Transforming Stormwater Management

How the Following Technology Tools Make MS4 Compliance **Easier**

Treasure Agbonkhese, EIT

Smart Tools For Stormwater Compliance

Oklahoma's MS4 permit is complex, but modern tools make compliance simpler, smarter, and more connected. From inspections and asset tracking to public education and reporting, platforms like **SWAMP, Datafi, and ArcGIS StoryMaps** have transformed and continue to transform how cities manage stormwater. Here is how Oklahoma's communities can benefit from this.

Stormwater Asset Management Program (SWAMP)

What is SWAMP?

SWAMP© (Storm Water Asset Management Program) is a Web-based application that allows for a customized prioritization of annual storm water pond, outfall, and structural BMP inspection and maintenance activities while creating a **roadmap** for storm water infrastructure management.

BMPs as Valuable Assets

BMPs are critical infrastructure, not just maintenance items. **SWAMP will manage BMPs with the same care and long-term strategy used for roads and utilities**.

Simplify O&M

SWAMP brings all your stormwater **O&M data into one place, offering real-time updates, maintenance history, and inspection schedules**.

Inspection & Maintenance

Not all BMPs perform the same. **SWAMP helps you pinpoint which basins are doing the most for water quality, and which need attention right away**.

Ensure Regulatory Compliance

Stay in **full compliance with Oklahoma's MS4 permit requirements**, ensuring your BMPs are actually working, always keeping your city audit-ready.

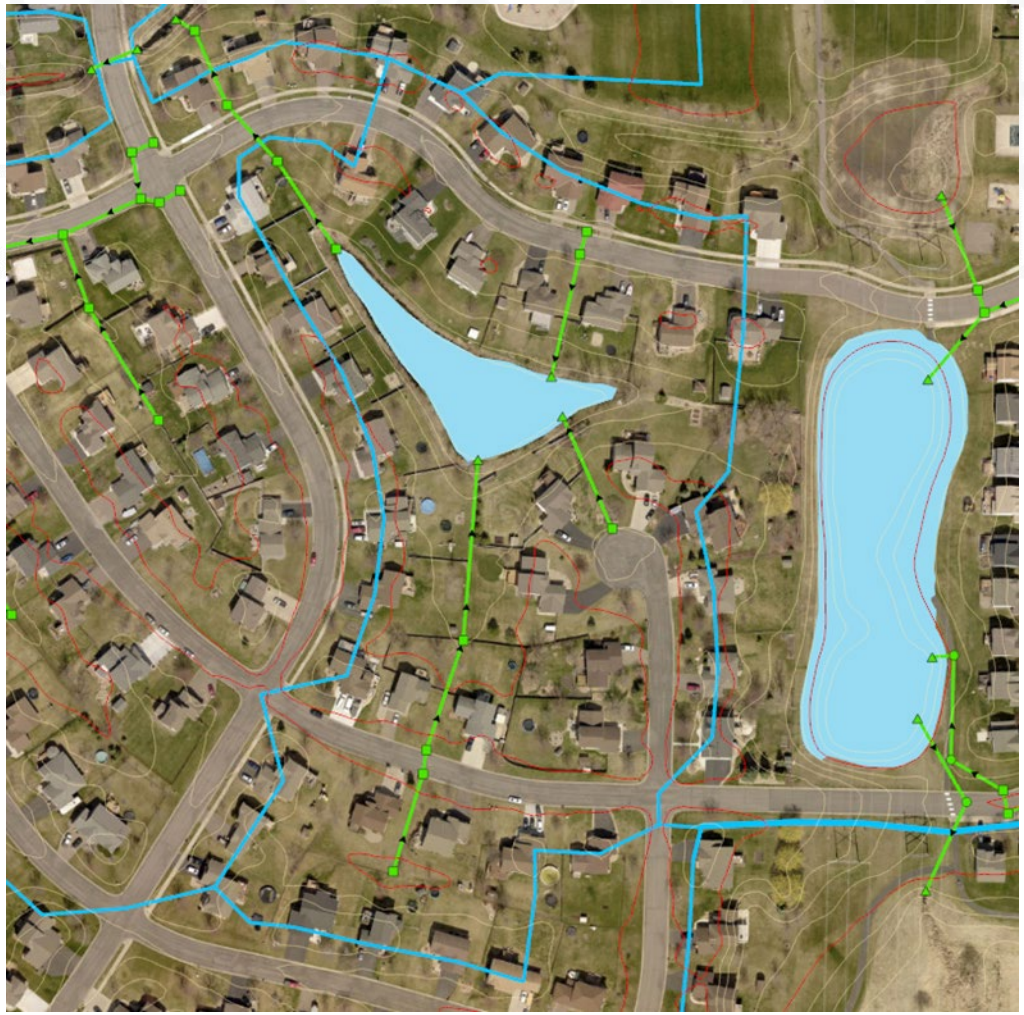
Scoring & Prioritizing Pond Performance with SWAMP

