**GENERAL DESCRIPTION**

Rainwater harvesting is the process of collecting rainwater and storing it for future use. The rainwater is typically collected on a roof and then conveyed to a storage tank. Rainwater harvesting systems can help reduce demand on municipal treated water supplies. This helps delay expansion of treatment facilities, conserve energy used for pumping and treating water, and lower consumer water bills.

**COLLECTION AND CONVEYANCE SYSTEM**

The collection and conveyance system consists of the catchment, downspouts and pipe that channel water into a storage tank. Catchments and downspouts should be designed to prevent contamination from debris, dust, leaves, and other materials. The catchment area is the surface from which rainfall is collected. Generally, roofs are the catchment area, although rainwater from low-lying parking lots and walkways may be suitable for some non-potable use (e.g., outdoor washing). The quality of the harvested water will vary according to the type of catchment area and material from which it is constructed. Rainwater harvested from parking lots, walkways, or ceramic-tiled roofs, such as asphalt shingles, tar and gravel, and wood shingle roofs, should only be used for irrigation or toilet flushing due to potential contamination with toxic compounds.

**STORAGE TANKS**

The storage tank is the most important and typically the most expensive component of a rainwater harvesting system. The required size of storage tank is dictated by several variables: rainfall and snowfall frequencies and totals, the intended use of the harvested water, the catchment area, and budget. In the Greater Toronto Area, an initial tank size for the harvesting system could be predicted by using a water usage over a 10 to 12 day period.

**DISTRIBUTION SYSTEM**

Most distribution systems are gravity fed or operated using pumps to convey harvested water from the storage tank to its final destination. Typical outdoor systems use gravity to feed hoses via a tap and spigot. For underground systems, a water pump is needed to transport water from the cistern to a domestic water supply system. The pump can be above or below ground and is typically connected to a water distribution system through a pressure tank. For underground systems, a water pump is needed to transport water from the cistern to a domestic water supply system. The pump can be above or below ground and is typically connected to a water distribution system through a pressure tank. Underlying geological conditions, such as the presence of underground water, can affect the performance of the storage and distribution systems.

**OPERATION AND MAINTENANCE**

Maintenance requirements for rainwater harvesting systems vary according to use. Systems that are used to provide supplemental irrigation water have relatively low maintenance requirements, while systems designed for indoor use have much higher maintenance requirements. All rainwater harvesting system components should undergo regular inspections every six months during the spring and fall seasons to help keep leaf screens, eavestroughs and downspouts free of leaves and other debris, check screens and filter systems, clean and inspect first flush diverters and filters, especially those on drip irrigation systems, inspect and clean storage tank lids, pay special attention to vents and screens on inflow and outflow spigots, and replace damaged system components as needed.

**MOSQUITO CONTROL**

If screening is not sufficient to deter mosquitoes, vegetable oil can be used to create a barrier. Alternatively, mosquito traps or pellets containing larvicide can be used.

**WINTER OPERATION**

Rainwater harvesting systems have a number of components that can be affected by freezing winter temperatures. For above-ground systems, winter operation may not be possible. Prior to the onset of freezing temperatures, the distribution and overflow systems should be drained. For below-ground systems, winter operation can be used.

**SITE CONSIDERATIONS**

Storage tanks can be placed on shoulders adjacent to buildings on commercial and industrial lots. Site Topography influences the placement of the storage tank, especially for above-ground systems and overflow systems.

**GENERAL SPECIFICATIONS**

<table>
<thead>
<tr>
<th>Component</th>
<th>Specification</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Storage Tanks</td>
<td>Length of collection system</td>
<td>Determined by the catchment area</td>
</tr>
<tr>
<td></td>
<td>Diameter of storage tanks</td>
<td>Large tanks (10 m3 or larger) should have a settling compartment for removal of sediments</td>
</tr>
<tr>
<td></td>
<td>Materials</td>
<td>Used to construct storage structures can support the load associated with the volume of water stored</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Large tanks (10 m3 or larger) should have a settlement compartment for removal of sediments</td>
</tr>
<tr>
<td></td>
<td></td>
<td>The size of the overflow system is determined during the design calculations</td>
</tr>
</tbody>
</table>

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