360 ENGINEERING

WATER DIRECTORATE ANNUAL FORUM 2026 · FOUNDATION STAGE

Digital Water Starts at the Sensor



Is your data actually ready for the next system?

Field to SCADA · data validity · accuracy · garbage in, garbage out

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A STORY FROM THE FIELD

The number looked right. For months.

How many times have you looked at a SCADA screen and said “That flow rate feels wrong”. feels wrong”.

The reported flow looked perfectly reasonable on SCADA for months. When we finally finally checked the meter against SCADA, it was out by about 30% — the PLC scaling didn’t scaling didn’t match the range set on the transmitter.

Do we dare talk about the flow pulse?

> **Nobody was careless. Nobody checked the data on its way from the field to the screen.**

Everything downstream inherited it

- **Trends and reports** — confidently wrong
- **Process calculations** — dosing built on a bad number
- **Compliance reporting** — signed off, and wrong

WHERE THIS SITS IN TODAY'S PROGRAM

Every stage inherits the data underneath it

Today is about smarts; analytics and AI — the exciting end. None of it works on numbers you can't trust.
can't trust.

STAGE 1

Readiness

Strategy, skills and governance. Knowing where you stand.

STAGE 2

Foundation

Instruments, signals, SCADA and data quality. Data you can trust.

Today's focus

STAGE 3

Integration

Connecting systems and sharing data across the business.

STAGE 4

Optimisation

Analytics, AI and smarter operations.

You can't skip the foundation stage just because the tools further up are more interesting.

THE DATA JOURNEY — FIELD TO SYSTEM

Every hop is a place data can quietly go wrong

1 — Instrument

Selection, installation, calibration and drift

2 — Signal

4–20 mA ranges, units and scaling mismatches

3 — PLC / RTU

On failure: hold last value, zero, or or flag a fault?

4 — Telemetry

Throughput, dropouts, clock synch, deadbands, timestamping, quality

5 — SCADA and historian

Tag names, deadbands and compression

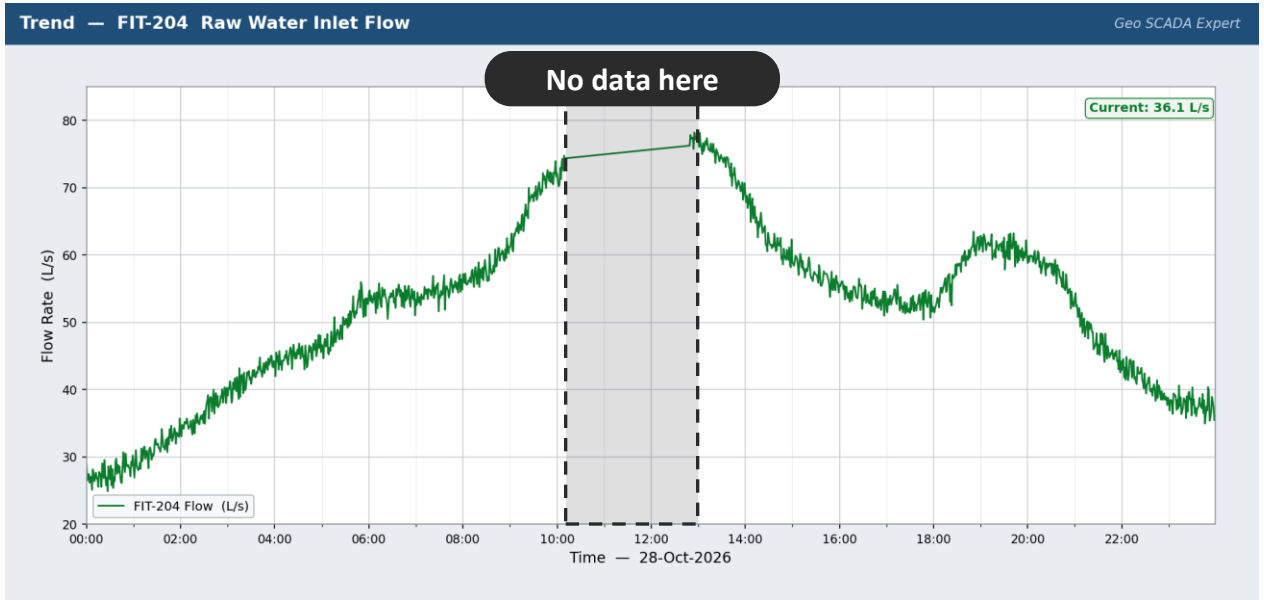
6 — Ingestion

Mapped to the right right asset, units and location

Small errors compound: a mis-scaled instrument becomes a confident, wrong number in a board report.

