



FSA CONFERENCE · JUNE 2026

AI in Stormwater Practice: Managing Complexity Under Real-World Constraints

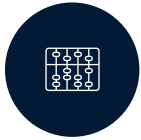
John Wolf
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Agenda



Overview



Problem 1

Data Collection & Geospatial Analysis



Problem 2

Surrogate Modeling



Problem 3

Deliverable Review



Problem 4

Project Delivery



Best Practices/Safety



Q&A



Overview

Computer Vision

See what's in the world

Machine Learning

Predict from patterns

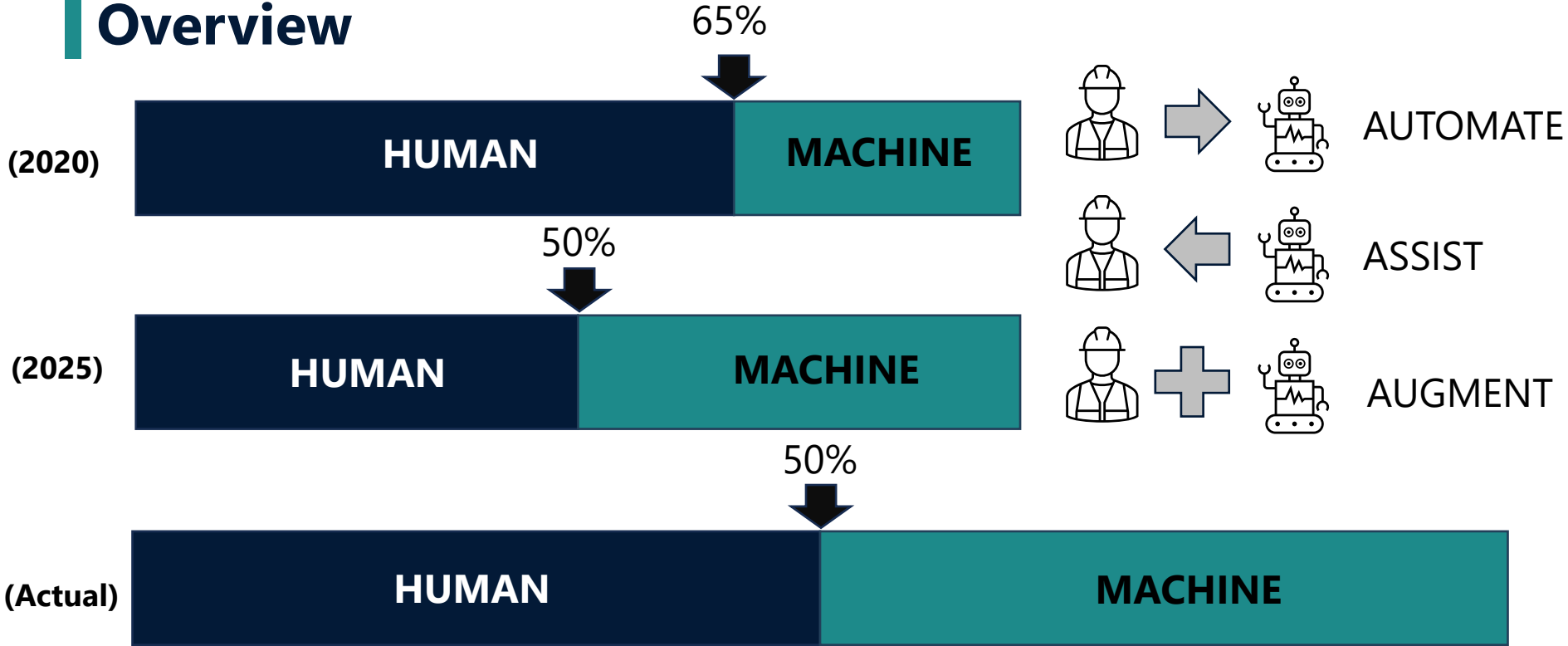
Language Models

Read/Write/Understand

Data Intelligence

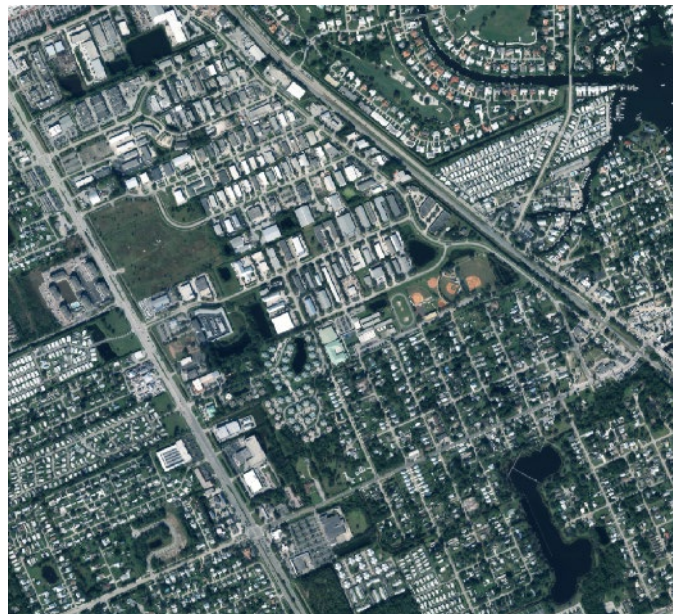
Collect/Analyze Data

Overview





Problem 1: Data Collection & Geospatial Analysis



Problems

Staff Constraints

GIS layers are incomplete or nonexistent

Change detection needs repeatable methods

High-resolution data is available but hard to use



Problem 1: Data Collection & Geospatial Analysis





Problem 1: Data Collection & Geospatial Analysis



Benefits

Land Cover Classification

Asset & Feature Extraction

Temporal Change Detection

Condition Assessment



Problem 2: Surrogate Modeling

Problem Statement

Significant time and resources have been invested into developing watershed models.

Decision makers need **fast, actionable** flood predictions to support operations, emergency response, and infrastructure management.

Machine Learning

**INSTANTANEOUS
FLOOD FORECASTS**

Benefits

Can leverage existing model infrastructure

Generate predictions faster than traditional physics-based models

Lower data and setup burden for operational deployment

Data flywheel effect



SIMULATED FLOOD RISK

LOW

Based on 3.00" simulated storm

LOW flooding: 33 nodes at risk (4%), 0 in Major/Severe zones [Extrapolated — outside training range]

Below training range (4.4" min) — prediction is estimated

[Return to live conditions](#)

SIMULATE STORM

Rainfall (in)

3

Duration (hr)

48

Run Prediction

GNN inference ~0.8s

LAYERS

2D Surface Flooding

GNN-generated 3.0"/48h flood surface

7-DAY QPF OUTLOOK

Day 1 (24h)

LOW 1% 0.00"

Day 2 (24h)

