2011

Final Report: Appendix C. LID Parking Lot Design and Teaching Tool at Bridgewater State University, Bridgewater – Supporting Information

Horsley Witten Group, Inc.
APPENDIX C. LID PARKING LOT DESIGN AND TEACHING TOOL AT BRIDGEWATER STATE UNIVERSITY, BRIDGEWATER – SUPPORTING INFORMATION
BRIDGEWATER STATE COLLEGE
75% IMPROVEMENT PLANS
BRIDGEWATER, MASSACHUSETTS
JULY 2010
### Construction Specifications for Bioretention Systems

**Planting Soil Media**
- USDA soil types loamy sand or sandy loam
- Considered as required with sample submission.

**Mulch**
- Shredded hardwood, aged 6 months, minimum.
- Finely shredded softwood will be considered by the Engineer as required.

**Filter Fabric**
- Mirafi 140N, Geotex 351 or approved equal.
- Non-woven geotextile fabric with a flow rate of >110 gallons/minute/square foot.

**Erosion Control Blanket**
- Bionet S150BN, short-term biodegradable erosion control blanket.

**Gravel Layer (underdrain)**
- AASHTO M-43, 0.375" to 0.75".
- Underdrain Piping: ASTM D 1785 or AASHTO M-278, 4" perforated schedule 40 PVC.
- 3/8" perf. @ 6" on center, 4 holes per row. T's and Y's as needed depending on the underdrain configuration.
- Extend cleanout pipes to the surface with vented caps at T's and Y's.

**Underdrain Cleanout**
- Non-perforated PVC pipe, elbow, cap, and all associated fittings.
- 4 inch
- For use between the filter media and the underdrain gravel.

**Pea Gravel Layer**
- 2 to 4 inch layer of washed stone.

### OVF and Bottom Elevations

<table>
<thead>
<tr>
<th>OVF Type</th>
<th>No.</th>
<th>Lowest Top Elevation (ft)</th>
<th>Spillway (ft)</th>
<th>Design Freeboard (ft)</th>
<th>OVF Rim (ft)</th>
<th>Ponding Depth (ft)</th>
<th>Bottom Elev. (ft)</th>
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<tbody>
<tr>
<td>WEIR</td>
<td>1</td>
<td>54.00</td>
<td>1.25</td>
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### Bio Cell Schedule

<table>
<thead>
<tr>
<th>Bio Cell</th>
<th>Elevation Change from Lower Cell (ft)</th>
<th>Min. Underdrain Stone Cover (in.)</th>
<th>Underdrain Pipe Size (in.)</th>
<th>Underdrain Distal Inv (ft)</th>
<th>Length Underdrain (ft)</th>
<th>Slope Underdrain (ft/ft)</th>
<th>Underdrain Inv In (ft)</th>
<th>Min. Outlet Inv (ft)</th>
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</thead>
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### Abbreviations
- SA: Bottom Surface Area
- CB: Catchbasin
- OVF: Overflow
- Inv: Invert

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### Typical Inflow Detail

- **BIORETENTION FACILITY SECTION A-A:**

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### Typical Grass Channel Detail

- **BIORETENTION DRAINAGE OUTLET (D) DETAIL:**

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### General Notes
- **Note:**
  - Landscape rock covering the OVF area is required to prevent erosion.
  - Landscaping and grading around the OVF area should be designed to prevent erosion.
  - The OVF area should be protected from wind erosion.
  - The OVF area should be protected from vehicle erosion.
  - The OVF area should be protected from water erosion.
  - The OVF area should be protected from animal erosion.
  - The OVF area should be protected from human erosion.
  - The OVF area should be protected from mechanical erosion.
  - The OVF area should be protected from thermal erosion.
  - The OVF area should be protected from biological erosion.
  - The OVF area should be protected from chemical erosion.
  - The OVF area should be protected from electrical erosion.
  - The OVF area should be protected from magnetic erosion.
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### Stormtech Underground Chamber Schedule

<table>
<thead>
<tr>
<th>Chamber Type</th>
<th>Location</th>
<th>Description</th>
<th>Material/Model</th>
<th>Dimensions</th>
<th>Notes</th>
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<tbody>
<tr>
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<td>30.00</td>
<td>0.10</td>
<td>12</td>
<td>12</td>
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</tbody>
</table>

### Stormtech General Notes

1. Stormtech provides detailed design information for each chamber. Use this information to plan your installation.
2. Stormtech recommends using a horizontal alignment to ensure proper installation. This reduces the risk of damage to the chamber and its components.
3.风暴tech's design is subject to change without notice. Check the latest version of the manual on our website for updated information.
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### Stormtech Isolator Row Manifold Detail

- Stormtech isolators are designed to be compatible with Stormtech's manifold system.
- Stormtech isolators are manufactured to withstand a wide range of environmental conditions.

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### Stormtech Underdrain Detail

- Stormtech underdrain systems are designed for ease of installation and maintenance.
- Stormtech underdrain systems are manufactured to withstand a wide range of environmental conditions.

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### Stormtech Technical Details

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<table>
<thead>
<tr>
<th>ITEM NUMBER</th>
<th>DESCRIPTION</th>
<th>ESTIMATED QUANTITY</th>
<th>UNIT</th>
<th>UNIT PRICE</th>
<th>TOTAL AMOUNT</th>
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<td>49.0</td>
<td>UNDERGROUND CHAMBER SYSTEM W/ INSTALLATION</td>
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<td>PER CHAMBER</td>
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<td>SQUARE YARD</td>
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<td>HOURS</td>
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**SUB TOTAL** | **$1,684,745**

**ESTIMATED BID PRICE** | **$1,685,000**

Owner Contingency | 30% |

**ESTIMATED CONSTRUCTION BUDGET** | **$2,191,000**

**NOTES:**
CONTINGENCY IS PROVIDED BASED ON 75% DESIGN PLANS REFLECTING THE FACT THAT UNCERTAINTY EXISTS BETWEEN THIS STAGE AND CONSTRUCTION STAGE DRAWINGS. FINAL CONSTRUCTION ESTIMATES WILL BE DEPENDANT ON FACTORS RESOLVED AT THE CONSTRUCTION BIDDING STAGE.