Digital Transformation & AI in Environmental Compliance

FROM FIELD EVIDENCE TO FINDINGS

From scattered photos, maps and PDFs to an intelligent, traceable environmental record

—

a practical framework from AVA's own practice in Puerto Rico.

01 — OVERVIEW

Digital Transformation & AI in Environmental Compliance

Environmental reviews for federally funded projects in Puerto Rico are evidence work. A single HUD Part 58 review can draw on dozens of map layers, hundreds of site photographs, every above-ground fuel tank within a mile, a contamination database search, agency consultations and several rounds of reviewer comments. For years that evidence lived in folders, inboxes and memory. Digital Transformation (DX) is the first response — one registry of project sites, field apps that capture photos and measure-

ments where they are taken, map generators that draw every exhibit from the same boundary, and a status board that shows what is done and what is missing. Artificial intelligence is the next step — not to replace the professional judgment that HUD, FEMA and Puerto Rico's agencies rely on, but to take on the reading, searching and first drafting that used to consume it. The use cases and results below come from AVA's own projects and tools, counted in our own records.

3,761

SITE PHOTOS SEARCHABLE BY WHAT THEY SHOW

AVA's photo archive is indexed on our own server — a vision model describes every image and OCR reads the text inside it, so a tank, a transformer or a stenciled capacity can be found across 16 projects in seconds. **Digital Transformation** organizes the evidence. **AI** reads, searches and drafts. *Neither one signs the determination.*

02 — THE PATH FORWARD

The Path Forward

STEP 1 · FOUNDATION

Digital Transformation (DX)

Efficiency-focused transformation. Put every project's site, photos, maps and status in one place, and produce the standard outputs the same way every time. Digital tools, human-made determinations.

- One registry of project sites that every tool reads
- Phone apps for site visits — photos, GPS, measurements, checklists
- Map and exhibit generators fed by public data services
- A live status board, team calendar and daily digest

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STEP 2 · NEXT LEVEL

Digital Transformation with AI

Intelligence-driven transformation. Models that read documents, see photographs, search by meaning and draft in the house style — built on the DX foundation and reviewed by people.

- Photo search by content, by look-alike and by text in the image
- Drafted captions, narratives and report sections in AVA's style
- Reviewer comments extracted, threaded and tracked to "addressed"
- Project e-mail matched to the right project and summarized

03 — USE CASES

Use Cases Across the Environmental Review

DX digital workflow — rules, templates, data in one place

AI artificial intelligence — models that read, see, search or draft

FIELD · SITE EVIDENCE

Phone-first site visits

DX

Photos, GPS position, notes and checklists captured per project on the phone, saved locally first and synced when there is signal.

Visit Checklist · Field Route

Searchable photo archive

AI

Every project photo embedded by a vision model and read by OCR on AVA's own server — found by what it shows, by look-alike, or by the text painted on a tank.

Photo Index

REVIEW · ANALYSIS & DOCUMENTS

Map exhibits on demand

DX

Thirty-one generators draw FEMA flood, wetlands, karst, critical habitat, soils, topography, land cover and more from the same site boundary.

AvaMaps · MainMap

DELIVERY · COORDINATION & KNOWLEDGE

One board for every project

DX

Studies, consultations, site visits and deliverables for every active review on one live board, with a team calendar and a 7 a.m. digest.

Project Status board

E-mail that files itself

AI

Client and agency e-mails captured from the shared mailbox, matched to their project and summarized on the board.

E-mail capture

Photo log drafting

AI

Report-worthy photos grouped and captioned in the house style for the contamination report's photo log, with numbered observations for the analyst to confirm.

Site Visit Report · analyst workflow

Field notes to gallons

AI

Free-text tank measurements ("two tanks, 10 ft by 4 ft") turned into structured dimensions by a language model; the gallons are computed in code, never by the model.

Visit Checklist

Explosive and flammable hazards

DX

Each tank's distance to the Site and Off-Site areas computed, HUD's official separation-distance calculator run automatically and its PDF filed with the record.

Tank Review · Explosivos Upload

Grounded narratives

AI

Draft text for each environmental factor written from the project's own screening results and the CDBG-DR Environmental Assessment guide — rated, edited and saved by the reviewer.

Project Viewer

Ask AVA AI

An assistant that searches the firm's SharePoint library and the board, answers with its sources and builds a page of the documents found.

AVA Assistant

Proposal intelligence

DX

Puerto Rico's public contract registry — 15,030 contracts and 50,493 searchable pages — beside the firm's own experience records.

Company & market library

Reviewer comments, tracked

AI

Every comment and reply thread pulled out of a marked-up PDF into an “addressed” checklist filed on the project, with suggested responses to start from.