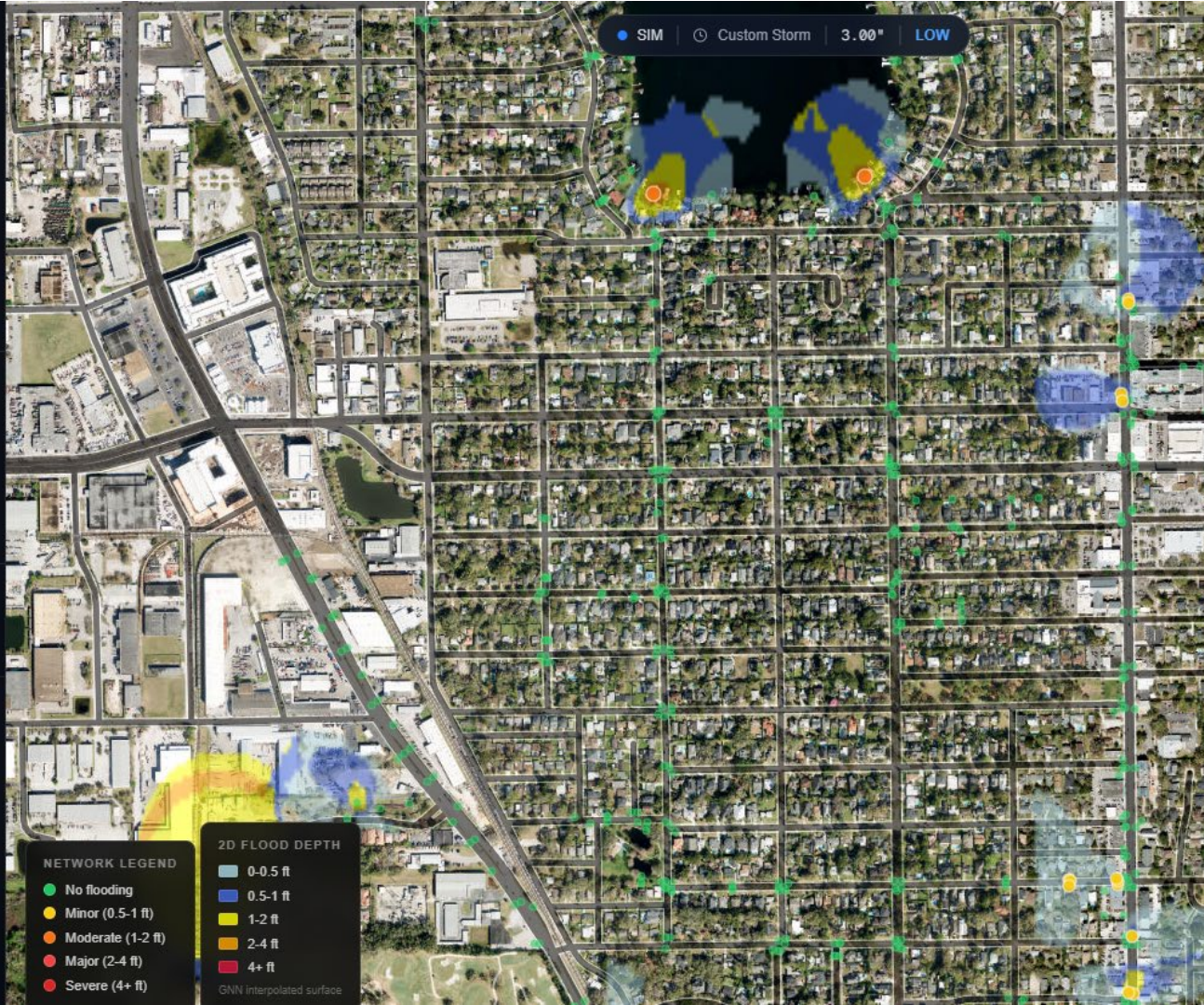
LOW 1% 0.00"

Day 3 (24h)

LOW 1% 0.00"

Days 4-5 (48h)

LOW 2% 1.85"





Problem 3: Deliverable Review

Problem Statement

Design and project teams need reliable, timely review of construction documents and outgoing deliverables. Errors are **embarrassing** at best, and **costly** at worst.

A lot of **effort** has been invested into **standards, specifications, and procedures**, but these are **inconsistently** applied across projects and reviewers.

