



# Case Study: VA SYD's Successful Phased Approach to Remote Water Inlet Monitoring with Waltero

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## Enhancing Operational Efficiency and Building a Future-Ready Water Infrastructure

VA SYD, the regional water utility in Skåne, Sweden, has partnered with Waltero to revolutionize its water inlet monitoring and maintenance. This collaboration leverages Waltero's cutting-edge camera-equipped W-Sensors and the intelligent Mimir cloud platform, implemented through a strategic phased plan. The result? VA SYD is achieving significant operational savings and laying the groundwork for a truly predictive, scalable, and resilient water infrastructure management system. This case study highlights a successful partnership, beneficial to both VA SYD and Waltero, demonstrating a clear path to modernized utility operations.



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## Background & Objectives: The Challenge of Traditional Monitoring

Maintaining thousands of water inlets has traditionally demanded frequent, time-consuming physical inspections to check for debris blockages and monitor water levels. These tasks become even more challenging and critical during unpredictable weather events. VA SYD recognized the need for a more efficient, proactive approach to:

- **Reduce Operational Overhead:** Minimize the labor, fuel, and time associated with manual inspections.
- **Improve Response Times:** Address potential problems faster to prevent severe blockages or flooding.
- **Enhance Overall Infrastructure Management:** Move from a reactive to a predictive maintenance model.



Waltero's W-Sensor, paired with their Mimir platform, offered the ideal solution: consistent imagery and machine learning (ML) analysis that could fundamentally shift maintenance from reactive to preventive. VA SYD actively drove the solution forward, integrating their system with Waltero's Mimir platform to unify infrastructure data and automate decision-making.






*"We have a good collaboration with Waltero, and their product has already provided significant benefits to our operations at an early stage. Our team is now able to perform visual inspections from the office instead of having to drive out to the monitored facilities."*

— John Hägg, Development Engineer, VA SYD

## Three Phases of Implementation: A Roadmap to Success

The partnership between Waltero and VA SYD was structured around a pragmatic, three-phase implementation plan, ensuring continuous learning and optimization at each step.

 <b>Phase 1</b> Image Collection	 <b>Phase 2</b> Smart Insights	 <b>Phase 3</b> Predictive Monitoring
W-Sensors are deployed to capture initial image data from water inlets. This phase focuses on gathering visual intelligence and learning from real-world conditions, providing immediate remote visibility.	Building on collected data, Waltero's AI trains to automatically extract actionable metrics like water depth and blockages. This enables intelligent, automated alerts for faster response and better resource allocation.	As our AI matures, it will dynamically adapt monitoring frequency and predict future blockages. This phase empowers strategic decision-making and optimal resource deployment across the entire water infrastructure.

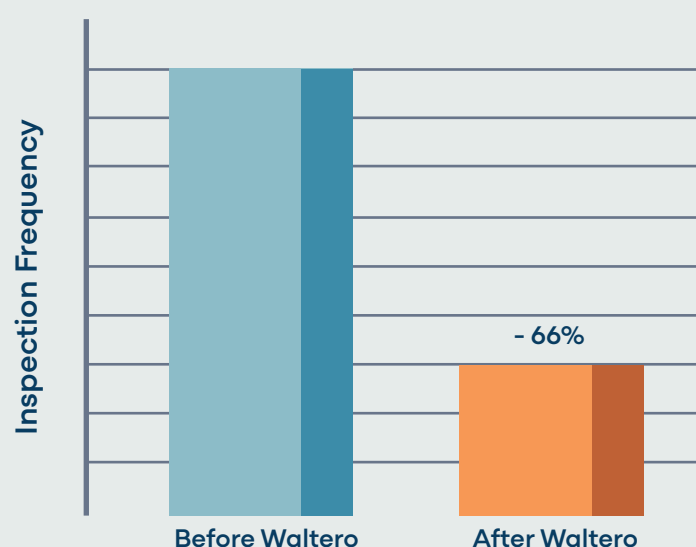
### Phase 1: Remote Visual Inspections & Environmental Learning

The initial phase focused on deploying W-Sensors at selected water inlets to gather foundational image data and learn from real-world field conditions. Images were uploaded to Mimir for manual annotation and baseline analysis, feeding directly into VA SYD's system for immediate utility. This phase was crucial for both data collection and strategic discovery.



