**GENERAL DESCRIPTION**

Permeable pavement, an alternative to traditional impervious pavement, allows stormwater to drain horizontally through a permeable pavement system. For example, the parking spaces of a parking lot or road can be permeable pavement areas while the parking strips are asphalt pavement.

**SITE CONSIDERATIONS**

**Wellhead Protection**

Permeable pavement should not be used in the areas with a water supply for the treatment water before 1980. (City of Victoria, 2008)

**Site Topography**

Permeable pavement is suitable for areas that slope at least 1% and no greater than 5%.

**Water Table**

The use of permeable pavement stone reservoir should be at least 1.0 metre below the water table or top of bedrock elevation.

**Soil**

When located in native soils with an infiltration rate of less than 15 m/hr (0.0036 ft/sec) or (20 in/hr) require a perforated pipe underdrain. Native soil and infiltration rate at the proposed location and depth should be confirmed through measurement of hydraulic conductivity under field saturation conditions.

**Drainage Area & Runoff Volume**

The impervious area should not exceed 2.5 times the area of permeable pavement which receives runoff.

**Setback from Buildings**

Permeable pavement is not recommended for the locations of building foundations. If the pavement does not drain away from the building, a minimum setback of 6 (5) metres downgradient from the building should be provided.

**Pollution Hot Spot Runoff**

Permeable pavement is not recommended in areas that experience high levels of pollution or that are prone to Leachate contamination, runoff from highly polluted areas.

**OPERATION AND MAINTENANCE**

Annual inspections of permeable pavement should be conducted in the spring to ensure continued infiltration performance. Permeable pavement may have a 2-year life expectancy if the surface is maintained with a permeable pavement cleaner.

**QUALITY ASSURANCE**

Material Specifications for Permanent Pavement

<table>
<thead>
<tr>
<th>Material</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Concrete</td>
<td>700 ksi with 28 day compressive strength of 2,000 psi.</td>
</tr>
<tr>
<td>Asphalt</td>
<td>0.15 to 0.20-in. diameter with a minimum of 10% voids and 0.5% penetration for asphalt.</td>
</tr>
</tbody>
</table>

**GENERAL SPECIFICATIONS**

**Stone Reservoir**

- ALL aggregates should meet the following criteria:
  - Maximum wash loss of 25%
  - Minimum durability index of 25
  - Maximum abrasion of 10% for 100 revolutions and maximum for 50 revolutions

**Stone Base**

- The granular base material should be crushed 0.075 mm (20 mesh) or smaller stone with void space ratio of 0.4

**Geotextile**

- Geotextile should conform to Ontario Provincial Standard Specification (OPSS) 1860 for Class II geotextile fabric.
- Should be woven monofilament or non-woven needle punched fabric. Woven slit film and non-woven heat bonded fabrics conform to ASTM D6788 and D4861 for geotextile.
- Primary considerations are:
  - Synthetic monofilament opening size (KOS) for non-woven fabrics or percent open area (POA) for woven fabrics. To maintain light soil erosion and filter out sand into the embankment.
  - Maximum loadings to be exerted on the fabric (i.e., weight, vacuum, and punch strength) should be determined.
  - Load bearing strength of the geotextile and its expected amount of stress.
  - Water flow rate and percentage of the overlying aggregate.

**Permeable Pavement Other Applications**

<table>
<thead>
<tr>
<th>Material</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Porous Concrete</td>
<td>500-700 ksi with an air voids percentage to have the best freeze-thaw durability without any freeze-thaw cracking.</td>
</tr>
<tr>
<td>Porous Asphalt</td>
<td>Open-graded asphalt with a minimum of 10% voids and 0.5% penetration for asphalt.</td>
</tr>
</tbody>
</table>

**Pavement Pavers**

- Permeable pavers should conform to manufacturer specifications.

**Concrete Base**

- Concrete edge restraints should be supported on a minimum base of 20 cm (1 foot) for concrete edge restraints.

**MONITORING WELLS**

A standpipe from the underdrain to the pavement surface for monitoring and maintenance of the underdrain.

**BMP**

- Permeable pavement with no underdrain.

**ABILITY TO MEET SWN OBJECTIVES**

<table>
<thead>
<tr>
<th>BMP</th>
<th>Water Balance</th>
<th>Water Quality</th>
<th>Stream Channel Erosion Control</th>
</tr>
</thead>
<tbody>
<tr>
<td>Permeable pavement with undrained base</td>
<td>Yes</td>
<td>Yes, 5% for water quality storage requirement</td>
<td>Yes</td>
</tr>
<tr>
<td>Permeable pavement with undrained base</td>
<td>Moderate - Based on native soil infiltration and storage beneath</td>
<td>Yes</td>
<td>Based on available storage volume and soil infiltration rate</td>
</tr>
<tr>
<td>Permeable pavement with undrained base</td>
<td>Low - 3% volume reduction occurs through evaporation</td>
<td>Moderate - Limited filtering and settling of aesthetically</td>
<td>Based on available soil volume and soil infiltration rate</td>
</tr>
</tbody>
</table>

**SITE PLANNING AND DESIGN**

**PLANNING ASSUMPTIONS**

- Conventional rainfall and soil type.

**PLANNING AND DESIGN FACT SHEET**

<table>
<thead>
<tr>
<th>Source</th>
<th>Site Conditions</th>
<th>Site Description</th>
<th>Vegetation</th>
<th>Planting &amp; Paving</th>
<th>Construction &amp; Development</th>
<th>Maintenance &amp; Monitoring</th>
<th>Certification</th>
</tr>
</thead>
<tbody>
<tr>
<td>City of Victoria</td>
<td>Low Impact Development</td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
</tbody>
</table>

**ACKNOWLEDGEMENTS**

The University of New Hampshire Stormwater Center has developed a Stormwater Planning and Design Guide. For further details, see the section on the Victoria Gazette.