**AI-Powered
Review**

**CUSTOMIZABLE,
SELF-IMPROVING
REVIEW**

Benefits

Applies QA/QC consistently

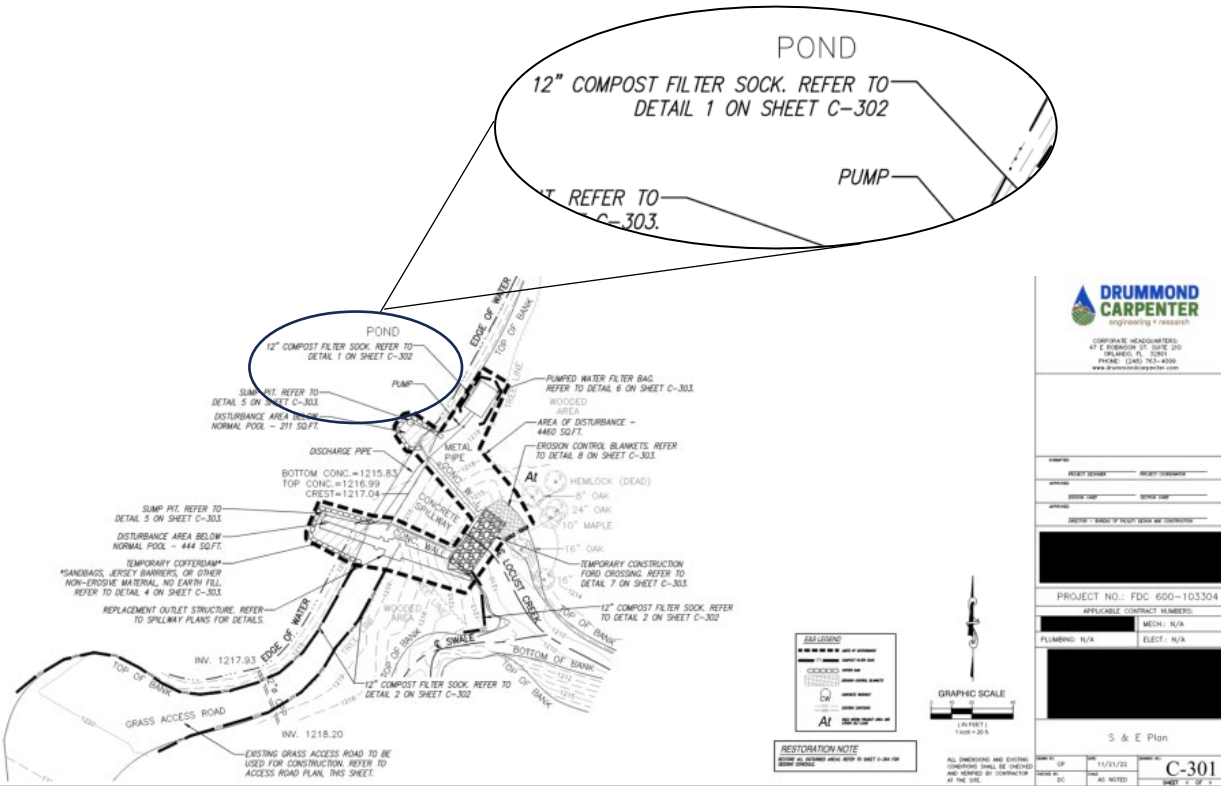
Avoids coordination errors

Scales review capacity

Extremely cost efficient



Problem 3: Deliverable Review



- ## What can it do?
- Pre-Submittal Review
 - Bid Takeoff / Quantity verification
 - Cross-Discipline Consistency
 - Constructability Review
 - Permitting/Approval
 - RFIs/Submittals/Change Orders

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www.drummondcarpenter.com

PROJECT NO.: FDC 600-103304

MECH: N/A
ELECT: N/A

DATE: 11/21/22
SHEET: C-301

Problem 3: Deliverable Review

MAINTENANCE NOTES:

- ROCK CONSTRUCTION ENTRANCE THICKNESS SHALL BE CONSTANTLY MAINTAINED TO THE SPECIFIED DIMENSIONS BY ADDING ROCK. A STOCKPILE SHALL BE MAINTAINED ON SITE FOR THIS PURPOSE.
- ALL SEDIMENT DEPOSITED ON PAVED ROADWAYS SHALL BE REMOVED AND RETURNED TO THE CONSTRUCTION SITE IMMEDIATELY.
- IF EXCESSIVE AMOUNTS OF SEDIMENT ARE BEING DEPOSITED ON ROADWAY, EXTEND LENGTH OF ROCK CONSTRUCTION ENTRANCE BY 50 FOOT INCREMENTS UNTIL CONDITION IS ALLEVIATED OR INSTALL WASH RACK.
- WASHING THE ROADWAY OR SWEEPING DEPOSITS INTO ROADWAY DITCHES, SEWERS, CULVERTS, OR OTHER DRAINAGE COURSES IS NOT ACCEPTABLE.