WHEN THE DATA STOPS

That straight line isn’t flow. It’s 2½ hours of missing data.



How the system above should handle it

Flag it

Quality codes travel with every value, so the next system system knows good, suspect and missing.

Show it

Break the trend at the gap. Never draw a confident line through nothing.

Fill it properly

Backfill from the RTU’s event buffer, or mark anything estimated as estimated.

A gap you can see is a nuisance. A gap you can’t see is a bad decision waiting to happen.

WHAT THE NEXT SYSTEM SEES

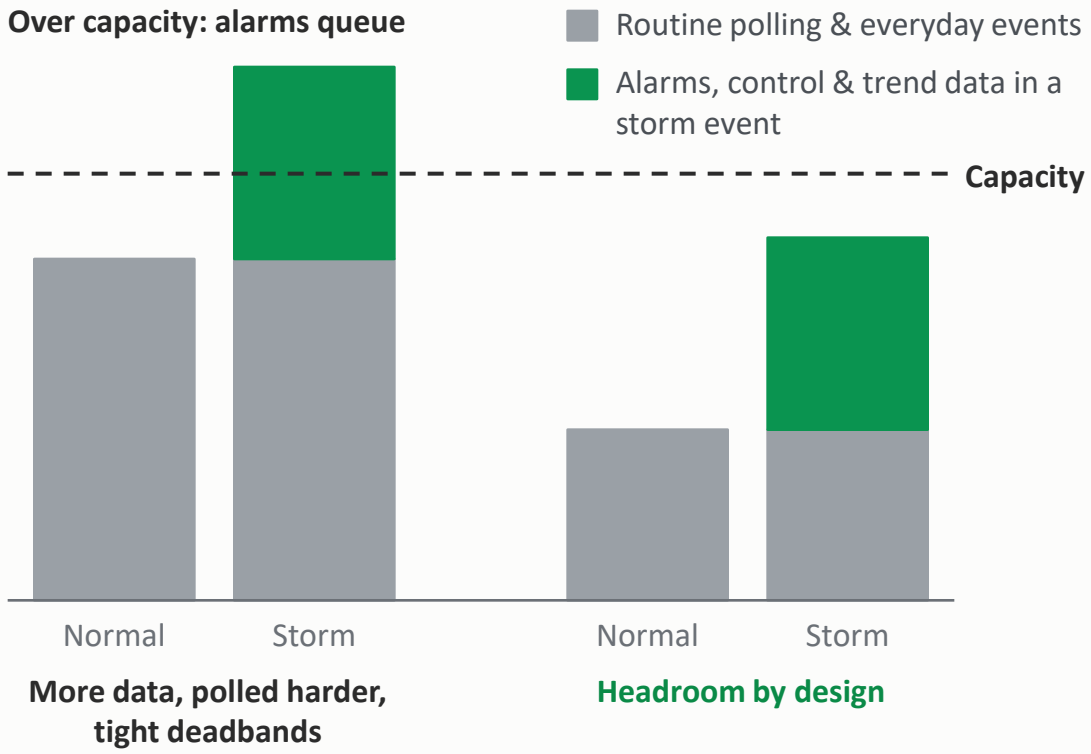
Reports — daily volumes volumes built on invented invented flow

Analytics and AI — learn a ramp that never happened

Operators — a dropout looks like a steady process process

THE TELEMETRY NETWORK

Normal days don’t test your network. Storms do.



Report by exception

Send changes and alarms, not every value on every poll. Set sensible deadbands.

Alarms and control first

Bulk and historical data can wait: backfill off-peak.

Leave headroom, and test it

Size for storm and outage conditions, then load-test the network under a simulated event.

