tolerate winds of ten miles per hour or more.</td>
</tr>
</tbody>
</table>

| Zone 1 | Plants that tolerate Zone 1 are common riparian, wetland and bog plants capable of surviving in saturated soils for long durations throughout the year. Most of these plants are not drought tolerant and require some water throughout the growing season. |
| Zone 2 | Plants that tolerate Zone 2 are common in riparian/upland transition areas, moist woodlands, and seasonal wetlands. They are capable of surviving in saturated soils for shorter durations especially in the winter or spring. Many of these plants tolerate summer drought but could benefit from some year-round moisture. |

<table>
<thead>
<tr>
<th>High Performers</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Best for irrigated sites</strong></td>
<td>These plants have been used successfully in irrigated bioretention areas in the Bay Area.</td>
</tr>
<tr>
<td><strong>Best for non-irrigated sites</strong></td>
<td>These plants have been used successfully in non-irrigated bioretention areas in the Bay Area. Temporary irrigation for establishment is highly recommended.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Origin</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>CA Native</strong></td>
<td>Indicates native or cultivar of California native. Cultivars offer habitat benefits to native wildlife and are adapted to the local climate but have reduced genetic diversity.</td>
</tr>
<tr>
<td>Scientific Name</td>
<td>Common Name</td>
</tr>
<tr>
<td>----------------</td>
<td>-------------</td>
</tr>
<tr>
<td>Bioretenion</td>
<td>Sedum and Euphorbia</td>
</tr>
<tr>
<td>Bioretenion</td>
<td>Calceolaria</td>
</tr>
<tr>
<td>Bioretenion</td>
<td>Dianthus and Phlox</td>
</tr>
<tr>
<td>Bioretenion</td>
<td>Echinacea and Echinops</td>
</tr>
<tr>
<td>Bioretenion</td>
<td>Geranium and Veronica</td>
</tr>
<tr>
<td>Bioretenion</td>
<td>Helianthus and Coreopsis</td>
</tr>
<tr>
<td>Bioretenion</td>
<td>Liatris and Monarda</td>
</tr>
<tr>
<td>Bioretenion</td>
<td>Nepeta and Stachys</td>
</tr>
<tr>
<td>Bioretenion</td>
<td>Solidago and Salvia</td>
</tr>
<tr>
<td>Bioretenion</td>
<td>Symphyotrichum and Monarda</td>
</tr>
</tbody>
</table>

*Notes: All plants require regular watering and full sun exposure.*
<table>
<thead>
<tr>
<th>Scientific name</th>
<th>Common name</th>
<th>Light Preference</th>
<th>Size</th>
<th>Watering</th>
<th>Erosion Resistance</th>
<th>High Performance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sorghum bicolor</td>
<td>Sorghum</td>
<td>Full Sun</td>
<td>15-6</td>
<td>3</td>
<td>Full</td>
<td>Need for irrigation</td>
</tr>
<tr>
<td>Phragmites australis</td>
<td>Phragmites</td>
<td>Full Sun</td>
<td>5-5</td>
<td>3-6</td>
<td>Partial</td>
<td>Need for irrigation</td>
</tr>
<tr>
<td>Schoenoplectus californicus</td>
<td>Schoenoplectus</td>
<td>Partial Shade</td>
<td>3-3</td>
<td>2-4</td>
<td>Partial</td>
<td>Need for irrigation</td>
</tr>
<tr>
<td>Juncus effusus</td>
<td>Juncus</td>
<td>Partial Shade</td>
<td>1-1</td>
<td>2-4</td>
<td>Full</td>
<td>Partial for irrigation</td>
</tr>
<tr>
<td>Echinochloa crus-galli</td>
<td>Echinochloa</td>
<td>Full Sun</td>
<td>15-6</td>
<td>3</td>
<td>Full</td>
<td>Need for irrigation</td>
</tr>
<tr>
<td>Rumex obtusifolius</td>
<td>Rumex</td>
<td>Full Sun</td>
<td>5-5</td>
<td>3</td>
<td>Partial</td>
<td>Need for irrigation</td>
</tr>
<tr>
<td>Polygonum amphibium</td>
<td>Polygonum</td>
<td>Full Sun</td>
<td>5-5</td>
<td>3</td>
<td>Full</td>
<td>Need for irrigation</td>
</tr>
<tr>
<td>Salix alba</td>
<td>Salix</td>
<td>Full Sun</td>
<td>3-3</td>
<td>2-4</td>
<td>Full</td>
<td>Need for irrigation</td>
</tr>
<tr>
<td>Phragmites australis</td>
<td>Phragmites</td>
<td>Full Sun</td>
<td>5-5</td>
<td>3</td>
<td>Partial</td>
<td>Need for irrigation</td>
</tr>
</tbody>
</table>

Notes: Full Sun: 100% direct sunlight; Partial Shade: 50% direct sunlight; Full Shade: 0% direct sunlight.
**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).

