

Appendix 5: Community Highlights

Saint Paul

Rainwater Harvesting at CHS Field

CHS Field is a regional ballpark in the heart of the Lowertown neighborhood of Saint Paul, Minnesota just a few hundred feet from America's greatest river. CHS Field is home to the Saint Paul Saints minor league baseball team. The ballpark has a capacity of 7,000 spectators, will host approximately 400,000 visitors annually and will be used for a both sporting and non-sporting events.

With population on the rise, Minnesota's groundwater supplies continue to decline and stormwater runoff pollutes local lakes and the Mississippi River. Ballparks require large amounts of water for irrigation, drinking and other operational activities. To reduce consumption of potable water as well as the amount of polluted runoff flowing to the Mississippi River, the City of Saint Paul, Saint Paul Saints, Metropolitan Council and Capitol Region Watershed District collaborated to collect and store rainwater and use it for irrigation and other uses at CHS Field. Why do this? Because even in the Land of 10,000 Lakes, water is a resource we can't afford to take for granted.

Project implementation

Partnerships

This reuse project was part of the original plan and budget for the ball park, but several partners worked together to provide funding and technical support for the project: City of St. Paul, Capital Region Watershed District, Metropolitan Council, and the St. Paul Saints.

Finding a potential water source

Rooftops provide a great opportunity to collect rainwater because the water flowing off roofs is relatively clean compared to streets or parking lots. CHS Field doesn't have a lot of roof cover, but the Metropolitan Council offered the roof area of the Green Line light rail Operations and Maintenance Facility (OMF) located next door. A pipe installed between the properties allows rainwater to flow from roughly $\frac{3}{4}$ -acre portion of the OMF roof to a 27,000-gallon steel cistern tank below the ballpark concourse near center field.

Treating water to ensure it is safe to use

Harvested rainwater at CHS Field is used to irrigate the ball field and flush toilets. Before it can be used for those purposes, water is treated to ensure it is safe. A vortex filter removes large particles such as leaves and sediment (or baseballs!) from the water before it goes to the cistern. From there, a pump pulls water from the cistern and sends it through two filters that remove smaller particles. Finally, UV light is used to disinfect the water before it is sent to the irrigation system or toilets.

Using the water

Irrigation

The harvested rainwater is used to irrigate the main playing field, which includes two acres of sod. The area is watered by 115 irrigation heads and 7,000 feet of irrigation pipe.

Toilet flushing

The public toilets located behind center field include nine water closets and four urinals which are serviced by water from the cistern. The remaining 127 public toilets are located too far away to be served by the cistern, but all toilets in the park include water-saving fixtures.

Challenges

Plumbing Code

The success of the project required obtaining approval from the plumbing inspector for rainwater reuse inside the building (toilets).

The rainwater harvesting design was reviewed and approved locally under Minnesota Plumbing Code Rule 4715.0330 "*Alternative Fixtures, Appurtenances, Materials, and Methods.*" Criteria within Uniform Plumbing Code Chapter 17 ("*Non-Potable Rainwater Catchment Systems*") were used to support the review and approval. Water quality treatment standards were derived from NSF/ANSI 350 for onsite residential and commercial water reuse treatment systems.

Property owner cooperation during construction

The success of the project required construction of rainwater conveyance piping inside an active rail facility (the Metro Transit Green Line Operations and Maintenance Facility), followed by construction of a cistern and conveyance piping at the ball park. Close coordination between property owners and partners ensured the success of the project.

Maximizing the amount of water storage in a minimum amount of space

Project Benefits

- Annual potable water reduction estimated at 450,000 gallons
- Annual cost savings of more than \$1,600

What may help other communities?