Collect more data by all means — just not with the bandwidth your alarms will need.

DATA AINT JUST DATA

2 Hour Polling Sampling

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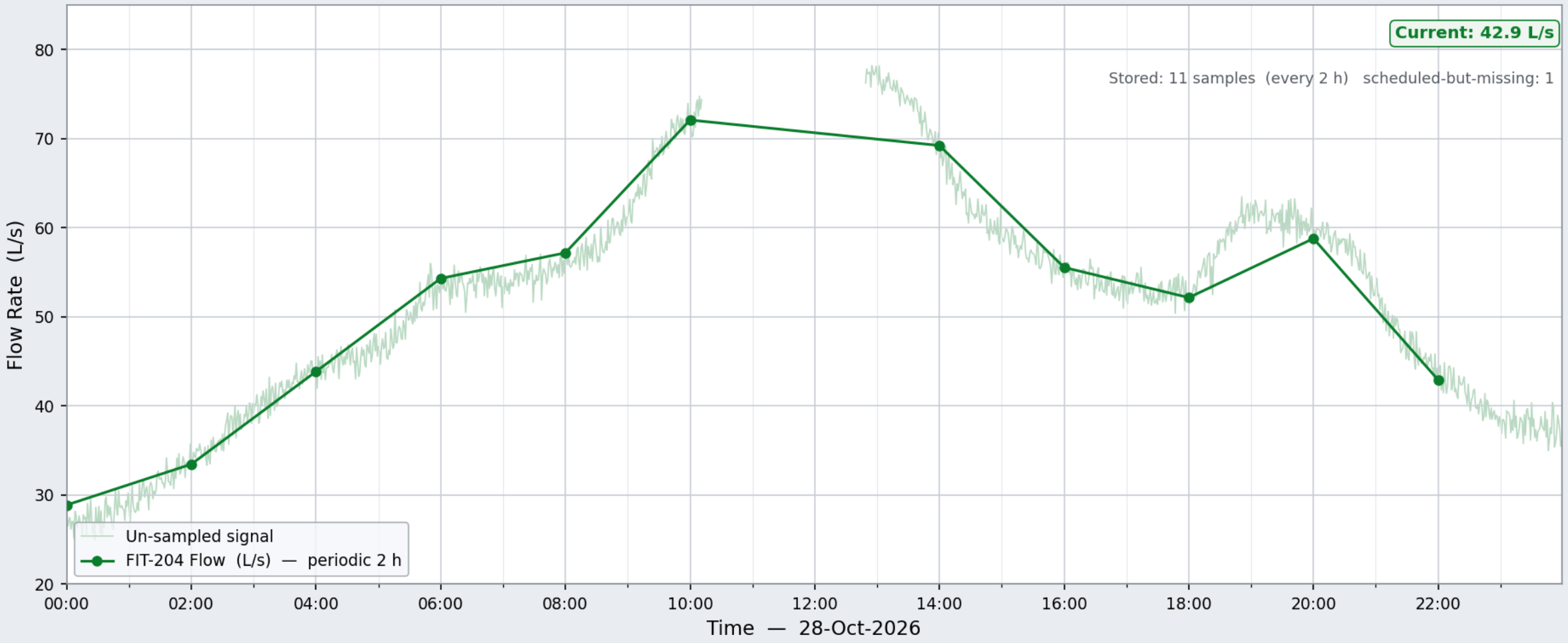
Trend — FIT-204 Raw Water Inlet Flow *Geo SCADA Expert*



