



Water Conservation at Cemstone Products Company

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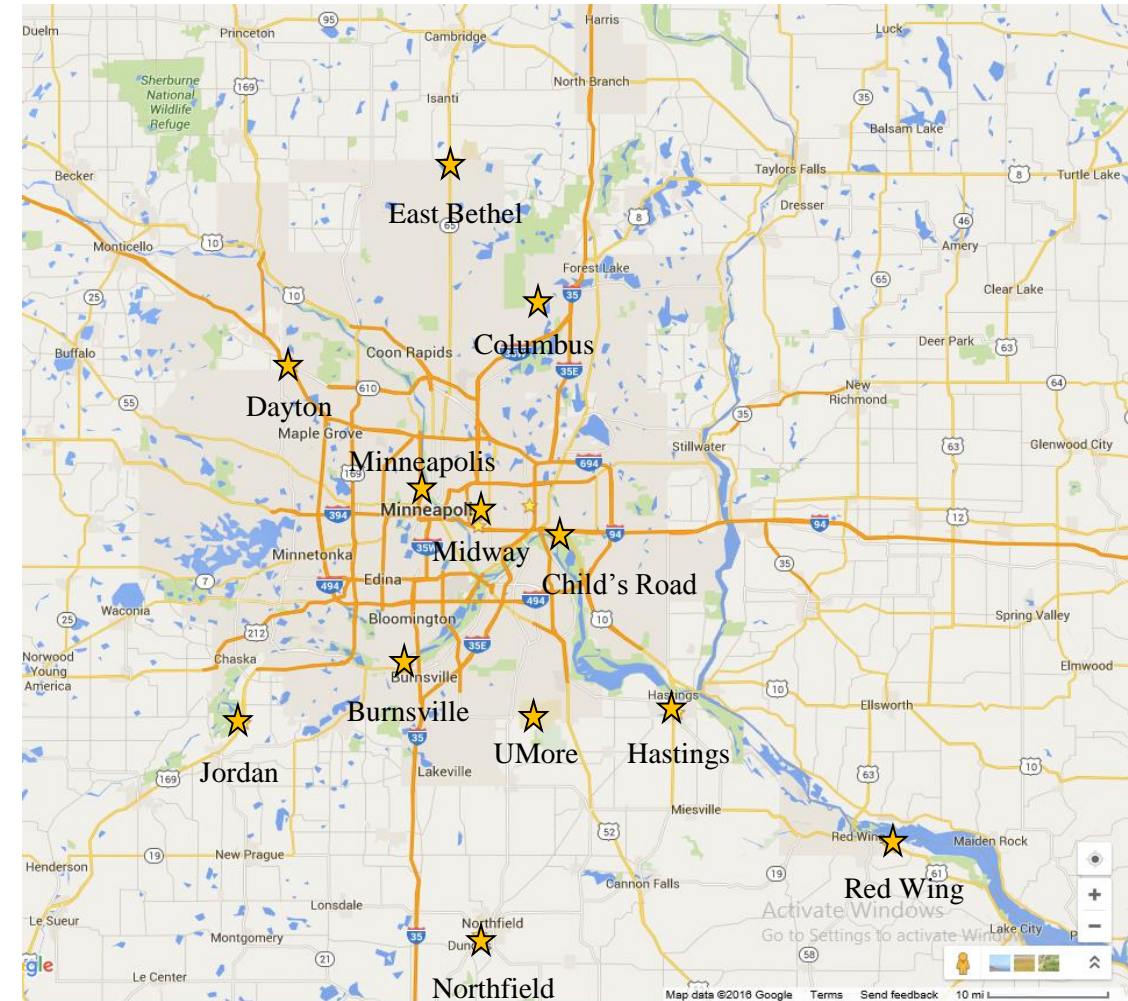


UNIVERSITY OF MINNESOTA

Driven to DiscoverSM

Company Background

- **Ready mixed concrete producer with 40+ plants.**
 - Serving Minnesota, Wisconsin and Iowa
- **Focused on 12 plants in and around the metro**
 - Red Wing, Hastings, Northfield, Jordan, Rosemount, Burnsville, St. Paul (2), Minneapolis, Dayton, East Bethel, and Columbus.