## Key Discoveries and Learnings:

- **Immediate Value of Visual Data:** Even without full AI automation, remote access to images drastically reduced inspection trips.
- **Dynamic Nature of Blockage:** Observations revealed that blockages could form either at the waterline or from debris accumulation at the base, requiring comprehensive monitoring.
- **Optimal Camera Positioning:** A wider view, positioned at a distance from the grid, was essential for maintenance teams to get a full overview and avoid interfering with cleaning routines.
- **Varying Monitoring Needs:** Daily daytime images sufficed for routine checks, while heavy rainfall demanded hourly, 24/7 monitoring.
- **Hardware Demands:** Sensors required 3-5 year battery life and robust optics to perform in all conditions (direct sunlight, low light, total darkness).



## Operational Results from Phase 1:

- Routine inspections reduced by -66%, leading to substantial savings in labor and transportation.
- Maintenance teams gained the ability to review inlet conditions remotely, improving efficiency.
- A solid foundation was laid for smarter hardware and AI models in subsequent phases.

## Phase 2: Sensor Upgrades & Smart Insights (Current Stage)

Leveraging the invaluable feedback from Phase 1, Waltero and VA SYD implemented significant hardware and software upgrades. This phase is currently focused on training Waltero's ML model to automatically extract actionable data from images, enabling custom thresholds for automated alarms.



## Hardware Enhancements:

- **New Weather-Resistant Casing:** Enhanced durability for all outdoor environments.
- **IR Lighting:** Ensures clear imaging in low-light and total darkness conditions (e.g., wells).
- **Higher-Resolution Cameras:** Provide the detailed input required for advanced ML analysis.
- **Upgraded Battery Modules:** Extend deployment cycles for longer uptime and fewer maintenance interventions.

## In Parallel, Software Updates Were Deployed Remotely:

- **Virtual Ruler:** Enables precise measurement of water levels and rising speeds directly from images.
- **API-based Rescheduling:** Allows smart adjustments to monitoring frequency based on real-time weather forecasts.

## Key Benefits Realized in Phase 2:

- Automated water depth and blockage detection via ML.
- Customizable alarms triggered when predefined thresholds are breached.
- Faster reaction times for remote teams, allowing for prioritized site visits based on real-time data.

Status	AI score	Object	Initiated by	Mission type	Due date	Priority	Responsible team
12	12	Clear blocked vent at Sheikh Zayed Road	Device KJUMH9ul	Clear debris	2024/11/21	Medium	Team #77
23	23	Remove fallen branches from Al Khal T...	Device KJUMH9hwa	Clear debris	2024/11/21	Critical	Team #77
66	66	Inspect flow in Palm Jumeirah drainage ...	Mr. Smith 1	Inspect area	2024/11/20	Low	Team #77
13	13	Ensure unobstructed flow at Downtown ...	Mr. Smith 2	Restore flow	2024/11/20	Low	Team #77
13	13	Sand removal from Business Bay sluice...	AI assistant	Remove sand	2024/11/20	Low	Team #77
41	41	Clear fine debris in Expo City water tun...	Device KJUMH9y7	Clear debris	2024/11/27	Lowest	Team #77
57	57	Inspect sand accumulation in Jumeirah ...	AI assistant	Inspect area	2024/11/21	Medium	Team #77
26	26	Restore flow in Marina drainage pipes	Device F2VAB23	Restore flow	2024/11/20	High	Team #77
85	85	Remove sand from emergency sluice at ...	Reminder	Remove sand	2024/11/20	High	Team #77
2	2	Inspect blocked pipe under Sheikh Moh...	Device PMALJ3	Inspect area	2024/11/21	Low	Team #77
90	90	Clear storm debris in Al Sada neighborhood...	AI assistant	Clear debris	2024/11/20	Medium	Team #77
9	9	Inspect sluice gate operation at Jabel Al...	Mr. Smith 3	Inspect area	2024/12/05	Medium	Team #77
80	80	Emergency sand removal in Umm Suq...	ME	Remove sand	2024/12/04	Critical	Team #77



## Phase 3: Predictive Monitoring & System Optimization (Future)

As the volume of image data accumulates and the ML model matures, Phase 3 will unlock highly sophisticated predictive capabilities. This will enable VA SYD to move beyond reactive and even proactive, into truly predictive maintenance.