Comment Report

04 — REAL-WORLD IMPACT

Real-World Impact — AVA Projects

Contamination report · Photo log

1,276 site photos from a CDBG-MIT warehouse project became a 32-entry, 83-photo log with 19 numbered findings during a two-day pilot, every draft saved as a revision. A coverage check over the photos left out surfaced three features the first pass had missed.

Result: Nearly three times the coverage of a typical approved report (about 12 entries and 36 photos)

Explosives survey · HUD ASD

153 tanks recorded across 7 projects; 139 run through HUD's official calculator automatically with the PDF filed. A rule that also measures to the Off-Site corridor caught a tank 180 ft from it against a 238 ft separation distance — and every project with tanks was recomputed.

Result: 139 official ASD calculations · one compliance error caught and corrected

Site geometry · CAD to map

A project drawing ignored an 8.5° rotation of its own coordinate grid, placing the site about 8.5 m off. Refitted to the drawing's grid and checked against LiDAR elevations at 2,269 survey spots, it now lands within about half a meter.

Result: Boundary error cut from 8.5 m to 0.53 m (median)

Linear utility · Erosion-control report

The design of a linear project arrived as CAD exports. The import placed every structure on the map and flagged the ones drawn away from their scheduled position; they went back to the designer as questions, not as silent corrections.

Result: Same-day report with 0 items left to confirm

Agency review · Comment rounds

346 reviewer comments extracted from 17 review PDFs totaling 9,839 pages, each with its reply thread and an “addressed” checklist filed on the project, so the team sees how many are done.

Result: Every comment accounted for, round after round

Karst · LiDAR screening

A 1-meter terrain model of a 241-acre site in Puerto Rico’s northern karst revealed 295 closed depressions — 35 inside the site, the deepest of them 5.9 m — and showed that only 14 of 48 mapped ponds actually sit in a sinkhole.

Result: 295 depressions mapped and classified in 80 seconds of processing

05 — FRAMEWORK

Digital Maturity for Environmental Compliance

LEVEL 1

Basic

Paper field notes, photos on personal phones, maps made one at a time. Every review starts from a blank folder.

LEVEL 2

Emerging

Shared folders and templates, some GIS. Evidence is re-typed between tools and project status lives in e-mail.

LEVEL 3

Proficient

One project registry; field apps and map generators feed the same record; a live board shows what is missing.

AVA IN 2026 — WITH LEVEL 4 TOOLS IN PRODUCTION

LEVEL 4

Advanced

AI embedded in daily work — photos searchable by content, drafts grounded in project data, comments tracked automatically — with people reviewing every output.

06 — HOW TO GET STARTED

Key Steps & Guardrails

Key steps

1. **Start with the site boundary**
   Every map, distance and screening depends on one verified geometry. Fix it first — from the survey, the CAD drawing or the cadastre.

2. **Capture evidence where it happens**
   Photos with GPS, measurements typed once, checklists on the phone — synced to the project, not to someone's camera roll.

3. **Generate the standard outputs**
   Maps, tables and official calculator runs produced the same way every time, so reviewers see a consistent record.

4. **Put status in one place**
   Studies, consultations, deliverables and deadlines on a board the whole team sees, with reminders that arrive by e-mail.

5. **Add AI where reading and searching dominate**
   Photo search, comment extraction and first drafts grounded in the project's own

Guardrails we work by

- A licensed professional makes and signs every determination. AI drafts; people decide.
- Arithmetic and regulatory formulas stay in code and in the agencies' own calculators — models extract and describe, they don't compute.
- AI suggestions are shown for review before they are saved, and every change to a deliverable is a new, dated version.
- Uncertain findings are written as uncertain — "not verified" or "undetermined" — never filled in to look complete.
- Photo indexing runs on AVA's own server, and we decide step by step where a cloud AI model may be used.

Technology earns its place in an environmental review only when the record it produces is one a reviewer can trust.

data — the jobs that used to eat the day.

6 **Keep the record of what the tools did**

Save revisions, rate the drafts, check coverage. Treat it as a living roadmap and recalibrate as you learn.



> “The future of environmental compliance in Puerto Rico is not a choice between speed and rigor — it is building the foundation for both, one verified record at a time.”

Every project’s path is different. Whether you need a single environmental review or want your project evidence organized, mapped and searchable, it starts with a conversation about your site, your program and your timeline.

AVA Environmental Consultants, Inc.

Source: AVA project records and platform data as of October 14, 2026. Counts come from AVA’s own databases; we do not claim time savings we have not measured. © 2026 AVA Environmental Consultants, Inc.

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