

Waiting is the Expensive Option: AI and the Future of Water Infrastructure

Executive Summary

The water infrastructure industry is facing two critical challenges: an aging workforce and the urgent need to modernize. According to the EPA, approximately 30% of water workers are set to retire in the next decade, and training replacements is no small task. It can take up to six months for new hires to contribute meaningfully.

AI is emerging as an important solution, but not in the way that many people fear. Rather than replacing human judgement, it's designed to support it. Removing tedious tasks, streamlining workflows, and freeing operators to focus on the work they enjoy is what AI does best.

"AI is revolutionizing underground water infrastructure," says Abhinoor Dhull, vice president of operations at SewerAI. "It's an underserved market, and AI is no longer a dinner table conversation. It's happening right under our feet."

SewerAI works with more than 200 customers across the industry, and has seen firsthand how AI can ease workforce pressures without replacing the people doing the work. The technology is no longer in its experimental stages, and its impact is already being felt in the field.

This whitepaper explores how operators can embrace AI as an asset that enhances human judgement instead of replacing it.



Why Are Operators Hesitant to Use AI?

Despite AI's promise, many operators remain cautious. The water and wastewater industry has been historically slow to modernize. Dhull has made it her goal to reverse that.

"We want to turn this industry from being on the archaic side to being at the forefront of AI," she says. "That's why it's so important to meet people where they are."

Instead of forcing operators to use their technology, SewerAI approaches operators in the field to understand their workflow, then builds the workflow in their platform—this helps streamline their daily work.

Rather than completely taking over an operator's job, the company removes tedious tasks from their work load.

Most operators look forward to performing inspections, and want to complete more of them. SewerAI enables that.

"It's much easier to run a camera through the pipe over and over again without stopping," Dhull explains. "Having to stop every few minutes to figure out what a code is means they have to pause their workflow constantly."

If operators are still hesitant to try AI, she suggests running a pilot in a small location that's only a few linear feet. Once they are comfortable using AI on a small scale, the operator may consider broader adoption.

Small wins build confidence, and confidence is often what opens the door to full deployment.

Common Misconceptions

Job security is the most prominent fear surrounding AI in the water and wastewater industry.

"It's apparent in the wastewater industry that people think AI

Case Study: Coronado

The city of Coronado, Calif., is a prime example of this. It had inspection data living in hard drives that dated back to 2017, and it was trying to get the information onto the SewerAI platform.

"Since the data is nearly a decade old, it's not as up-to-date as it should be," she explains. "Now they're having their inspectors and contractors go back in to inspect those pipes again."

Now that the data from 2017 is on the platform, SewerAI can help the city identify its riskiest assets—Coronado should focus on those areas by reinspecting them and potentially solving those problems preventatively.

"As soon as the new inspection is done, the risk score is updated," she says. "They can create asset plans for their entire system in a matter of minutes and ask for a budget to fix it instead of having it fail. This helps them avoid going over budget and getting bad press in the process."

For all its capability, AI has a blind spot. It knows what it's been trained to see. Experienced operators know what to look for when something doesn't fit the pattern.

For Coronado, better information drove the shift from reactive to proactive asset management. The data already existed; the platform made it usable.

is coming for their jobs," Dhull explains. "It's not—we're trying to reduce the barrier to entry for more people to enter the water workforce and not get overwhelmed by the learning curve. If we're doing our job well, we should start seeing more operators go into the wastewater field."

The second most common misconception operators have about AI is that it's inaccurate. In this context, accuracy is a process. SewerAI's model flags defects, and a human reviewer checks the results before a decision is made. The human-AI combination catches more than either would alone.

As time goes on, AI will continue to learn and improve its outputs. As Dhull notes, the AI tools available three years ago are much different than what they're using today—and humans will always verify the data to ensure accuracy.

Since the wastewater industry

desperately needs new operators as current talent nears retirement, viewing AI in a negative light is difficult to defend. If a tool can predict water infrastructure incidents before they happen, why not use it?

Responding after an incident happens isn't cutting it anymore. Getting ahead of the problem is the path forward, and AI is making that possible.

These misconceptions dissolve through experience. When operators see AI in action, the results often speak for themselves.

What Does a Successful AI Deployment Look Like?

A successful deployment doesn't always mean going "all in" on AI.

"Contractors see a lot of value in using us in other places," Dhull says. "They're deploying us with other customers across the U.S. because they're finding they're able to do

more inspections without buying hundreds of thousands of dollars of trucks and crew.”

By performing more inspections with SewerAI, utilities can increase their capacity between 35 to 55%—they’re able to accomplish more with the same crew.

One of the biggest perks of the AI platform, Dhull says, is how it speeds up decision making. Instead of being able to make decisions in six to eight months, operators can make a decision in a matter of days.

Where Human Intuition Still Outperforms AI

Human intuition is still needed in the water infrastructure industry. Dhull thinks of how human thinking fits into the picture in a four-part framework.

- 1. AI executed by human verifiers.** AI flags defects, but a human still reviews the results. The last set of eyes catches what the model hasn’t learned to “see” quite yet.
 - 2. Human-led and AI-assisted.** The human does the heavy lifting in this scenario—AI simply makes sure they’re working from the right information when it’s time to make a decision.
 - 3. Human-AI collaboration.** AI handles tedious tasks like coding, documentation, and pattern recognition, and the operator focuses on what actually requires human judgement.
 - 4. No AI involvement.** AI doesn’t play an active role in certain situations. Regulatory decisions and community conversations, for instance, belong to humans alone.
- Each part of the framework has a different level of human

involvement. But one thing remains true for every part: human thinking is required in some capacity.