### Capabilities in Development:

- **Adaptive AI:** Dynamically adjusts image frequency based on weather forecasts and previous anomaly detections.
- **Subtle Pattern Detection:** AI will learn to predict where and when blockages are likely to occur.
- **Prioritization Engine:** Recommends where to send teams across the entire region based on risk levels and predicted needs.

### Anticipated Outcomes from Phase 3:

- **Region-Wide Insight:** Enables strategic decision-making for infrastructure planning.
- **Automated Scheduling:** Site checks are tied to risk levels, optimizing resource deployment.
- **Better Use of Resources:** Longer asset life and significantly reduced emergency repairs, contributing to overall sustainability.

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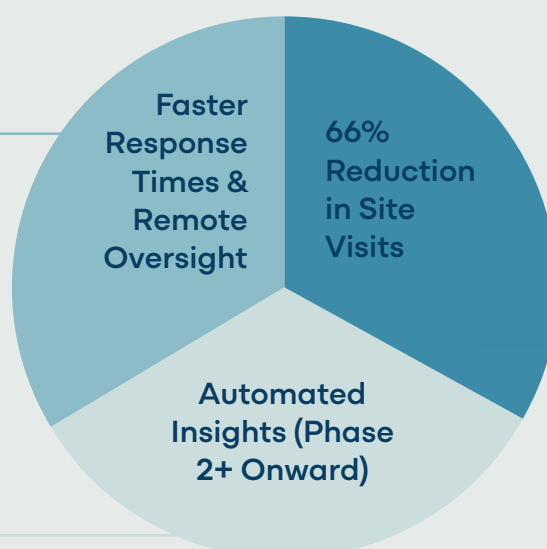
## Early Results & Outlook: A Partnership Driving Real Value

The collaboration between Waltero and VA SYD has already delivered tangible benefits and promises even greater efficiencies in the future.

### Key Achievements

**Impact:** Empowered technicians to perform visual checks from the office, enabling quicker interventions and real-time collaboration.

**Impact:** Shifting to ML-powered data extraction and alerts for immediate, actionable intelligence and targeted interventions.



**Impact:** Significantly cut labor and transportation costs by minimizing physical inspections.



- **Operational Savings:** Even in Phase 1, on-site maintenance runs decreased by a remarkable 66%, leading to substantial cuts in labor and transportation costs.
  - **Remote Monitoring:** Technicians can now perform most visual checks from their desktops, dramatically improving response times and enabling real-time collaboration.
  - **Automated Insights (Phase 2+):** As the project moves into Phase 2, ML-powered data extraction will empower teams with immediate, actionable intelligence, leading to even fewer site visits and more targeted, efficient interventions.
  - **Scalable and Future-Ready:** With Phase 3 on the horizon, VA SYD will gain deeper, predictive insights, allowing for agile adaptation to changing conditions and system-wide management priorities, paving the way for smarter city infrastructure.
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Through this phased, collaborative approach, VA SYD is transforming its operational model from reactive to proactive and ultimately, predictive. Waltero's camera-equipped W-Sensors and AI-driven Mimir platform are unlocking new efficiencies, providing deeper insight into water inlet conditions, and conclusively strengthening Skåne's water infrastructure for the future. With each phase, the utility is becoming not only more efficient but more resilient, proactive, and future-focused. This partnership stands as a testament to the power of modernizing essential public services.

## Contact



+46 70 935 83 55



[sales@waltero.com](mailto:sales@waltero.com)



[www.waltero.com](http://www.waltero.com)



Medicon Village  
Nytänkargatan 4  
223 63 Lund  
Sweden