Green Infrastructure Technical Assistance Program

The Village of Barrington Hills and their partners sought EPA assistance with the first phase of a two-phase project. Phase I's objective is to conduct a feasibility study to establish a plan for retrofitting a detention basin to accept stormwater and use this stormwater to recharge the shallow aquifer system. Phase II will be the implementation of the selected plan that will reduce the amount of stormwater impacting the watershed and increase the sustainability of the area's groundwater supply. The full grant proposal is attached.

Kurt O. Thomsen

1/23/2014

Green Infrastructure Technical Assistance Program
2014 Request for Letters of Interest
Detention Basin Retrofit

1) Cover Page

Applicant Identification: Village of Barrington Hills
112 Algonquin Road
Barrington Hills, Illinois 60010-5199

Location: Spring Creek Watershed
Helm Woods Forest Preserve
Kane County
Illinois

Wet Weather Programs: MS4

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2) Abstract The Village of Barrington Hills has jurisdiction over most of the Spring Creek watershed. A recently completed watershed-based plan for the Spring Creek identified a multitude of locations where green infrastructure projects could be implemented. A number of these locations require the retrofitting of detention basins that are located in groundwater recharge areas.

Two problems have been identified in the area. First, because of urbanization portions of the watershed are prone to flooding due to increasing volumes of stormwater runoff. Also, water quality in the watershed has suffered due to non-point source pollution. Second, Barrington Hills and the surrounding area rely on groundwater as their only water source. A recent study by the Illinois State Water Survey (ISWS) reported that serious groundwater shortages can be expected in the area by 2050.

The Village of Barrington Hills and their partners seek assistance with the first phase of a two-phase project. Phase I's objective is to conduct a feasibility study to establish a plan for retrofitting a detention basin to accept stormwater and use this stormwater to recharge the shallow aquifer system. Phase II will be the implementation of the selected plan that will reduce the amount of stormwater impacting the watershed and increase the sustainability of the area's groundwater supply.

3) Project Need The Barrington Hills area is located northwest of Chicago east of the Fox River. Land use in the area is composed of bedroom communities having lot sizes ranging from 5 acres to small urban lots, some light industry, commercial areas and open space. The area is totally reliant on groundwater extracted from private wells as their water source. In addition, because of urbanization, problems are experienced in stormwater control. This has resulted in flooding problems during larger precipitation events and in poor water quality due to non-point source pollution.

The selected project area is located in the Spring Creek watershed. A watershed-based plan was completed in 2012. The plan identified numerous green infrastructure projects to reduce flooding and improve water quality. Projects included stream restoration and maintenance, wetland restoration, installation of vegetation buffers, and detention basin retrofits. Planning is taking place and funding is being sought to implement these green infrastructure projects. The first step is preparing a watershed monitoring plan that should be completed in fall of 2014 and implemented in 2015. The results of the first sampling effort will be used to establish baseline characteristics of the watershed. Subsequent monitoring efforts will allow us to measure the effectiveness of the implemented green infrastructure projects. In addition, a groundwater monitoring program is already being implemented. It will ultimately measure groundwater levels in the area and monitor groundwater discharge to the Spring Creek watershed.

The selected project is a pilot detention basin retrofit project that if successful, can be implemented in other locations within the watershed as well as in other areas in the Midwest having similar conditions. The chosen detention basin is in a forest preserve bounded on two sides by densely populated areas. During large storm events, area runoff overwhelms the existing storm water controls. Urbanization of the area has left no space to develop additional stormwater storage areas. The only way to reduce stormwater volume and mitigate flooding potential is by

recharging excess stormwater to the shallow aquifer system. Recharging the local aquifer has the immediate effect of reducing the volume of stormwater and the long-term effect of sustaining the groundwater resource on which the area relies.