Partnerships and incentives

- The Metropolitan Council granted \$100,000 to the City for the rainwater harvesting system Capitol Region Watershed District granted \$246,500 to the City for the rainwater harvesting system
- The Metropolitan Council funded the OMF rainwater conveyance retrofit (\$82,800)
- Metropolitan Council funds are from the Clean Water Land and Legacy Amendment

Lessons learned

- Take officials on tours of similar projects to help them feel comfortable about supporting innovative stormwater reuse projects
- Pay close attention to the roof; are there HVAC units that have condensate that should be piped away from the rainwater harvesting area?
- Work closely with MDH to determine the appropriate level of water treatment

Awards and Recognition

- 2015 Clean Water Champion Award from the Freshwater Society

Contact the Project Partners

- Brian Davis, Senior Engineer, Metropolitan Council, (651) 602-1519

Savage & Burnsville

Water Supply Partnership

For the past 6 years the Cities of Savage and Burnsville have worked together to utilize quarry water that was previously discarded to the Minnesota River as part of mining operations at the Kraemer Quarry in Burnsville. Annually, via a water use agreement, Burnsville provides more than 600 million gallons of potable water to Savage, which accounts for about 79% of their annual demand. The partnership has reduced groundwater pumping between the Cities of Savage and Burnsville by 1.1 to 1.2 billion gallons per year. This reduction in pumping has resulted in rebounding water levels in the Jordan Aquifer since the project came on-line in 2009. The \$14 million project included construction of a quarry surface water intake, supply watermains and water treatment plant addition and upgrades.

Project implementation

Prior to construction agreements and funding between Burnsville and the City of Savage, State of Minnesota and Kraemer Mining and Materials were required. As lead agency, Burnsville constructed the surface water intake which consists of two pumping stations along with connecting water system infrastructure to convey water to the existing water treatment plant. An addition was made to the plant to allow for treatment of this water. Additional improvements to enhance water aesthetics made by Burnsville after completion of the initial project included a Granular Activated Carbon building, surface water drainage improvements and baffling improvements to the finished water reservoir.

The project has been operating for 6 years and annually provides 1.1 to 1.2 billion gallons of potable water. This water supplements the 2 billion gallons of ground water pumped by the City.

Challenges

The primary challenges once operations began were related to the aesthetics of the new water supply. The new mixed supply was harder and had a different taste and odor. Savage and Burnsville staffs worked together on several collaborative solutions to solve these issues. Communication, patience and cooperation were key in solving these issues. The water quality complaints related to the initial issues have virtually been eliminated in both communities.

Project Benefits

- Reuse of 1.1 billion gallons of water annually
- Reduction of 1.1 billion gallons of groundwater pumping and rebounding water levels in the Jordan Aquifer
- Viable/sustainable long term source of water for the communities

What may help other communities?

It can be done if communities are willing to work together, trust each other and collaborate. However, this type of partnership and success can't occur without state and agency help.

Partnerships and incentives

This project would not have been possible without collaboration of Kraemer Mining and Materials, State of Minnesota, MDH, DNR and Cities of Savage and Burnsville. Below is the cost participation in the project:

- State of Minnesota: \$5.5 Million
- Kraemer Mining and Materials: \$3.0 Million
- City of Savage: \$2.0 Million
- City of Burnsville: \$3.5 Million
- Total SWTP Capital Cost: \$14.0 million

Community commitment to sustainability, water supply security, and collaboration

The potable use of 1.1 billion gallons of previously discarded quarry water has resulted in rebounding water levels in the Jordan Aquifer locally, and will help ensure sustainability of the water supply for Savage and Burnsville.

Lessons Learned

- Mixing of surface and groundwater is complicated and upfront investment in pilot results will reduce issues
- Understand potential operational issues of connected system, such as impacts to chlorine levels
- Proactive education of Public, Council and City Staff on issues such as:
 - Potential changes in water aesthetics (taste, odor and hardness etc.)
 - Water is “safe” exceeds all standards

Awards and Recognitions

- 2009 City Engineers of Minnesota Project of the Year – Honorable Mention
- 2009 Environmental Initiative Award
- 2009 National League of Cities Silver Award for Municipal Excellence
- 2010 Finance and Commerce Top Project Award
- 2010 Minnesota Society of Professional Engineers Merit Award
- 2010 American Council of Engineering Companies Grand Award
- 2010 American Council of Engineering Companies National Recognition Award

Contact the Community

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