Unpacking the Partnership and Process for Rainwater Harvesting at CHS Field

Freshwater Society

Water Reuse Workshop

May 2, 2016
Saint Paul’s CHS Field

- Public-private partnership
- Brownfield redevelopment
- Sustainability focused
- *Rainwater harvesting across properties*
Partnership

Agencies
• Capitol Region WD
• Metropolitan Council
• Metro Transit

Project Team
• St. Paul Saints
• City of Saint Paul Parks and Recreation
• Ryan Companies
  • Schadegg Mechanical
  • Solution Blue, Inc.
  • Rainwater Management Solutions
Rainwater Harvesting Drivers

- **Audience**
  - 180 events
  - 400,000 annual visitors

- **Location**
  - Mississippi River
  - Green Line
  - Brownfield site

- **Placemaking**
  - “Greenest” ballpark
  - Showcase innovation
Rainwater Harvesting Drivers

- Facility demand
- Community commitment
  - Greater Lowertown Master Plan
  - Comprehensive Plan Water Chapter
Broad Challenges

• Lack of standards
• No defined process
• Multiple jurisdictions
• O & M impacts
  – Cost
  – Oversight
• Water economics
Design Charrette

• Facilitated by outside reuse expert (Stark Rainwater / RMS)
• Developed 3 possible alternatives
• Schematic design and prelim cost estimates

MEP contractor not on project team yet
Stormwater “Double Play”
Preferred Alternative – Option C

Rainwater use – toilet flushing & ballfield irrigation
- 27,000 gallon tank
- 10% of toilet fixtures; 15-20% of field demand (450,000 gall est.)
Design Refinement: U of M tour
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Vetting and Coordination

- State, local reviewers; funding partners; project team
- Facilitate transparency
- Receive comments, perspective, or technical input
Enhanced Water Sustainability

- Total Ballpark cost .................................. $ 63,000,000
- Total cost* .................................................. $ 487,000
  - Rainwater harvesting system .......... $ 300,000
  - Enhanced stormwater items .......... $ 68,000
  - Design and Admin/Fees ................. $ 75,000
  - Contingency ........................................ $ 44,000
- Total grants ............................................ $425,000

*Does not include cost to re-route OMF rain leaders
Rainwater Harvesting

- RHS Components: 72%
- RHS Controller: 23%
- Connect and Install: 5%
- Cistern Room: 40%
- Overflow pipes: 21%
- Signage: 8%
- Signage: 3%
Met Transit “OMF”

- Operation & Maintenance Facility
- 4-acre facility for storing light rail trains
- Roof drained away from CHS Field site
- Active train electrical grid near rain leaders
Performance Results

• Operated August - October
• Water quality standards met
• Toilet reuse: 22,500 gallons
• Irrigation reuse: 118,500+ gallons

141,000 gal total (or 18,850 ft³) reused/conserved
Partnership Hurdles

• Determining end use standards
• Sharing runoff between buildings
• Initial operation troubleshooting
• Meaningful visibility
Water Quality Testing
Major sports venue to meet B3 Standards + MN SB 2030
LEED Silver Equivalent
- Use rainwater for toilet flushing and field irrigation

CHS FIELD: THE GREENEST BALLPARK IN AMERICA

DISTRICT ENERGY: 1. CHS Field connects to one of the best district energy systems for heating and cooling loads. District energy is ~33% more efficient than traditional grid supply.

RENEWABLE ENERGY: 2. Xcel Energy helped fund 100 kW of solar arrays to supply 12.5% of the ballpark’s power.

FIELD LIGHTING: 3. Innovative fixtures focus light on the field, reducing spill into adjacent areas and the total number of fixtures by 40% compared to Midway Stadium.

BUILDING FOOTPRINT: 4. 80% of interior spaces are below the concourse, requiring less open space and less energy to operate.

BUILDING REUSE: 5. 230 foundation piers, 5,120 SF of concrete wall, and 168,000 SF of slab were reused in the ballpark.

RECYCLED MATERIALS: 6. Virtually all concrete from the existing Gillette building was crushed and used as structural fill beneath the field.

REDUCING WASTE: 7. Ryan diverted 98% of construction waste from landfills. The Giants are introducing composting and recycling with the goal of operating a zero waste facility.

INDOOR ENVIRONMENTS: 8. Low VDC finishes and occupant-sensor lighting were used in all interior spaces. Nearly all offices and the press box have access to natural light and air flow.

ENERGY EFFICIENCY 3.

BENEFITS 13.

BROWNFIELD TO BALL-FIELD 11.

BUILDING TO FOOTPRINT 12.

WATER REUSE AND TREATMENT 14.

SITE BENEFITS 15.

BENCHMARKS 1.

ANNUAL SAVINGS

13.

SITE TRANSFORMATION: 9. 8.5 acres of contaminated, impervious site were transformed into almost 60% green space with an environmental cap to minimize contaminated runoff.

GREEN SPACES: 10. 135 trees and 138,800 SF of natural grass, including the playing field, will remove 22.5 tons of CO2 from the atmosphere each year.

COMMUNITY CONNECTION: 11. Part of the site was turned into a neighborhood dog park and rain garden featuring local artwork.

SUSTAINABLE TRANSIT: 12. CHS Field’s urban location and walk score of 89/100 encourages fans to BIKES, walk, or use nearby bus and LRT lines to commute to games.

CLEAN STORMWATER: 13. Virtually all stormwater runoff is treated through sand filters, tree trenches, or rain gardens to remove pollutants before entering the Mississippi watershed.

WATER RECLAMATION: 14. A 27,000 gallon cistern collects rainwater for reuse in toilets and field irrigation, saving up to 450,000 gal of H2O each year.

RESPONSIBLE USE: 15. Metered, dual-flush, and low-flow fixtures are installed in public restrooms and locker rooms to control water waste.

1st

- LEED Silver equivalent
- B3 benchmarks
- MN SB 2030
- Use rainwater for field irrigation

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Questions?