Need for MnTAP

- **Goal: Reduce fresh water consumption by 10%**
 - Will aid in NRMCA sustainability certification
- **Quantify reduction using water balance**
 - Identify major water saving areas
 - Develop system for future
- **Optimize existing systems**
 - Weir system



Motivation

- **Cost Reduction**
- **Reduced risk of process water discharge**
 - Environmental compliance
- **NRMCA Certification**
 - Only four companies with certification

Average Yearly Water Totals for Each Plant

Fresh Water: **4,723,000 gal**

Domestic: **144,000 gal**

Batching: **2,164,000 gal**

Savings Potential: **2,415,000 gal**

Steps Taken

Site visits, process understanding, and water balance



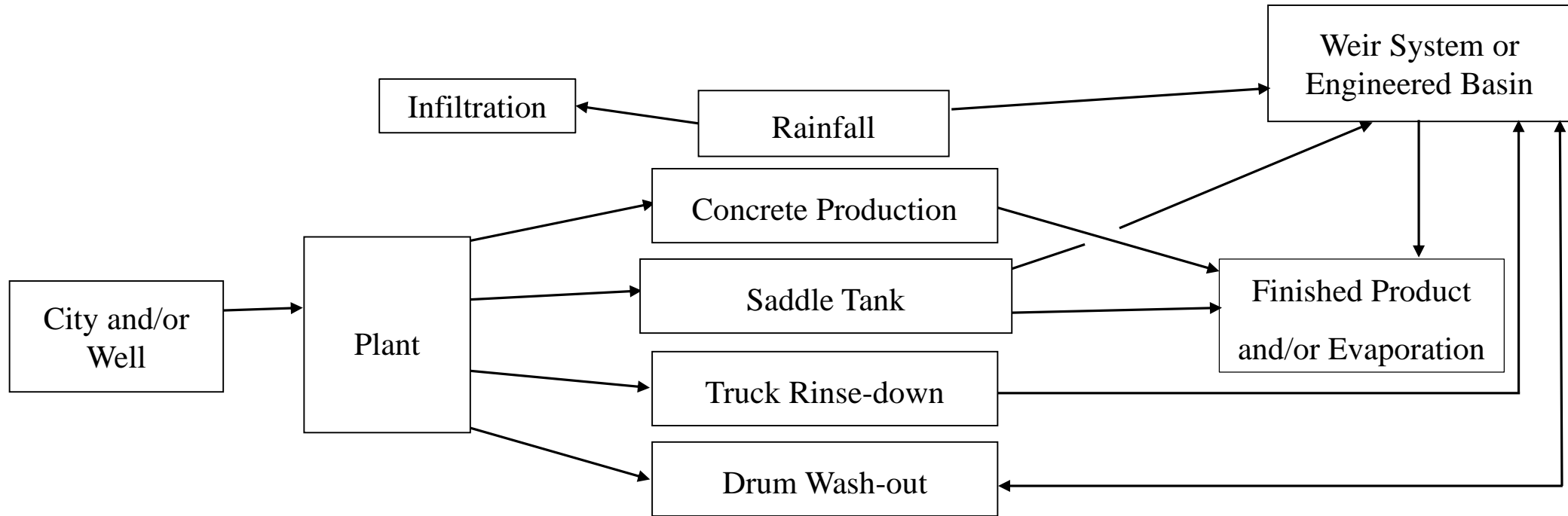
Identification of possible water saving areas and vendor contact



Development of site specific solutions



Water Flow Diagram



Opportunities for Fresh Water Reduction

- **Water Reduction Options**

- Saddle tank overfilling
- Rinse down/out procedure at the plant and at the jobsite
- Pre-delivery truck wash

