

WARNER PARK POND PROJECT: CREATING COMMUNITY SPACE THROUGH STORMWATER INFRASTRUCTURE

Introduction

The residents of Miller Ranch, a neighborhood on the south west side of Manhattan, Kansas, approached the Manhattan Parks and Recreation Advisory Board about their neighborhood storm water retention basin during the summer of 2014. A presentation was given to the advisory board concerning the current state of the pond and action items that Miller Ranch residents would like the city to consider. Since that time, the Warner Park pond has been on the agenda of two additional city meetings. No decisions concerning the design of the pond have been made. It is the intent of the NRES project design team to propose a concept for the Warner Park pond that is in the best interest of the City of Manhattan and Miller Ranch residents alike.

Critical Issues

Miller Ranch homeowners and the City of Manhattan have differing views on the current conditions of Warner Park pond, and therefore, have opposing future expectations of the pond site.

Homeowner Objectives: Miller Ranch residents believe the pond is of a failed condition due to

- algae growth fostered by stagnant water conditions,
- sedimentation from erosion which has resulted in marsh-like conditions,
- concern about the health, safety and aesthetic appeal of the current pond condition,
- a lack of appealing community space for residents, and
- lack of continual maintenance by the city.

City Objectives: From a functional perspective, the city argues that the stormwater pond is serving its intended purpose – that of stormwater detention – and has no desire to spend Stormwater budget dollars on improvements to the area. The city believes that

- the pond was then left in the hands of the city by developers, infrastrucutre which the city would not have constructed,
- erosion and unwanted pond infill is not a major issue,
- the Miller Ranch Homeowners Association lacks consensus on the future of the pond, hindering the decision making process of the city, and
- a new design will not be approved unless it is easy to maintain and fosters public education and outreach for Wildcat Creek.

Methods

The process of developing a new approach to the design of the Warner Park pond involved research of relevant literature and personal interviews with homeowners and the City of Manhattan. Literature regarding wetlands, wetland shelves, stormwater runoff and low impact designs led to a plan to adapt what is already present at the project site. Funding of the project was a contributing factor to the design decision, and resulted in a two-phase project outlook. The first phase will establish a limited number of wetland plants as well as hydrophilic tree species. The second phase will contribute to site aesthetics and involve limestone seating areas and the creation of a park-like community space.

The Public Works branch is not interested in funding this project as there are no current issues impairing the pond’s function. The pond is able to manage the rain events in Manhattan, and an emergency spillway serves to reduce water level in extreme cases. If the City decides to make a change to the pond itself they would like to create a dry basin as it is a cost effective solution. The homeowners, however, would like to see the pond retained.

Proposal A - Wetland Shelf



Wet Pond			
Item	Unit Price	Quantity	Total
PawPaw Tree	37	1	\$ 37.00
Willow Tree	12	1	\$ 12.00
Water Lillies	25	8	\$ 200.00
Submerged Plants	1.8	15	\$ 27.00
Floating Pond Plants	6	10	\$ 60.00
3 Months Mowing (\$/sf)	0.02	21780	\$ 1,306.80
Rip-Rap (\$/ton)	39	5	\$ 195.00
Limestone Benches	450	3	\$ 1,350.00
Total:			\$ 3,187.80

The pond is roughly 500,000 ft^3 (10.72 acre-ft) in volume with a 48 inch concrete pipe draining the pond to the north. The pond can drain quickly. It would need to drain at a rate of 5.7 cubic feet per second (cfs) in order to empty within 24 hours. The maximum allowable rate is 131.66 cfs for a 100-year storm (Manhattan, 1995). The actual maximum rate is in excess of 100 cfs. This pond can easily handle most rain events in Manhattan.

Proposal B - Dry Basin

Dry Pond			
Item	Unit Price	Quantity	Total
Mechanical Dredging (\$/ac) or...	75000	0.5	\$ 37,500.00
Hydraulic Dredging (\$/ac)	18750	0.5	\$ 9,375.00
Grading (\$/sf)	2.8	32670	\$ 91,476.00
3 Months Mowing (\$/sf)	0.02	21780	\$ 1,306.80
Rip-Rap (\$/ton)	39	5	\$ 195.00
15" RCP Class IV (\$/LF)	19.3	60	\$ 1,158.00
48" RCP Removal (\$/LF)	12	62	\$ 744.00
15" RCP Installation (\$/LF)	39.25	62	\$ 2,433.50
Total:			\$106,688.30

Retrofitting the pond into a dry basin has a high initial cost to implement. Sediment Removal Solutions estimates mechanically dredging a pond costs \$75,000/acre on average. Dredging is an important component to the design life of the pond, however, this task can be

postponed and incorporated into the City’s stormwater budget the pond, however, this task can be postponed and incorporated into the City’s stormwater budget at a later date. A feasible alternative for the City to investigate could use high-volume suction pumps, as described on the Sediment Removal Solutions website, which costs nearly 75% less than mechanical dredging (Sediment Solutions, 2012).

Benefits of repurposing the pond to a dry basin are: 1) a reduction in mosquitoes, 2) fewer frogs, 3) limiting of algae blooms, 4) odor reduction, 5) lower maintenance cost, and 6) decrease in peak flow discharge.

“Perceived value (i.e., the value estimated by residents of a community) of homes was increased by about 15 to 25 percent when located near a wet pond” and “dry ponds can actually detract from the perceived value of homes adjacent to a dry pond by between 3 and 10 percent” (Emmerling-Dinovo, 1995).

Converting the pond into a dry basin would therefore result in a potential decrease of \$140,960 in value for the four adjacent properties.

Team Recommendations

It is the recommendation of the student design team for the City of Manhattan to implement Proposal A – “Wetland Shelf” as a design solution for the Warner Park storm water detention basin. This aesthetically pleasing option would support appropriate levels of storm water runoff for the area, while simultaneously filtering excess nutrients and controlling algae blooms. By this, the storm water pond can be managed for multiple uses – maintaining ecosystem habitats, a passive recreational area, an amenity for public appreciation, and a functional system for reducing the impact of storm water flows to downstream Wildcat Creek. Through small budget allowances over multiple years, the City of Manhattan can affectively fund the project while continuing low yearly maintenance requirements.

References

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