DATA AINT JUST DATA

Deadband Sampling - 5 L/s

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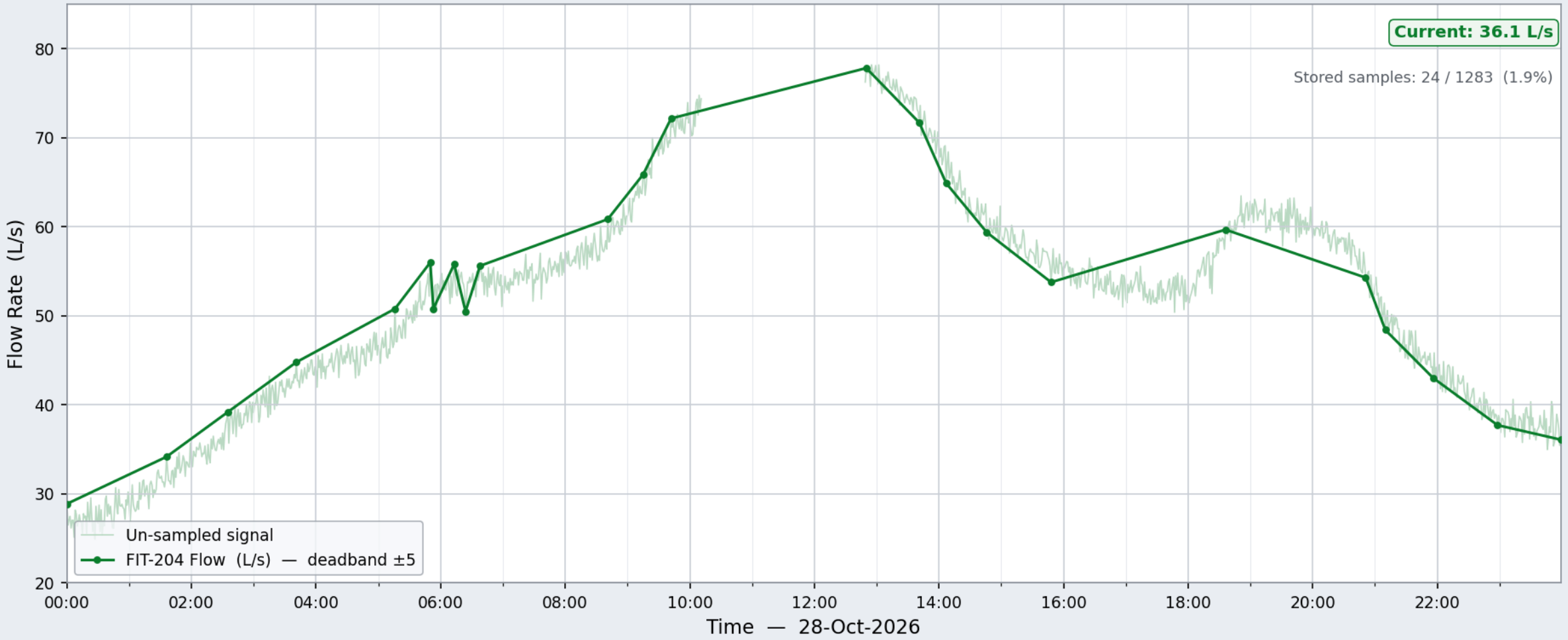
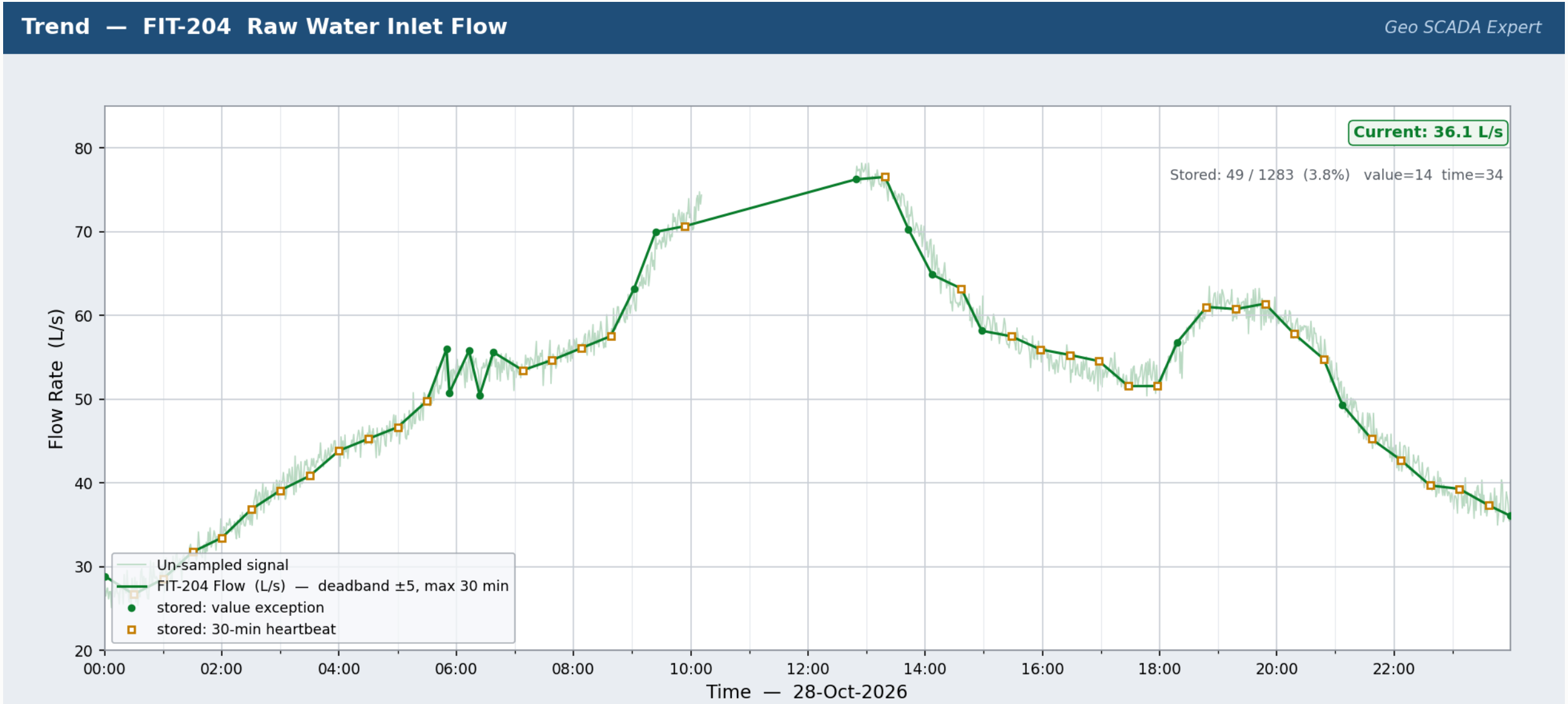
Trend — FIT-204 Raw Water Inlet Flow *Geo SCADA Expert*



