Life-Cycle Costs of BMPs: A Game of Hot Potato

By Laurie Honnigford

Pushing off maintenance costs to the next owner in line is a bit like the childhood game of "hot potato." The installation cost is just the beginning of the total cost of owning a stormwater BMP. For example, when a housing development is built; the developer builds the roads, the stormwater system etc. and then turns the roads and stormwater system over to the municipality for maintenance. If a stormwater pond is built into the development; the municipality may be signing up for pond maintenance – or maybe the home-owners association is responsible. The question is – who is going to pay the cost for maintaining the pond? Does the municipality or home-owners association even know there is a BMP to maintain? What happens when a natural BMP finally fails? Who gets the bill then? Who gets the hot potato?

There are two ways to define "Life Cycle" as it pertains to stormwater solutions; one is the sum of present values of investment costs, capital costs, installation costs, energy costs, operating costs, maintenance costs, and disposal costs over the life of the project, product or measure. The other definition is the evaluation of the total operation and maintenance (O&M) costs of water efficiency options over the life time of the project, not just the initial equipment capital costs. It is imperative that the owner of the BMP plan for life-cycle cost.

The challenge is to determine what those life-cycle costs will be – there are many variables to consider both in evaluating the site and the different BMPs. A hydrodynamic separator may save land costs, but will create the need for planned periodic maintenance to remove trash and sediments. A small pond may not require sediment removal for years, but its banks could require weekly mowing during parts of the year. The functions may be similar, but the timing and the nature of the maintenance activities are vastly different.

The manufactured systems have been tagged as high maintenance by some in the stormwater industry; however this is a disservice to these devices. Once a manufactured device is cleaned (i.e. maintained), the system operates just as efficiently as a new device.

When a pond is maintained, the trash is picked up, the landscaping is repaired. However, sediment is generally left in the pond. The sediment piles up year after year until the pond can no longer properly handle stormwater. At this point it has failed and the entire structure needs to be re-built in order to once again be a functioning BMP.

There is one other consideration that needs to be factored into the construction equation: loss of the *use* of the property. When a bio-retention pond is put on a property, the land cannot be used for anything else. The value for loss of land use depends upon where the pond is located and what land

costs in the area are. Additionally, the land the municipal pond is on will not generate tax revenue. For commercial property on valuable retail land, the cost could be considerable. It might be possible to save the extra pond volume and specialized plantings (and plant maintenance) by utilizing a manufactured filtration system to perform the "biotic" functions of a bio-retention pond, followed by a cistern to store the filtered water for re-use. In this case, the initial cost may be higher, but maintenance is simplified, and precious water resources are saved by using stormwater for irrigation or other gray-water uses.

Given all the variables that exist in building a pond, it is hard to put numbers to the system. For the purpose of example, let's use the typical cost to build a bio-retention pond as approximately $20,000/acre. Typically bio-retention ponds have an eight- year life cycle. Maintenance will run $1000/month. This translates into $96,000 life-cycle maintenance cost; $20,000 construction cost plus the cost of loss of use of the land.

In an attempt to allow water infiltration, some parking lots are being built with an infiltration system unit. At some point in the future, that infiltration system will clog with sediment. How is the system cleaned? Who gets the hot potato then? What happens if the effect isn't readily visible but results in flooding downhill from the parking lot? Who is the lucky party that is responsible for that?

These are difficult and expensive questions that must be answered. In many cases, neither the municipality nor the owner has budgeted for the cost of maintenance or replacement of the BMP. It is necessary that the life cycle costs be calculated as best as possible. There isn't a good formula for determining the maintenance costs. If you start tracking the costs involved in maintenance, you will build a body of data from which to estimate the costs better going forward. The Stormwater Equipment Manufacturers Association (SWEMA) has commissioned Barr Engineering to study this important issue. It will take time to gather this information, but life-cycle costs can no longer be ignored. SWEMA is committed to providing quality data the stormwater industry can use. We cannot afford to play "hot potato" with water quality anymore.

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