Village of Elmwood Park
Green Alleys
Project

Illinois Green Initiative Grant
and
Local Funding

FAA Number: IGIG 1104

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Please note: the project evaluation and final report was prepared using Illinois Green Infrastructure Grant Program for Stormwater Management (IGIG) and distributed through the Illinois Environmental Protection Agency. The findings and recommendations herein are not necessarily those of the funding agency.

Table of Contents

Summary	**3**
Introduction	**4**
Discussion	**6**
Appendix	**7**
Project Photos	**8**
Location Map	**10**
BMP Summary Report	**12**
Project Cost Summary	**13**

Summary

Major threats to the Watershed are flooding, hydrologic modification, fragmentation of habitat, and the spread of non-native and invasive species. The Des Plaines River is one of the most flood-prone waterways in the region, with 1 to 2 damaging floods occurring every 10 years since 1930. Hydrologic modifications such as dams built along the river and the conversion of wetlands into farmland have only exacerbated the problem. Historical flooding in 1986 and 1987 caused over $100 million in damage in communities along the Des Plaines River, including Elmwood Park.

These large areas of impervious land in the developed parts of the Basin are resulting in serious flood conditions during heavy rainfall, leading to significant amounts of polluted runoff that flow into the Watershed's lakes and streams. This is an especially important issue in the developed areas of the Des Plaines River Watershed where many older communities have a combined sewer system. During periods of significant rainfall, these systems reach full capacity and excess flows are discharged into nearby water bodies further impairing water quality. Elmwood Park is one such community that utilizes a combined sewer system for conveying stormwater and sanitary waste that links to the MWRDGC interceptor sewer. The Village's sewers range from 12 inches to 66 inches in diameter size. Most of these sewers have a very limited capacity to convey stormwater runoff due to their small size and long distances from the MWRDGC interceptor. The interceptor sewer links to the Des Plaines TARP system tunnel which accommodates combined sewer flows until the system reaches capacity during periods of heavy rainfall. Once the TARP tunnel is at maximum capacity, MWRDGC closes the sluices gates to the system and excess flows are diverted into the Des Plaines River. The CSOs from Elmwood Park's sewer system discharge into segment G-30 of the Des Plaines River which has been assessed as impaired and not supporting aquatic life, fish consumption and primary contact, according to the 2010 Illinois Integrated Water Quality Report and Section 303 (d) List.

The Village is actively pursuing green infrastructure projects to reduce flooding, stormwater runoff and CSOs. In 2010, the Village was awarded funding through the Illinois Green Infrastructure Grant Program for Stormwater Management (IGIG) to reconstruct two alleys with permeable pavers. Both of these alleys were completed in 2012. Elmwood Park also reconstructed a third alley with permeable pavers using local funds in 2012. Progress photos of the construction along with typical cross sections are included in the Appendix.

Introduction

Elmwood Park has been addressing stormwater management issues for the last 15 years to help reduce combined sewer overflows into the Des Plaines River. The Village is using a combination of traditional and green infrastructure Best Management Practices, primarily funded by local dollars, as a long term strategy to eliminate CSO conditions. Between 2000 and 2005, Elmwood Park constructed five underground storage facilities into which stormwater runoff from roads is diverted until there is sufficient capacity in the Village's combined sewers to accommodate the excess volume of water. Although the project helped reduce the frequency and magnitude of flooding and CSOs, the capacity of these facilities is exceeded during periods of intense rainfall, as was the case during the June 2008 and July 2010 storms. At those times, the Village experienced community-wide flooding and CSOs into the Des Plaines River.

The Village was able to utilize these IGIG funds to implement a green infrastructure project with the objective of increasing infiltration of stormwater flows into the ground and decreasing the volume of runoff entering the combined sewer system. The Village was able reduce the amount of impervious surface area in the alley ways by constructing permeable pavement at the following locations:

1. Oakleaf Avenue alley from 80th Avenue to Diversey Avenue

2. 1700 Block Alley between 76th Avenue-76th Court

These green alleys were constructed of Permeable Interlocking Concrete Pavement (PICP) with a Portland Cement Concrete (PCC) Pavement adjacent to the system. PICP consists of a layer of concrete pavers that are separated by joints filled with small stones. The impervious units are designed with small openings between permeable joints. The openings are typically 5% to 15% of the paver surface area and are filled with highly permeable, small-sized stones. These joints allow stormwater to enter a crushed stone aggregate base layer which provides storage and runoff treatment. PICPs are attractive, durable, easily repaired, and low maintenance. The system significantly reduces rates and volume of stormwater runoff and filters pollutants as the water infiltrates into the ground. The permeable pavement also helps to reduce the urban heat island effect and lowers ambient temperatures. PICP is a highly effective on-site stormwater management practice, especially for CSO communities.