DATA AINT JUST DATA

Deadband Sampling - 5 L/s + 30 minute periodic



DATA AINT JUST DATA

Faster Moving Trend

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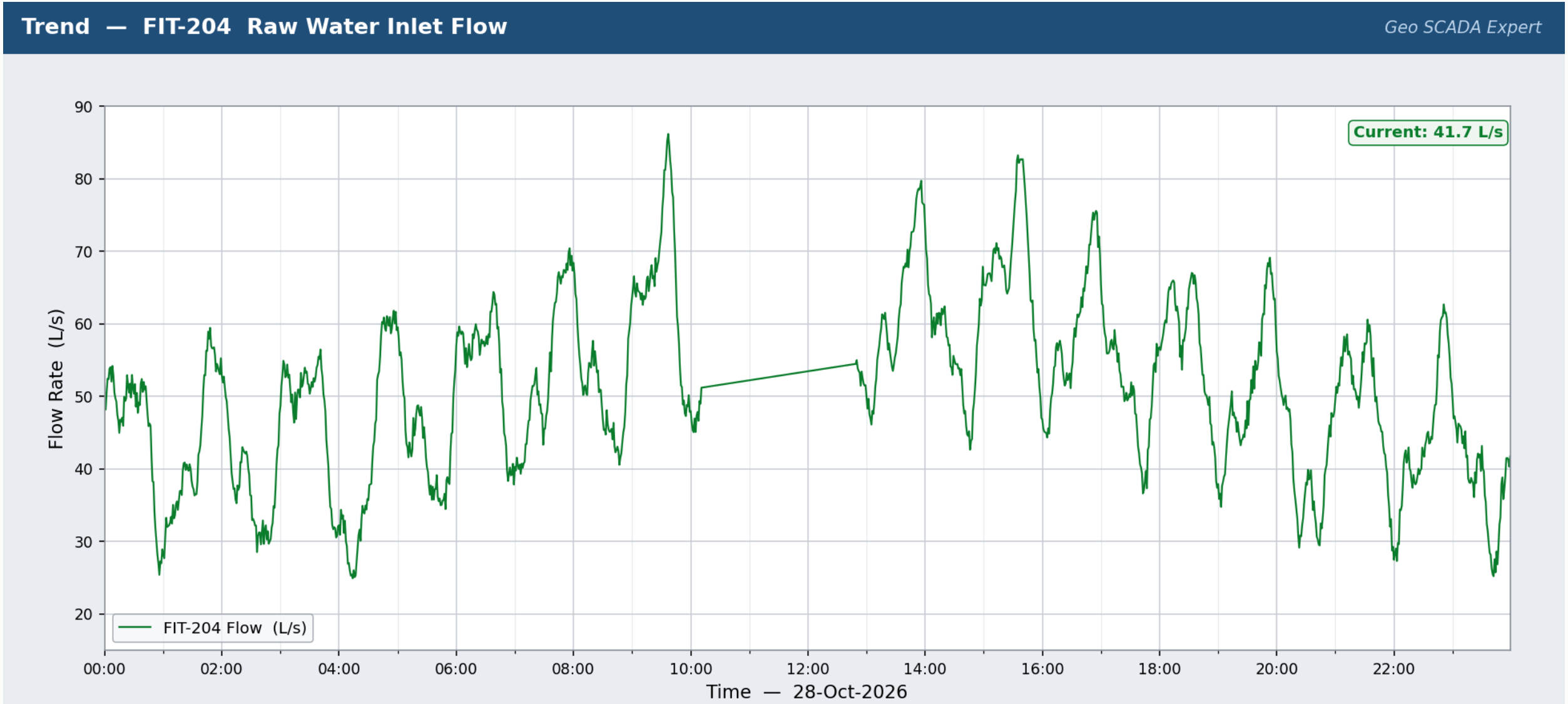
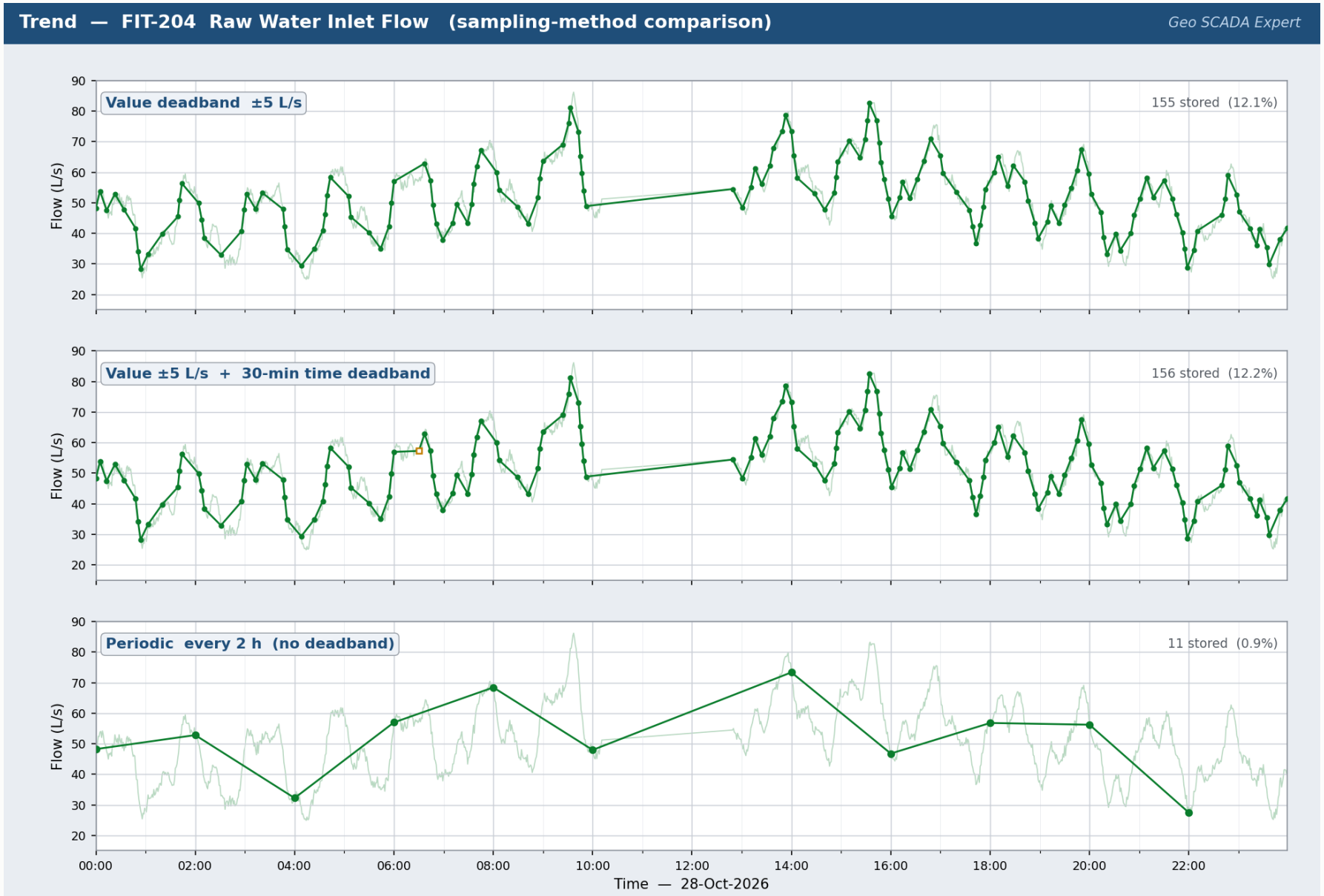