WASHING NOTES:

- WHEN NECESSARY, WHEELS SHALL BE CLEANED TO REMOVE SEDIMENT PRIOR TO ENTRANCE ONTO PUBLIC RIGHT-OF-WAY.
- WHEN WASHING IS REQUIRED, IT SHALL BE DONE ON AN AREA STABILIZED WITH CRUSHED STONE WHICH DRAINS INTO AN APPROVED SEDIMENT TRAP OR SEDIMENT BASIN.
- ALL SEDIMENT SHALL BE PREVENTED FROM ENTERING ANY STORM DRAIN, DITCH OR WATERCOURSE THROUGH USE OF SAND BAGS, GRAVEL, BUNDLES OR OTHER APPROVED METHODS.



SECTION

- COMPOST FILTER SOCK NOTES:**
- SOCK FABRIC SHALL MEET THE STANDARDS OF TABLE 4.1 OF THE PA DEP EROSION CONTROL MAN.
 - COMPOST FILTER SOCK SHALL BE PLACED AT EXISTING LEVEL GRADE. BOTH ENDS OF EXTENDED AT LEAST 8 FEET UP SLOPE AT 45 DEGREES TO THE MAIN SOCK ALONGS SLOPE LENGTH ABOVE ANY SOCK SHALL NOT EXCEED THAT SPECIFIED FOR THE SIZE SLOPE OF ITS TRIBUTARY AREA. STAKES MAY BE INSTALLED IMMEDIATELY DOWN-SLOPE SPECIFIED BY THE MANUFACTURER.
 - TRAFFIC SHALL NOT BE PERMITTED TO CROSS FILTER SOCKS.
 - ACCUMULATED SEDIMENT SHALL BE REMOVED WHEN IT REACHES HALF THE ABOVE! SOCK AND DISPOSED IN THE MANNER DESCRIBED ELSEWHERE IN THE PLAN.
 - SOCKS SHALL BE INSPECTED WEEKLY AND AFTER EACH RUNOFF EVENT, DAMAGED! ACCORDING TO MANUFACTURER'S SPECIFICATIONS OR REPLACED WITHIN 24 HOUR!
 - BIODEGRADABLE FILTER SOCKS SHALL BE REPLACED AFTER 6 MONTHS. PHOTOLOG YEAR. POLYPROPYLENE SOCKS SHALL BE REPLACED ACCORDING TO MANUFACTURER.
 - UPON STABILIZATION OF THE AREA TRIBUTARY TO THE SOCK, STAKES SHALL BE RE LEFT IN PLACE AND VEGETATED OR REMOVED. IN THE LATTER CASE, THE MESH SHN MULCH SPREAD AS A SOIL SUPPLEMENT.

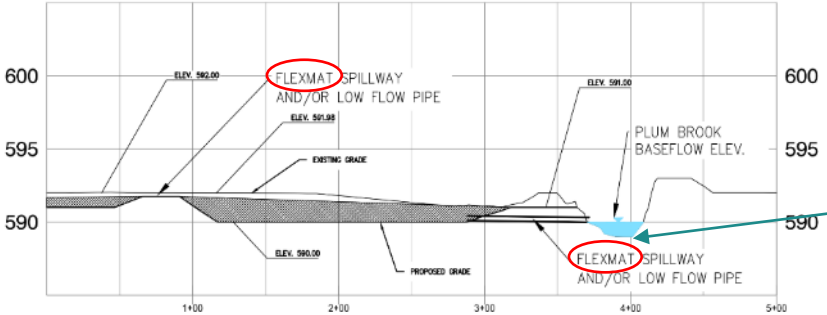
DETAIL # 1 - ROCK CONSTRUCTION ENTRANCE

NO SCALE

DETAIL # 2 - COMPOST FILTER SOCK

NO SCALE

ALIGNMENT 3



Hi there,

I reviewed **Plans1.pdf** (Sheets C-301 and C-302, Dam Repairs at Various Dams in [redacted]). The document has one critical cross-reference error that could result in a contractor installing the wrong BMP, plus a significant scale conflict on Sheet C-301. Several minor items also need attention before issue.

