

Detailed Analysis of Pros and Cons of Rain Gardens

Name

Institution

## Introduction

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#### **Introduction**

Storm water is a management project that is designed to help local community conserve land and water catchment areas by controlling and minimizing the effects caused by running water. Water runoff is a natural process altered by infrastructure development. Developments lead to generation of impervious surfaces that hinder water infiltration, hence causing flooding and increased water flow velocities. The results, in turn, increase chances for storm water to collect pollutants that range from bacteria's, nutrients, and petroleum based sediments draining them into surrounding water catchment areas. This project is, therefore, created to find a solution protecting the water catchment areas from the polluted storm water using measures that include bio-retention basins, open space conservation, and constructed wetlands (Zhen, et al, 2006). To make the project local and cost affordable to the local community, rainwater gardens are most recommendable as they are cost effective, eye appealing, and environmentally friendly. The project, hereby, gives detailed analysis of procedures, budget, and development mechanism to use in construction of a viable rain garden. The pros and cons for rain gardens are also explained in cost benefit analysis.

#### **Rain Gardens**

Rain gardens are environmental conservation projects designed to conserve water. They are appealing and aesthetic in nature despite their small size. Rain gardens are inexpensive, simple, and require minimal resources to build. They can be designed for small areas like homesteads or large sites, such as schools; they are accessible for storm water retention and minimises water runoff. As development gains momentum, water flow becomes a problem, flooding in the developing areas becomes familiar and the running water collects pollutants from parking lots draining them into surrounding streams and other water

catchment areas. Rain gardens are, therefore, used to collect rainwater during the rainfall events reducing flooding and minimising water runoff impact. Rain gardens serve as small-scale bio retention basins constructed around homesteads and lawns. The flat bottom nature of the backyard and the porous soil allow water to infiltrate through and spread evenly across the planted regions. According to Zhen, et al, (2006), water drains through the ground in 2 days averagely after rainfall stops. A well-constructed rain garden should not serve as a mosquito-bleeding site, as the mosquito cycle will not thrive in this length of time.

### **Rain Garden Benefits**

Despite Rain gardens, low maintenance cost, and the aesthetic appeal are environmentally beneficial. They serve as habitat for wild animals that include bird's beneficial insects, such as bees and butterfly. They reduce water runoff velocity, flooding, and drainage problem. Improve underground water retention and quality, as the soil in the garden increase water infiltration. They also aid terminating pollutants that include sediments, fertilizers, and petroleum based products carried along by the storm water. According to research conducted in St. Louis huge amount of savings can be achieved by use of rain garden to slow water runoff. Increased use of the gardens has the capacity to improve stream quality benefiting aquatic animals.

Rain Garden over the years have registered substantial amount of cost savings especially on sites. Water in sites is well managed and drained off as the site occupants do not have to purchase traditional storm water materials like pipes, drain constructions, and inlets to carry away excess water from an area. Doing away with these materials have led to cost reduction and saving for local community, homeowner and developers. According to research, in the city of Bellingham in Washington, over \$40, 000 were saved after the introduction of rain gardens to solve the problem caused by storm water over the use of pipes and drainage to drain away the water from site (Jenkins, Wadzuk, & Welker, 2010).

According to the low impact development, strategies, and practice cost savings change from one region to another and from project to project (Hanley, Barbier, & Barbier, 2009).

Maintenance cost is another well served by rain gardens area. The gardens are able to reduce cost incurred in mowing grass, use of fertilizers and irrigation. The garden rather provides a landscape of native plants, grass in this case is terminated and cost incurred in the mowing, fertilizing, and irrigating cut-off. The indigenous plant species used in the garden are drought resistant, and hence irrigation is less required. Other benefits, incurred from rain gardens, include increased property value. Zhang, Chen, and Ding (2007) states, water runoff management by use of rain gardens helps to reduce flooding and elevate property value example, according to a study done in Kane County that property value rose from \$ 14,538 to \$ 36, 345 per acre in downstream areas.

Rain gardens can be created in different sizes and shapes and the plant arrangement can take any form of choice the garden location should be suitable ensuring that you have adequate water movement and infiltration in the soil. The garden should be about 10 feet's away from any foundation and should not be near or directly placed in a septic tank. To construct a good garden, it must be at a lower elevation from the surrounding ground. During construction make a shallow depression that will serve as the foundation of the backyard. Although a depression is necessary the garden should not be placed in an already existing pond. A pond is an indication of poor drainage. The garden should be exposed to the sun entirely or partially.

Having identified the most suitable grounds to set the rain garden determines the size and shape of the garden. The garden soil should be well mixed with manure either organic or nonorganic and the top soil in a 4- 6 inches depth. The plants in the garden should be colourful and unique depending on level of creativity. In the garden perennial flowers and plants are incorporated that have the ability to withstand drought and moist climates, local

plants are most recommendable as they are well adapted to the region climate (Jenkins, Wadzuk, & Welker, 2010). Avoid using foreign aggressive species, the plants chosen for planting should have different bloom periods, this allow the garden to remain colourful throughout the growing seasons.

### **Rain Garden Cost Analysis**

Rain garden cost can be estimated by looking into factors influencing their construction and development. Soil type is a major factor considered before rain garden excavation. Gardens in clay soil incurred more cost to construct as excavation is recommended and gravel liner is needed. The garden size is a factor that determines cost. Large gardens are more expensive to develop, since more excavation is to be done. Planting will be more and exhausting, hence more labour needed to be employed. Site topography determines cost because steep region require intense excavation to bring about land flatness.

The type of plants used can be either expensive or affordable exotic plants which require more capital and maintenance unlike indigenous plants that require less time and money for management. Labour hiring a landscaper is expensive and the cost incurred, when purchasing material and installation, elevate the price. Building gardens individually is less expensive but cost of plant, mulch, and time will be incurred. According to Lincoln watershed management land scaping company use \$10- 12 to design, install, and purchase materials for a square foot (Wise, et al, 2010).

### **Conclusion**

Environmental conservation is important; managing storm water can be achieved in various ways, but rain gardens are most appropriate and affordable in a local community. To make the project viable it is important to understand the benefits brought along by the project and their benefits to the community in general, through impact analysis. The cost incurred

should be measured and objectively reviewed, so that, homeowners and developers can choose the most an appropriate methods to use in developing the project.

## References

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