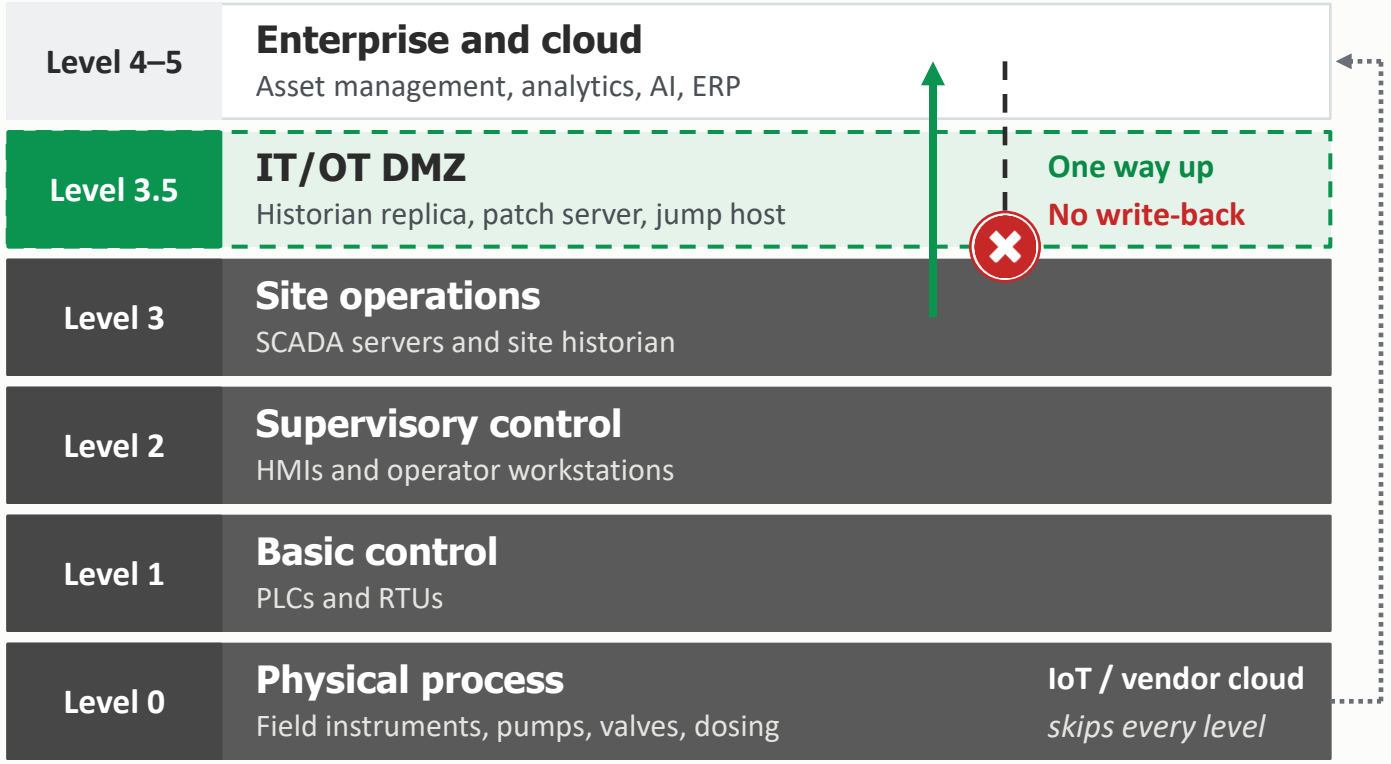
Faster Moving Trend – Same Rules – Different Results