Critical Items

- Wrong detail number called out for compost filter sock (Page 1 – Sheet C-301):** [redacted] the callout on Sheet C-301 for the 12" compost filter sock directs the contractor to *Detail 1 on Sheet C-302*. Detail #1 on C-302 is the **Rock Construction Entrance**, not a compost filter sock. The compost filter sock is **Detail #2** on C-302. This needs to be corrected to 'DETAIL 2 ON SHEET C-302' before issue.

Items to Review

- Product name inconsistency — FLEXMAT vs. FLEXAMAT (pages 2, 3, 5, 6):** Plan view callouts on Sheets 2, 3, and 5 use *FLEXMAT*; Detail 3 on Sheet 6 and the underlayment label use *FLEXAMAT*. These appear to refer to the same articulated concrete block spillway product. Confirm the correct trade name with the manufacturer and standardize across all sheets to avoid procurement confusion.



Problem 4: Project Delivery

Problem Statement

Stormwater and water asset management relies on large volumes of **disconnected data** across gauges, sensors, inspection reports, and historical records.

Decision makers spend **significant time searching** across systems instead of using integrated information to support time-sensitive operations.

Agencies need a **unified, data-driven platform** that combines monitoring, forecasts, inspections, and maintenance intelligence into **actionable decision support**.



Problem 4: Project Delivery

Problem Statement

New FDEP operation and maintenance requirements are increasing oversight responsibilities for large numbers of privately owned BMPs.

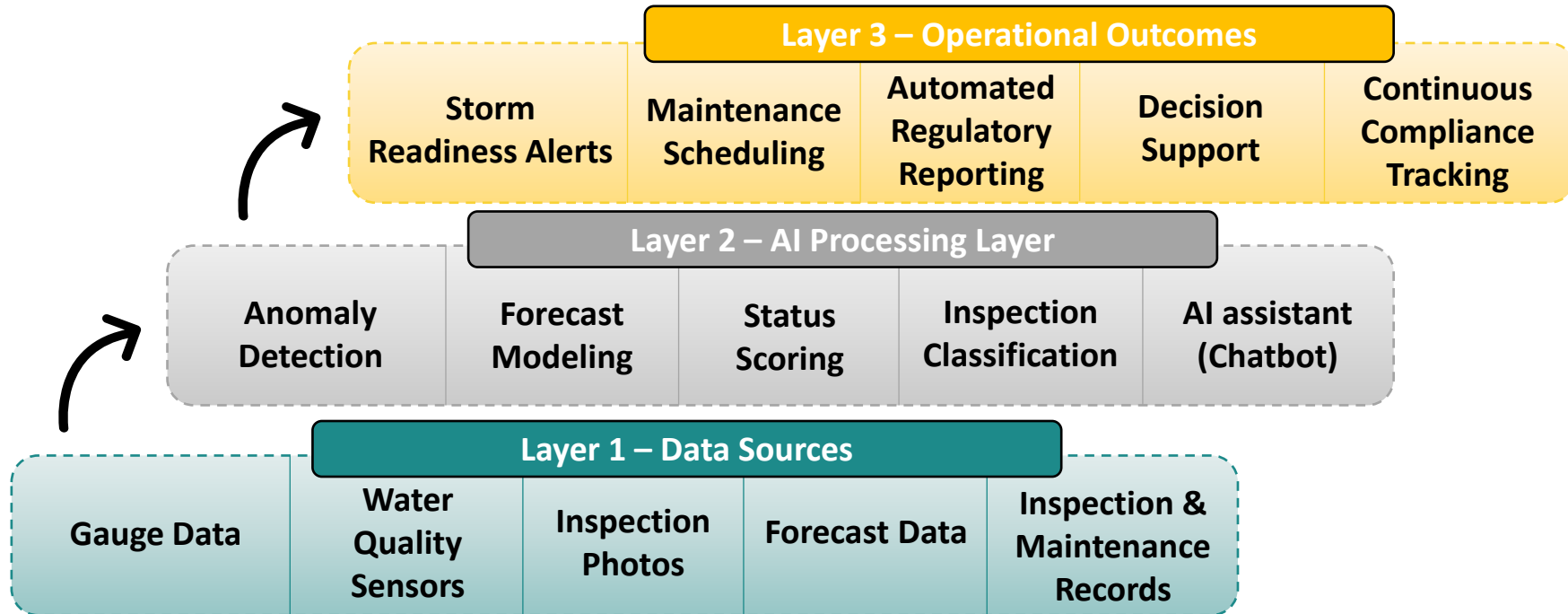
Inspection data, reporting formats, and documentation practices vary across inspectors and systems, making compliance tracking **difficult and inconsistent**.