A heavily populated area is located up the groundwater gradient from the Barrington Hills area that is putting a stress on the local groundwater system. The ISWS has estimated that the area is consuming 24.7 million gallons a day of groundwater and that by 2050 this pumpage could increase to 67.9 million gallons a day causing groundwater shortages in portions of the area. The only way to mitigate the effects of this increased groundwater usage is to institute a program of groundwater recharge.

4) Project Approach The Phase 1 feasibility study process consists of the development and screening of stormwater treatment and recharge alternatives and a detailed analysis of a limited number of the most promising options to establish the basis for an alternative selection decision. Project scoping is conducted by the project partners to develop preliminary objectives for controlling stormwater runoff and for recharging the shallow aquifer. The project partners will conduct field sampling and sample analyses during site characterization. A preliminary site characterization summary will be prepared to provide information on the site that will be useful in determining the feasibility of available technologies and in screening potential alternatives. .

Contractor participation begins with a kick-off meeting between the project partners and the selected contractor. During this meeting the project partners will provide the contractor with the results of the scoping and site characterization efforts. The project will be discussed, questions answered, and the path forward determined.

The project partners will work closely with the contractor to refine the preliminary objectives for controlling stormwater runoff and for recharging the shallow aquifer that were identified during the scoping process.

Once the objectives have been defined, the contractor will conduct a literature search to identify technologies for stormwater treatment and recharge and the circumstances under which they were put to use. Using the resulting information, the contractor will develop a preliminary set of appropriate alternatives. At this time the alternatives will be evaluated to establish their suitability for implementation under conditions established during site characterization and if the alternatives meet the project objectives. Viable alternatives will be identified during the screening process and each alternative will be evaluated with regard to short-and long-term effectiveness, and implementability including technical and administrative feasibility. The selected alternatives will be subjected to a cost-evaluation analysis.

The objective of the cost-evaluation analysis is to eliminate from further consideration those alternatives whose costs are grossly excessive for the effectiveness they provide. Cost estimates for alternatives will be sufficiently accurate to continue to support resulting decisions when their accuracy improves beyond the screening level. Capital, O&M, and present worth costs will be determined. Documentation of the screening process will be presented in a project report.

Once the contractor has completed the cost-evaluation analysis a determination will be made to identify the optimal project alternative. A report will be prepared documenting the alternative selection process.

It is expected that the contractor's work will be completed in 90 to 120 days and cost approximately $51,842. It is assumed that a local contractor will be selected to conduct this work and the project cost includes $200 in expenses for the kick-off meeting. The project tasks, task assignments, estimated hours and costs are presented in the table below.

Projected Phase 1 Costs			
Task	**Task Assignment**	**Hours**	**Cost**
Scoping	Project Partners	NA	NA
Site Characterization	Project Partners	NA	NA
Kick-Off Meeting	Project Partners/Contractor	4	$1,135
Project Management	Contractor	24	$2,970
Establish Objectives	Contractor	8	$778
Identify Treatment/Recharge Alternatives	Contractor	220	$17,598
Alternative Cost Evaluation	Contractor	220	$17,598
Recommend Optimal Alternative	Contractor	160	$11,759
		Total:	$51,842

5) Anticipated Results Upon implementation of the Phase 1 recommendation, this project will reduce the stormwater volume entering the watershed in the short term, thereby, reducing flooding and the pollutant load to the watershed resulting from nonpoint-source pollution. In the long-term, the storm water added to the groundwater system increases the groundwater supply and ensures groundwater sustainability for the area residents.

The political and public support in the communities having jurisdictions in the Spring Creek watershed is high as evidenced by the support garnered to developing the watershed-based plan that identifies green infrastructure projects required to restore the watershed.

The implementation of the proposed project is the first step in implementing the green infrastructure projects proposed in the watershed-based plan. Additional incentive for continuing to advance the implementation of green infrastructure projects is that the sustainability of the areas groundwater supply and the quality of life in the area is dependent on the successful completion of these projects.

Any area that is reliant on groundwater and has stormwater flooding problems can use this project approach to mitigate/solve their problems.