“The engineers and operators managing these systems are always going to be the final decision makers,” she says. “I don’t think we’re going to fully replace those roles at any point.”

Dhull is confident in her stance, even as AI tools continue to evolve and bring more value to the table.

The balance between human and machine judgement will only become more complex as AI technology evolves.

Where AI Will Continue to Evolve

Most AI improvements covered in the news surround large language models (LLMs) and agentic AI. SewerAI is more focused on computer vision, which enables machines to interpret, analyze, and understand visual information. It allows computers to “see” and

make decisions based on visual data.

“In the next year, I think we’re going to see the marriage of LLMs and computer vision,” Dhull says. “We’re already seeing operators use LLMs in their existing workflows to drive efficiencies in their own day to day.”

Right now, LLMs and computer vision complete two separate tasks. LLMs can answer questions and summarize reports, while computer vision can identify a crack in a pipe. When both platforms come together, they can complete both tasks at once: spot a pipe defect, understand the context around it, and explain what it means in simple language.

In practice, this means real-time alerts when a camera passes through something worth a second look, scores that update the moment the new inspection data arrives, and automated coding that cuts manual review time

Case Study: PG&E

SewerAI has worked with Pacific Gas and Electric Company (PG&E), an investor-owned utility based in California, to avoid cross bores in sewer pipes.

Cross bores occur when a natural gas pipeline passes through a small segment of sewer pipeline, which could cause sewer lines to back up. When a plumber tries to snake a clogged sewer line, they could strike the gas line, which may result in a fatal explosion and severe property damage.

When Dhull first joined SewerAI in 2024, PG&E was just starting a pilot program. Over the last two years, the utility launched into a full-fledged deployment with the company—all PG&E contractors use SewerAI software to complete their inspections across the region.

“Since then, PG&E has gone from having inspections with a turnaround time between 90 and 120 days to 10 and a half days,” she says. “This is a part of a larger solution that SewerAI can provide. It’s a small use case, but it’s impactful for the utility.”

In this scenario, humans are still in the driver seat. While human judgement is still needed in water infrastructure, utilities leverage it in different ways and capacities.

The numbers tell the story: a turnaround time that once stretched four months now takes less than two weeks.

without requiring new equipment or retraining. For stakeholders, it means 3D models they can review and approve in a single click.

These capabilities are taking shape, but they're still maturing. The rate of maturation depends on how quickly computer vision catches up with the rest of the AI landscape.

LLMs and agentic AI are evolving faster than computer vision. However, Dhull is confident that computer vision will catch up soon, and operators will become more comfortable with AI-first deliverables.

In water infrastructure, an AI-first deliverable is a report that's not only designed for human eyes to review. It's also an asset that AI systems, utility software, engineers, operators, and regulators can interpret and act upon.

"I still think we're a few years away from having AI deliverables being submitted to cities," she explains. "But I think computer vision is going to get significantly better and people are going to drive agentic AI in their own workflows."

The technology is ready. The harder question is getting the people who control the budget on board.

How to Make the Case Internally

The most important consideration isn't whether AI could play a role in a utility—it's how to present the case to stakeholders.

For operators who believe in AI's potential, the hardest conversation is often the one that happens in a boardroom or city council meeting. In these instances, risk carries more weight than improved efficiency.

There are several angles

operators can lean into to make their case more compelling. Here are a few they may consider:

Start with the workforce angle. Since 30% of the water workforce is set to retire in the next decade, "not needing AI" is no longer a valid argument. Most decision-makers are concerned about cost and complexity, but the more pressing problem is figuring out what to do when their operators clock out of their last shift.

AI can't replace their knowledge, but it can help fill the knowledge gaps for the new operators taking their place. AI can standardize workflows, reduce the learning curve, and allow new operators to work productively sooner.

When operators are sitting in that next internal meeting, they shouldn't frame their argument around investing in AI. They should frame it around what happens when operators retire and they aren't prepared.

Lead with a pilot. An AI pilot test takes the pressure off of a long-term commitment and lets data do the heavy lifting. After all, asking to run a small, short-term pilot with defined success metrics is much more appealing than a long-term buy-in.

Before starting the pilot test, operators should make sure the stakeholders are aligned on what success actually looks like. This could be reducing how long an inspection takes, increasing the amount of assets viewed per hour, or painting a clearer picture of capital priorities.

"If operators aren't comfortable with AI first, we would offer to do a pilot in a small location," Dhull says. "This would hopefully create comfort for broader adoption."

Supply evidence. Abstract arguments about AI's potential are

difficult to defend, but concrete results are not. Operators should bring case studies that contain concrete details, including treatment plant size, geography, and budget constraints.

The case studies mentioned in this whitepaper are a good starting point. Coronado went from having unprocessed inspection data to generating asset management plans. PG&E reduced its turnaround time from 90-120 days to just 10.5 days. Utility leaders and finance teams can evaluate these numbers on their own terms.

If possible, reach out to nearby utilities or organizations that have already deployed AI tools. The goal is to make AI feel like a proven, valuable asset that could help a utility modernize and move forward.

The strongest case for AI isn't that it's a good investment, it's that failing to adopt it is a greater risk than trying it out.

Stakeholders who frame AI as an unknown typically overlook the costs of keeping things as-is. It's worth asking in a board meeting: "Are we equipped to continue serving our community when a third of our workforce retires?"

The workforce shortage is real, the infrastructure is aging, and the technology to get ahead of both challenges exists.

AI can't solve every problem in the industry. But for utilities who are willing to start small, scale smart, and apply human judgement, it doesn't have to.

The strongest water systems of the next decade won't be the ones that replaced their operators with AI. They will be the ones that use AI to make their operators more capable, more confident, and better prepared for what comes next.