![Diagram of Zones A and B](image)

**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).

![Diagram of Zone A](image)
1. ADDITIONAL DESIGN GUIDANCE PROVIDED IN BIORETENTION FACILITY FIGURE 4.1 & 4.2 OF THE BASMAA POST-CONSTRUCTION MANUAL.

2. OVERFLOW STRUCTURE REQUIRED FOR IN-LINE SYSTEMS WITHOUT OVERFLOW BYPASS, DETAIL SWQ-140.

3. PROVIDE SPOT ELEVATIONS AT INLETS ON CIVIL PLANS (FE, OE, GIE, SIE); SEE DETAIL SWQ-120.

4. EDGE CONDITION WILL VARY FOR NEW AND RETROFIT PROJECTS. CURB, WALL, AND SIDEWALK DETAILS MAY BE MODIFIED FOR PROJECT BY CIVIL AND GEOTECHNICAL ENGINEERS AND APPROVED BY THE PUBLIC WORKS DEPARTMENT.

5. PROVIDE CAPPED, THREADED PVC CLEANOUT FOR UNDERDRAIN, 4" MIN. DIA. WITH SWEEP BEND.

6. IF CHECK DAMS ARE NEEDED, SEE CONCRETE CHECK DAM DETAIL SWQ-131.

7. IF CALTRANS CLASS 2 PERMEABLE IS NOT AVAILABLE, SUBSTITUTE CLASS 3 PERMEABLE WITH AN OVERLYING 3" DEEP LAYER OF 3/4" (NO. 4) OPEN-GRADED AGGREGATE. [VERIFY WITH CITY OF NAPA CONSTRUCTION DIVISION]

8. BIORETENTION SOIL MEDIA (BSM) SPECIFICATION PER BASMAA POST-CONSTRUCTION MANUAL.

9. PLANT SELECTION PER BASMAA POST-CONSTRUCTION MANUAL APPENDIX F - PLANT MATRIX.

10. MULCH (OPTIONAL) PER BASMAA POST-CONSTRUCTION MANUAL APPENDIX F - PLANT MATRIX.

11. LOCATE ENERGY DISSIPATION COBBLE PADS AS SPECIFIED IN INLET DETAILS - AVOID DECORATIVE USE.

CONSTRUCTION NOTES

1. SCARIFY SUBGRADE BEFORE INSTALLING BIORETENTION AREA AGGREGATE AND BSM.

2. FACILITY EXCAVATION TO ALLOW FOR SPECIFIED SOIL AND MULCH DEPTHS TO ACHIEVE FINISHED ELEVATIONS ON CIVIL PLANS.

3. INSTALL UNDERDRAIN WITH HOLES FACING DOWN. UNDERDRAIN DISCHARGE ELEVATION SHALL BE AT TOP OF AGGREGATE LAYER. UNDERDRAIN SLOPE MAY BE FLAT.

4. COMPACT EACH 6" LIFT OF BSM WITH LANDSCAPE ROLLER OR BY LIGHTLY WETTING. LET DRY OVERNIGHT BEFORE PLANTING.

5. DO NOT WORK WITHIN BIORETENTION AREA DURING RAIN OR UNDER WET CONDITIONS.

5. KEEP HEAVY MACHINERY OUTSIDE BIORETENTION AREA LIMITS.
DESIGN NOTES
1. ADDITIONAL DESIGN GUIDANCE PROVIDED IN BIORETENTION FACILITY FIGURE 4.1 & 4.2 OF THE BASMAA POST-CONSTRUCTION MANUAL.

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4. EDGE CONDITION WILL VARY FOR NEW AND RETROFIT PROJECTS. CURB, WALL, AND SIDEWALK DETAILS MAY BE MODIFIED FOR PROJECT BY CIVIL AND GEOTECHNICAL ENGINEERS.

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4. EDGE CONDITION WILL VARY FOR PARKING LOT PROJECTS. SEE PARKING LOT EDGE OPTIONS DETAIL SWQ-114. CURB AND FLUSH EDGE DETAILS MAY BE MODIFIED FOR PROJECT BY CIVIL AND GEOTECHNICAL ENGINEERS AND APPROVED BY PUBLIC WORKS DEPARTMENT.

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MANHOLE COVERS WITH "NO DUMPING - DRAINS TO RIVER" SIGNAGE MAY SUBSTITUTE ADDITIONAL MARKINGS. STORMDRAIN COVERS SHALL BE FROM OLDCASTLE PRECAST MODEL: CIN-COVER.

EACH STORM DRAIN WITHIN THE CITY LIMITS NEEDS TO BE MARKED WITH A "NO DUMPING - DRAINS TO RIVER" MARKER. CONTRACTOR IS TO PURCHASE THESE MARKERS FROM THE PUBLIC WORKS DEPARTMENT LOCATED AT 1600 FIRST STREET.