- **Water Reuse Options**

- Clarified water use in concrete production
- pH control for truck wash
- Rainwater harvesting

Recommendations - Water Reduction

- **Automatic Shut-off Nozzle**

- **Problem/Opportunity:**

- Overflow occurs when saddle tank is filled
 - Saddle tank is filled before each delivery

- **Solution:**

- Install nozzle on all saddle tank fill hoses
 - Eliminate most overflow from saddle tank

- **Benefits:**

- Easy to install/use
 - Difficult to work around



Photo curtesy of OPW Global (opwglobal.com).

Water Savings/Year: **4,100,000 gallons**

Implementation Cost/Nozzle: **\$500**

Average Payback Period: **2.8 years**

Recommendations - Water Reduction

- **Automatic Rinse Down System**

- **Problem/Opportunity:**

- Overuse of water during wash down

- **Solution:**

- Install automatic wash system
 - Optimize system for reduced water use

- **Benefits:**

- Completely automatic
 - Reduces time, water and injuries



Photo courtesy of Key Solutions (readymixwash.com).

Water Savings/Year: **2,700,000 gallons**

Implementation Cost/System: **\$58,700**

Average Payback Period: **1.4 years**

Recommendations - Water Reduction

- **Driver Training**

- **Problem/Opportunity:**

- Inconsistent driver training across all plants
 - Not all drivers are conscious of water use

- **Solution:**

- Create a “best practices” document
 - Start a water conservation initiative to raise awareness

- **Benefits:**

- Reduces the risk of a process water discharge
 - Potentially reduce saddle tank water use by 10%

Water Savings/Year: **780,000 gallons**

Implementation Cost/System: **\$0**

Average Payback Period: **N/A**

Recommendations - Water Reuse

- **Weir Water Use**

- **Problem/Opportunity:**

- Weir systems have usable water
 - Weir water has pH of 11-13

- **Solution:**

- **Use more water from weir systems**
 - Install pH control for added uses
 - Enclose existing weirs for year round use

- **Benefits:**

- Large overall water reduction
 - Applies to all plants that have a weir system

Water Savings/Year: **7,680,000 gallons**

Implementation Cost/Plant: **Varies**

Average Payback Period: **Varies**

Recommendations - Water Reuse

- **Rainwater Collection**

- **Problem/Opportunity:**

- Many plants with roof areas of $>5700 \text{ ft}^2$
 - Auxiliary buildings also have large roofs

- **Solution:**

- Install storage tank and gutter systems to catch rain water
 - Route water to truck wash stations and aggregate piles

- **Benefits:**

- Not considered process water
 - Supplemental water for when weir is being cleaned



Aerial of the Jordan plant curtesy of Google Maps

Water Savings/Year: **730,000 gallons**

Implementation Cost/Plant: **TBD**

Average Payback Period: **TBD**

Recommendation Summary

Water reduction option	Water saved (gal per year)	% Reduction	Implementation cost	Average cost savings (per year)	Payback period	Status
Automatic Shut-off Nozzles	4,100,000	7.2%	\$8,500	\$5,664	1.5 years	In testing
Weir Water Use	7,680,000	13.6%	Varies	\$9,029	Varies	Partially Implemented
Load and Go Rinse System	2,700,000	4.8%	\$352,200	\$265,384	1.3 years	Recommendation
Rainwater Collection	730,000	1.3%	Unknown	\$2,508	Unknown	Researching
Driver Training	780,000	1.4%	\$0	Varies	N/A	Partially Implemented
Total	16,020,000	28.3%		\$282,585		

Personal Benefits

- Engineering is not exact, but it's close
- The plant is the best source of information
- Talking on the phone is a skill and an art form
- Environmental compliance is paramount
- Got to ride in a Cemstone Truck



Questions?

This project was sponsored in part by Metropolitan Council Environmental Services