

CASE FILE



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SITE CIVIL IMPROVEMENT ↔ EROSION CONTROL ↔ SURFACE WATER QUALITY

Geopro® Learning Tool

March 29, 2004

Wal-Mart - Antioch, IL; March 2004

Local ordinances required construction of a large detention basin to control the storm water release rate leaving this new, 25 acre *Wal-Mart* facility. In addition, this 330' x 180' basin served as a sediment control trap during mass grading, utility installation and site development operations. Water exited the basin through a conventional perforated standpipe with gravel pack. These erosion/sediment management practices met local ordinance mandates.

Spring snow melt coupled with early rains sent turbid water into the completed basin. Since the basin was not stabilized prior to winter shutdown, the raw soil side slopes and bottom contributed additional suspended solids into the water column. Even with the large basin size, the colloidal [fine clay] suspensions would not clarify by gravity. Further, wind generated currents churned near-surface sediments and waves eroded bank soils, contributing to continuous high turbidity water condition.

Water exiting the basin drained into the environmentally sensitive wetlands surrounding the East and West Loon Lakes. The gravel packed standpipe performed the expected functions of filtering debris and sand, but offered little relief from the chocolate-brown colloidal and silt suspension; water leaving the basin did not pass *Lake County Storm Water Management* [LCSWM] nor *Illinois Environmental Protection Agency* [IEPA] requirements.

Both *LCSWM* and *IEPA* took due-process steps to ensure that water leaving the site met their quality standards. As a result, the excavating contractor, *Thelen Sand & Gravel, Inc.* of Antioch, IL, called erosion/sediment control material distributor *Ero-Tex* to determine if and what systems could be used to clarify the storm water prior to off-site discharge. After reviewing site conditions and hydraulic requirements, *Ero-Tex* suggested the use of a storm water treatment system that would flocculate and chelate [chemical processes] suspended solids from the water, leaving discharges significantly clarified.

To ready the system, *Thelen* excavated a sump within the southwest basin that consisted of two parts, a 'grit pit' into which an existing 15" pipe would discharge and the heavy soil fractions and floc would settle by gravity. The second system part, a 'baffle grid', would then filter finer floc

and chelate formations still moving within the water column.

The pit measured approximately 8' wide, 6' deep and 10' long while the downstream grid was 8' wide, 30' long and 2' deep. Both the pit and grid were stabilized using *Applied Polymer Systems, Inc.* [APS] **Silt Stop® 705** polyacrylamide [PAM] blend and jute fabric. Within the grid, 10 jute baffles were constructed, allowing the



Foreground: Grit Pit
Background: Baffle Grid



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Metro Grand Rapids, MI
425 36th Street SW, Wyoming, MI 49548-2108 Toll Free: 800-248-8230

Metro Detroit, MI
29165 Wall Street, Wixom, MI 48393-3525 Toll Free: 866-960-4300

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flowing water to pass through the jute to the discharge pipe. *Thelen* placed 16 **APS 706b Floc Logs** [semi-hydrated PAM blends] into the upper portions of the 1000' long, 15" pipe. The **Floc Logs** offered a passive method to introduce the appropriate flocculant-chelant into the treatment system.



Baffle grid flow from right to left. Note: water clarity change

Water passing over and around the **Floc Logs** dissolved the polymer in trace quantities. Down pipe movement enabled the suspended solids to attach to the polymer charge sites, causing floc and chelate formation. With the discharge entering the quiescent pit, most floc and chelates [and, thus, suspended soil particles] settled immediately. The remaining lighter floc fraction was 'filtered' by the jute baffles, rendering significantly improved storm water clarity prior to discharge to the off-site location.



Discharge from Floc Log clarification system to adjacent wetlands

Water entering 15" pipe = 8960 NTU
Water passing first baffle = 2.3 NTU
Discharge water = 1.8 NTU

This simple, cost effective system, using APS Floc Logs, provided a 3+ order of magnitude improvement in storm water clarity !!



Transformation: site water runoff on left to Floc Log clarification system discharge on right

To receive further information related to *Applied Polymer Systems, Inc.* **Silt Stop** and **Floc Log** polymer blends within Illinois and Wisconsin, please contact *Ero-Tex* at 866.437.6839.

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