Elmwood Park expects both project sites to help reduce the volume of stormwater entering its combined sewer system. Ninety-seven percent (97%) of rain falling onto the green alleys will infiltrate into the ground instead of burdening the combined sewer system. This initiative will also reduce pollutant loads entering the system and ultimately discharging into the Des Plaines. The pollutant removal efficiency is 34% for total phosphorous and 67% for nitrogen. The light colored pavers also counteract the heat island effect and effectively reduce urban temperatures.

Prior to construction, the existing pavement section consisted of nearly 20 year old hot-mix asphalt laid over a 50+ year old concrete base. This pavement and sub-base were removed to a depth of approximately 23 inches in the center of the alley (below the PICP) and 14 inches along the outside (below the PCC pavement). A typical cross section can be found in the Appendix. The BMP was designed to incorporate PCC pavement on the outside of the PICP as both a cost savings element and as a sustainable component. During initial design, it was determined that the inclusion of the adjacent PCC pavement, which drains to the porous pavers, provides the same environmental benefits as a pavement constructed entirely of porous pavers. Furthermore, the BMP implemented as such will provide a 20% cost reduction and will extend the life of the BMP. When compared to a conventional hot-mix alley reconstruction project, this BMP is estimated to cost an additional 50%. However, the life expectancy is expected to increase by up to 300%.

Both projects took approximately 11 months to complete. Riverside began implementation upon notification that the projects were approved for IGIG funding.

The key project components were:

1. (October 2011 – January 2012) Design/ Engineering Phase: The Village Engineer prepared the specifications and plans for the construction work for the alleys. The ten year Operations and Maintenance Plan was developed during this phase.

2. (January 2012 – July 2012) Public Bidding/ Bid Opening/ Contract Awarded: The construction bid notice was released, proposals were opened and evaluated, and the contract was awarded to the successful bidder.

3. (August 2012 – October 2012) Construction Phase: Once, the subcontract was approved by the IEPA, construction commenced. Construction was substantially completed on October 5, 2012.

Discussion

The Green Alleys Project will increase the amount of stormwater that is absorbed into the ground and reduce the volume of flow entering Elmwood Park's combined sewer system. Immediate outcomes resulting from the implementation of these projects include reduction in stormwater runoff by nearly 97% during significant rainfalls. In addition, the improvements are expected to achieve pollutant removal efficiencies of 34% (1 lb/year) for total phosphorous, 67% (7 lbs/ year) for nitrogen and 67% (.63 tons/year) sediment. As the project decreases the volume of flow in the Village's combined sewer system, it will reduce CSOs discharging into the Des Plaines River and in the long-term these BMPs will help improve the health of the River. Furthermore, the reduction in volume of flow in the combined sewer system will result in an energy savings as the overall volume of wastewater treated at the Metropolitan Water Reclamation District decreases.

These projects were successful in providing green initiatives that promote sustainability, preservation, and conservation practices. They were successfully completed ahead of schedule in the fall of 2012.

APPENDIX

Green Alley Construction Photos

Figure 1 – Pavment Removal and Sub-base Excavation

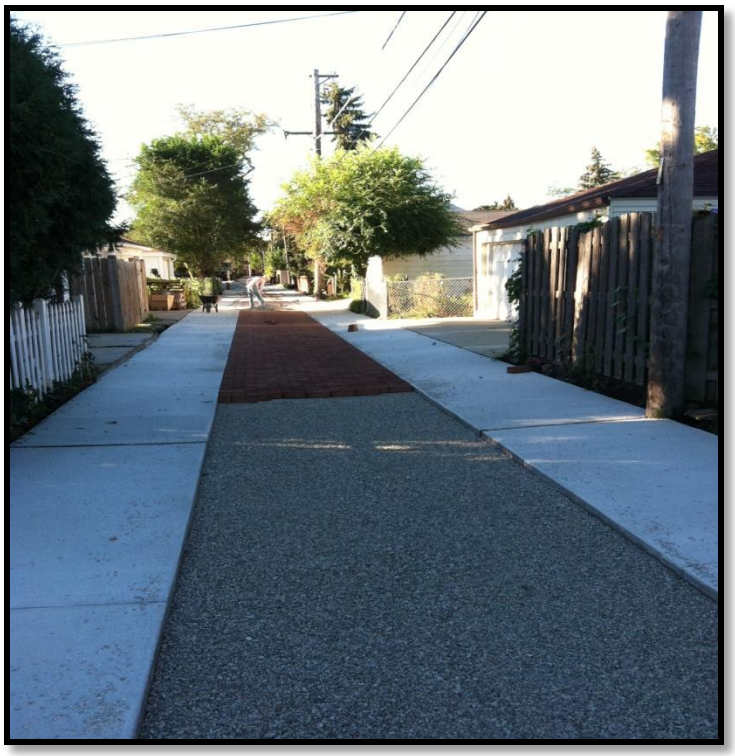

Figure 2 – Installation of Permeable Interlocking Concrete Pavement

Completed Green Alley Photos

Figure 3 – Completed Green Alley at Oakleaf Dr.

Figure 4 – Completed Green Alley at 1700 76th Ave. / Ct.

Figure 5 – Completed Green Alley with Project Sign