The SWAMP Score: Pond Health Scoring
Based on:
- GIS Features

What the Score Tells You:
- **Lower score = Higher risk / Lower performance**

Quantitative Pathway to Meet Goals:
Estimates:
- Sediment volume to excavate
- Cost of excavation
- Current & improved TP/TSS removal (%) and (lbs/year)

Forecasting Future Performance
- Predicts pond conditions and performance over 5, 10, and 15 years



Beyond Management: SWAMP as a Strategic Tool for TMDL Compliance

SWAMP isn’t just a stormwater asset management tool—**it’s a strategic BMP solution that helps you meet Oklahoma’s TMDL requirements**, while simplifying how you track and evaluate TSS and TP reductions across your stormwater basins.

SWAMP’s Role in TMDL Compliance

TMDL Compliance Solution

- SWAMP moves beyond traditional asset management by **tracking TSS & TP load reductions**.
- Helps cities meet TMDL load reduction targets by tracking and optimizing pollutant removal.
- Quickly **identifies which stormwater basins are meeting, exceeding, or falling short of TMDL goals**.
- Tracks the qualitative and quantitative effects of Stormwater BMPs over time for **continuous improvement**.

Meeting TMDL Load Reduction Goals

Pond Health Score

This pond health score that **identifies which ponds are failing** helps cities target maintenance where it's most needed

Load Reductions

The quantified load reductions further help **meet TMDL goals by showing exactly how much pollution is being removed**.

Smart Planning

These results focus on the highest-impact ponds, **tracks measurable progress toward TMDL targets** and demonstrate regulatory compliance.

Future Compliance

These results predicts future pond and visualizes improvements demonstrating TMDL compliance.

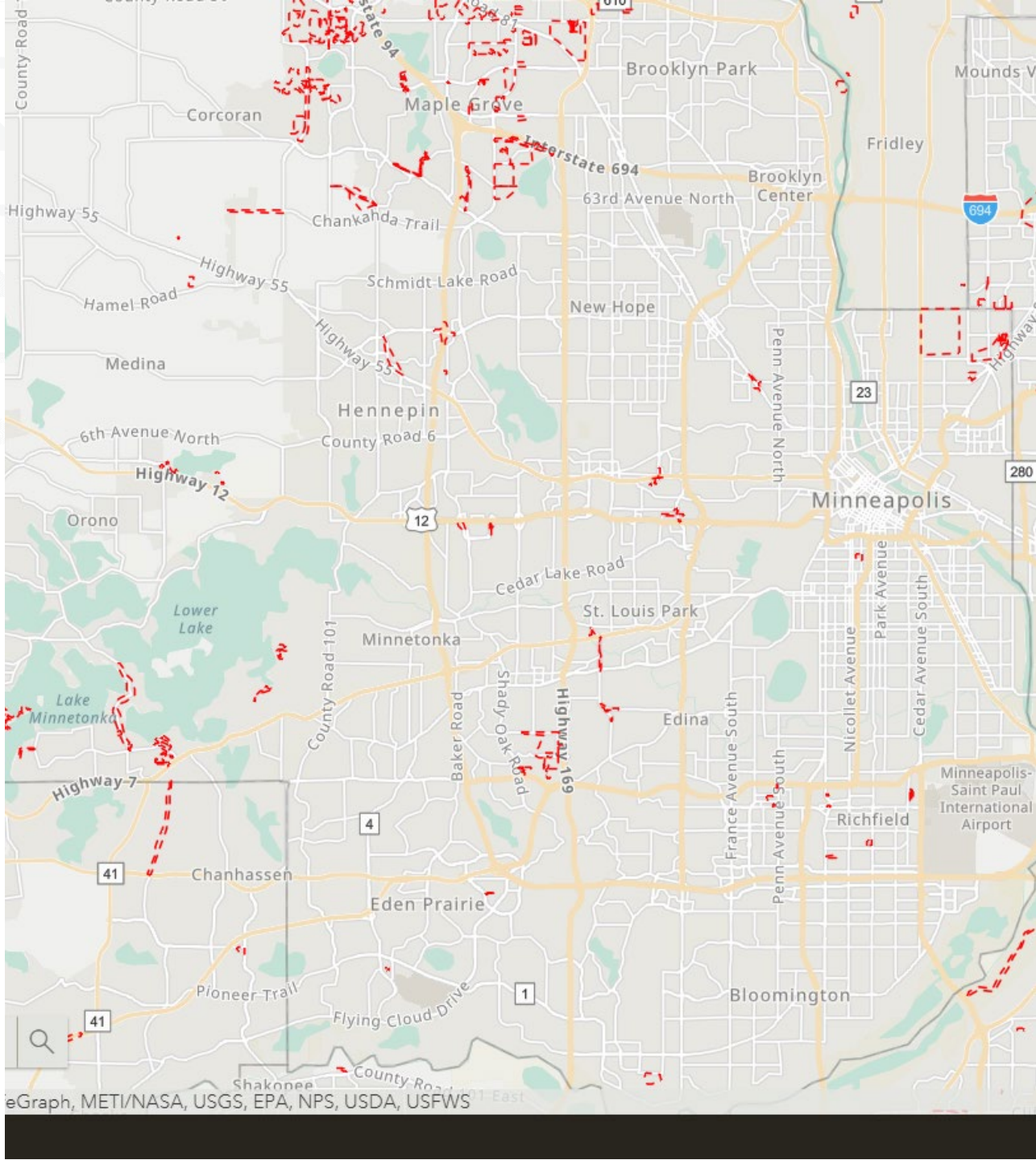
Datafi: Effortless Stormwater Program Management