Agencies need a **centralized platform** to support continuous compliance, standardized reporting, and clear documentation of maintenance actions.



Problem 4: Project Delivery

Custom dashboards for real-time decision making.



Best Practices

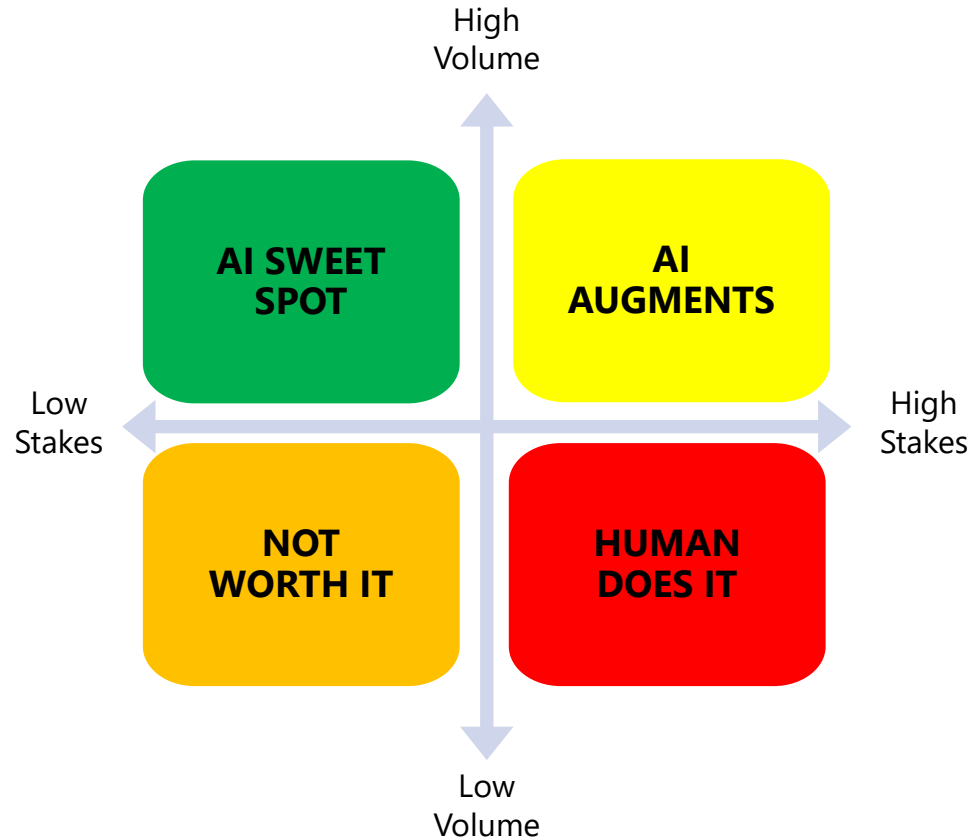
Verify everything that matters

Maintain responsibility for outputs

Control your data

Log what you did

Use the right tool for the task





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Questions?

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