SECURING THE PATH OUT

Share the data, not the control

Smart systems need data out of SCADA — and every new connection is also a potential way in.



One-way out

Data leaves through the DMZ.
Nothing in Level 4–5 talks to a PLC.

Enforce the levels

Firewalls between zones, with controlled conduits (use IEC 62443). No write-back path to control.

Remote access via the DMZ

Through a jump host with MFA, time-limited and logged. No internet-facing HMIs or stray supplier modems.

Side doors, same rules

IoT sensors and vendor cloud links need an owner, a boundary and a review too.

WHAT “READY FOR INGESTION” ACTUALLY MEANS

Six tests for any data stream

Valid

Physically plausible? A reservoir above overflow or a chlorine residual that never never moves is a red flag.

Accurate

Calibrated and checked against a reference. reference. Valid means possible; accurate accurate means right.

Complete

Gaps flagged as missing — not filled with with zeros or held values that look real.

Timely

Timestamps correct and consistent, including time zones and daylight saving. saving.

Consistent

Same naming, units and conventions at every site — what lets one plant scale to a network.

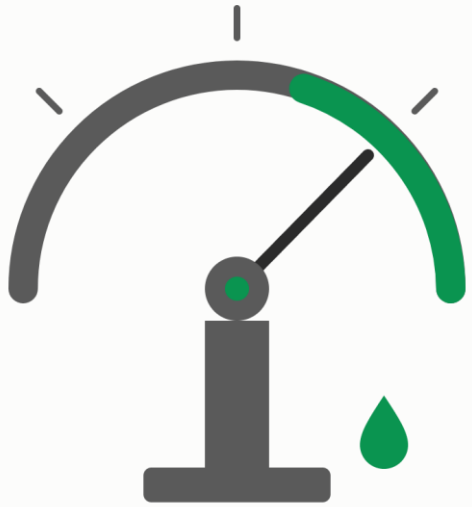
Contextualised

Every tag linked to a real asset, location and purpose. Context turns numbers into information.

Passes all six? It’s ready for the next system. If not, that’s where the work is — and it’s cheapest to fix here.

GARBAGE IN, GARBAGE OUT

Dashboards and AI don’t fix bad data — they scale it



A polished chart built on a mis-scaled meter is more dangerous than a rough spreadsheet — because people believe it.

Bad data flows into compliance reporting, capital planning and how operators run the plant day to day.

> **The biggest cost is trust. Once operators stop believing the screen, the digital investment is wasted.**

PRACTICAL STARTING POINTS

Five moves any utility can start on

No big program or budget needed — including for a small council team.



Audit critical tags first

Not all 5,000. Pick the ten that matter most and prove they're right. right.



Agree a naming standard

Before your next integration project — cheap to set, costly to retrofit.



Keep calibration with the data

Not in a binder in the plant room, where nobody downstream can see it.



Flag data quality

Good, suspect or missing — and the flags travel with the data.



Make "data ready" a handover test

Test it at commissioning, or inherit the problem for years.

THE CALL TO ACTION

Before the dashboard, check the data

Start at the sensor Get it right where the reading is made — and prove it survives the trip.

Make “data ready” a requirement Six tests, critical tags first, checked at every every handover.



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