Datafi: Built on SWAMP's Foundation

- Datafi by WSB connects your field and office teams with a simple, easy-to-use platform for conducing inspections.
- Collect, manage, and share inspection field inspection data in real time when they occur.
- Powered by ArcGIS and Esri, Datafi brings mapping and field tools together in one easy place.
- Say goodbye to spreadsheets and manual entry, say hello to easily accessible data.

Smarter Construction Inspections

- **Quickly and efficiently inspect multiple construction sites** to stay ahead of permit compliance requirements
- **Document and manage maintenance issues in real time,** with the ability to generate inspection reports
- **Capture inspection reports and maintain records from any location,** ensuring full documentation and easy access anytime
- **Meet the requirements** of both Oklahoma's Construction and Municipal Stormwater Permits



Meeting Stormwater Compliance Requirements

Stay Inspection-Ready

- Oklahoma requires inspections every 14 days and after ½ inch of rain—Datafi tracks it all and lets field teams log findings on-site, so nothing gets missed.

Track and Manage Maintenance Effortlessly

- Keeping stormwater documents is key to staying compliant. Datafi makes it easy organizing inspection making these documents easy to access and tracks and maintains maintenance efforts.

More Than Just Construction Inspections

- Performing pipeline inspections, property assessments, environmental compliance, and city code enforcement inspections are possible.

wsb

Construction ESC Inspection Form

Date & Time of Inspection:	04/29/2025 02:31 pm
Weather Conditions:	Clear
Reason for Inspection:	Rainfall
24 Hour Precipitation:	0.6 in.

Project Name:	Naber Business Park	**Project Number**	R-021222-000
NPDES Permit #:	C00066548	**Owner/Permittee:**	City of St Michael
MN State Duty Officer:	651.649.5451 or 800.422.0798	**Contractor/Permittee:**	Fehn Companies, jlandkammer@fehncompanies.com
Site Contact 1:	Erika Elfstrand, WSB 320.895.9351	**Site Contact 2:**	Nick Preisler, City of St Michael, 763.416.7936
In attendance:	Max Gezel, WSB		
General Site Activities:			
Building construction			

Inspection Findings:

1.	**Exit BMPs/Adjacent Roadway**	Deficient	**2.**	**Construction Phasing**	N/A
3.	**Buffer Zones**	N/A	**4.**	**Concrete Washout**	Noncompliant
5.	**Dewatering/Bypass Pumping**	N/A	**6.**	**Polymer/Flocculent Application**	N/A
7.	**Ditch Checks**	N/A	**8.**	**Grading/Earthwork**	Noncompliant
9.	**Dust Control/ Wind Erosion**	Noncompliant	**10.**	**Inlet Protection**	Noncompliant
11.	**ESC BMP Maintenance**	Noncompliant	**12.**	**Outlet Control Structure (24 hrs.)**	N/A
13.	**Inclement Weather Ready**	Noncompliant	**14.**	**Perimeter Sediment Controls**	Noncompliant
15.	**Redundant Perimeter Controls**	Noncompliant	**16.**	**Turbidity Curtain/Fence**	N/A
17.	**Soil Stockpile Protection**	Noncompliant	**18.**	**Offsite Discharges**	N/A
19.	**Directional Drilling**	N/A	**20.**	**Stabilization Measures/24 Hour**	N/A
21.	**Secondary/Hazard Containment**	N/A	**22.**	**Stabilization Measures/7 Day**	Noncompliant
23.	**Waste/Trash Containment**	N/A	**24.**	**Stabilization Measures/14 Day**	N/A
25.	**Vegetation (%)**	0 %	**26.**	**Inspection Records & SWPPP Documentation**	Compliant

Items that need maintenance:

Status: Open
Correct By: Immediately
Location: Project
Details: Please stabilize all soils that have not been actively worked within a 7 day timeframe.

