

Smart Tools for MS4:

Integrating Ecological Restoration and GIS Platforms



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General MS4 Permit-IL

Requirements:

- Submit Notice of Intent (NOI)
- Prepare Storm Water Management Plan (SWMP)
- Develop a storm water management program and measurable goals for the six (6) minimum control measures
 - 1. Public education and outreach on storm water impacts
 - 2. Public involvement and participation
 - 3. Illicit discharge detection and elimination
 - 4. Construction site storm water runoff control
 - 5. Post construction storm water management in new development and redevelopment
 - 6. Pollution prevention/good housekeeping for municipal operations
- Submit Annual Reports (June 1st of every year)



General MS4 Permit-IL

Special Conditions (III-C)

If a TMDL or watershed plan is approved for any water body into which you discharge, you
must review your storm water management program to determine whether the TMDL or
watershed management plan includes requirements for control of storm water discharges.



Watershed Planning & Management

"watershed planning is often too complex and too expensive for one person or organization to tackle alone" (US EPA)

Watershed Groups

- "groups of individuals and organizations, who represent the interest of the community and the environment with a mission, goals, and plan for implementing water quality improvement projects, enhancing habitat, developing recreational activities and informing their neighbors of the importance of natural resource protection" (WVDEP).
 Watershed Management Plan
- defines and addresses existing or future water quality problems from both point source and non-point sources of pollutants.



Ecosystem Services to Watershed Planning (retrieved from: http://s3.amazonaws.com/mongabayimages/13/0128.foresttrends_watershed_large.jpg)



In 2011, a watershed management plan was developed based on the nine elements and approved by the Illinois EPA





Hickory Crook Watershed Planning Group

Hickory Creek Watershed Plan

Executive Summary

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Watershed Management/Storm Water Opportunities

Watershed Plan Identified Environmental Goals

- Reduce nonpoint source pollutant loads
- Manage storm water runoff
- Improve water quality and habitat
 Watershed Group Prioritized Projects
- Identified three stream bank stabilization projects within the watershed, with the goal of these becoming demonstration projects
 - Including East Branch of Marley Creek Streambank Restoration, Mokena, IL (HUC 12: 0712000406) project
 - Applied and received Section 319 grant funding in 2016



Municipal Viewpoint:

Get administration/officials/public buy in, that these types of projects are worthwhile in our community.

- Sometimes the best way to win over support and get started is with a partial funding approved project.
- It hard to say no to grant money. Sustain momentum in MS4 projects
- Try and have follow up projects no matter how small to avoid one and done mentality
- Community has to see/use it, otherwise it can be forgotten on site and in the budget.
- Don't be a lone voice, build a choir

Maintenance is key component at the front end

- If maintenance staff believes it will be an undue burden they will fight the whole way and little help guide things toward failure (looking their worst instead of their best)
- Spend the money for planting inspection or you will be trying to catch up with maintenance for several cycles





Village of Mokena, POTW Parking Lot

Existing Conditions

- Increase stormwater runoff from new parking lot
- Eroded pervious area

Challenges

- Cost
- Rapid Deployment
- Maintenance

Watershed Goals

- Manage storm water runoff
- Storm water education opportunity





Village of Mokena POTW Parking Lot: Site Conditions



Village of Mokena: Rain Garden (Construction)



Village of Mokena: Rain Garden







East Branch of Marley Creek, Mokena, IL

Existing Conditions

- High levels of erosion
- Degraded stream banks

Challenges

- Grant deadlines
- High visibility (recreational and residential areas)
- Integrating with existing natural prairie

Watershed Goals

- Reduce suspended solids,
- Improve habitat and aquatic community diversity,
- Educate the community on green infrastructure and native vegetation

Pre-construction streambank conditions, looking upstream

Pre-construction streambank conditions, facing upstream

Pre-construction streambank conditions, facing west

East Branch of Marley Creek, Mokena, IL



That's odd, this looks like it was drawn by hand...



CONSTRUCTION

East Branch of Marley Creek Streambank Stabilization

Schedule:

- Concept plans developed Dec. 2017
- Construction document development Jan. 2017
- Competitive bid opening May 30, 2018
- Award contract to lowest bidder April 2018
- Permits obtained April 2018
- Begin construction August 2018
- Completes construction September 2018

Maintenance Schedule:

- Begin 10-year operations and maintenance period – Sept.2018
- Contractor 3-year maintenance period ends – Sep. 2021
- 10-year O&M ends September 2028



During construction, facing west

During construction, upstream



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Seal Prov

Post construction, facing downstream

BANHNAG Planting phase, facing east

East Branch of Marley Creek, Mokena, IL

Streambank Stabilization

- Approximately 0.2 acres of invasive brush and vegetation clearing
- 0.2 acres of native prairie and wetland seeding
- 228 native plugs planted on a newly graded floodplain bench
- 54 square yards of stone riprap stabilization
- Total of over 130 linear feet of stabilized streambank

Coordination Efforts:

 Village of Mokena, H&H/GZA, HR Green, Copenhaver Construction



East Branch of Marley Creek Streambank Stabilization

Operation & Maintenance (O&M)

- The Village of Mokena is committed to a 10year O&M agreement (Two Phase Approach)
 - Phase 1: More intensive management, through routine site inspections, to control weedy invasive plants
 - Phase 2: Annual long-term maintenance, past year one, to maintain native vegetation



Glove wick and hand-held wick application. Photo Credit: H. Chavez





Operation and Maintenance Plan Crystal Creek Streambank Stabilization Village of Mokena, Will County, Illinois

November 20, 2018 File No. 81.0220501.02

Proactive by Design. Our Company Commitment



PREPARED FOR: Village of Mokena 11004 Carpenter Street Mokena, Illinois 60448

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GZA has 31 Offices Nationwide www.huffnhuff.com www.gza.com A watershed-wide public program that pairs volunteers with trained biologist to sample for macroinvertebrates

ORES

Hickory Creek Watershed Bio-Blitz







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Sustaining Citizen Engagement

A platform for supporting public outreach and meeting regulatory requirements

Client's Pain Points:

- Need to be able to access historic Bio-Blitz results
- Finding a solution to expand to a wider audience
 - Online presence
 - Meeting Environmental Justice requirements
- Tracking trends in stream health in a geographic context
- Meeting Regulatory Requirements
 - NPDES MS4 permit
 - NPDES wastewater permit



Smart Tools for Stormwater Management: Geospatial Technology

Web GIS Pattern

- Migration from file-based data storage to Cloud services
- Desktop application capability extended to Software as a Service (SaaS)
- Data shared through web services
- Device agnostic

Key Benefits

- Cost
- Scalability
- Flexibility
- Rapid Deployment



Geospatial Tools That Support Citizen Engagement ...with web GIS and Esri Story Maps for Bio-Blitz



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Geospatial Tools That Support Stormwater Management ... by highlighting projects within the watershed



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Geospatial Tools That Support Stormwater Management-Information Dashboards Hickory Creek Watershed Planning Group

Operations Dashboard

- Manage events in real-time.
- Visualize performance indicators.
- Configurable
 widgets.
- Interactive map.
- Actions on features.





Municipality's Viewpoint

Build a brick, then a building with bricks

- Must conceive projects without funding, to have something ready to go
- Funding timing or residual allotments can leave only ready projects to be eligible with little competition
- Small projects at multiple locations in a watershed may be better than a single water quality improvement depending on the impairment
- Be practical: moderate restorations are easier to support in an age of divisive discussion on priorities and allocation of resources



Thank You!



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