Status: Open
Correct By: Immediately
Location: North side of project
Details: Please stabilize and install downgradient perimeter control around stockpiles. Clean up sediment from pavement and haul out concrete and asphalt waste.

Status: Open
Correct By: Immediately
Location: North side of project
Details: Please stabilize soils if not actively worked.

Status: Open
Correct By: Immediately
Location: Multiple locations
Details: Please clean up concrete washout and dispose of properly.

Status: Open
Correct By: Immediately
Location: Project
Details: Please add perimeter control at the backside of the curbline where soils are flush with the curb.

Status: Open
Correct By: The End of Next Business Day
Location: SW corner of site
Details: Please repair downed perimeter control.

ArcGIS StoryMaps: Connecting Our Community to Clean Water

From Data to Impact: The Role of ArcGIS StoryMaps

- More than just a storytelling platform—StoryMaps help us educate, engage, and comply **all in one place**.
- Combines stormwater education, MS4 permit reporting, and community pride in a *visually stunning format*.

Why StoryMaps?

- Interactive and accessible educational tool
- Visually engaging and user-friendly
- Centralized platform for annual stormwater content updates
- Built to meet MS4 education and outreach requirements (MCM 1)

One Tool, Multiple MS4 Requirements

- Covers MCM 1 through MCM 6 and visually displays annual education compliance
- Meets annual meeting and documentation requirements
- Fully accessible and updatable in real time

Visually Showcasing the City's Stormwater Program

- Full overview of the Stormwater Management Program
- Interactive maps of outfalls, ponds, inlets, BMPs, impaired waters
- Real-time updates reflect new improvements and programs

Built for Engagement

- Ideal for City Council, public meetings, and classrooms
- Reach high-priority audiences (schools, residents, HOAs)
- Showcase at stormwater events to drive awareness
- Easily shared and displayed on City's website or QR code

What the StoryMap Teaches

- Key clarifications of Stormwater Definitions
- **Illicit discharges: examples, impacts, and reporting**
- Why clean water matters for our lakes and rivers

Simplify, Educate, and Comply

ArcGIS StoryMaps as a tool helps cities meet MS4 education goals with clear messaging, engaging visuals, and real-time, audit-ready updates.

Clear Messages for Cleaner Water

- Educates residents on Oklahoma's education requirements of bacteria, pet waste, and FOG (fats, oils, and grease) on one platform

Always Current. Always Accessible.

- Automatically updates with no need to reprint or reupload
- Easily shared with staff, schools, partners, and the public
- Provides strong documentation for audits and annual reporting

Your Story, Your City, Your Water

ArcGIS StoryMaps transform stormwater compliance into a meaningful story, one that connects your community to the water they rely on. With **interactive maps**, **clear visuals**, and **real-time updates**, it's more than just a permit tool. It's a way to educate, engage, and highlight how your City protects its **most vital resource**.

LAUNCH DEMO

#1

Show, don't just tell, bring your stormwater program to life.

#2

All MS4 education in one place, interactive, visual, and up-to-date.

#3

Turn technical content into a story your community understands.

What Does This Mean for **Oklahoma**?

For Oklahoma’s MS4 permit, this means turning compliance into action. With these combined tools, cities and counties can **meet multiple MCM requirements** in one place, track inspections and outreach efforts in real time, and stay audit-ready without the paperwork hassle. It improves the process, strengthens documentation, and makes stormwater management more forward-thinking, transparent, and impactful for the community.

Treasure Agbonkhese, EIT

ENVIRONMENTAL COMPLIANCE SPECIALIST

Treasure is an Environmental Compliance Specialist with 3 years of experience in water resources engineering, MS4 permitting, SWPPP design, and inspections. She supports public and private clients with stormwater design, permitting, and MS4 program development. Her passion for MS4 and engineering background bring creativity, strong training skills, and a unique perspective to MS4 compliance and program management.

Kory Bonnell, PhD

DIRECTOR, ENVIRONMENTAL COMPLIANCE

Kory is an Environmental Compliance Specialist with nine years of industry experience. She is focused on providing clients with exceptional environmental compliance services in MS4 program and development, construction and industrial permitting, Spill Prevention Control and Countermeasure Plan needs, and SWPPP design, implementation and inspection. Her work experience, coupled with her PhD in Natural Resources Management and background in environmental law and policy, allows Kory to provide a unique and thorough service to WSB partners.

THANK YOU