TeamSolve

SEWAGE PUMP STATION 07 · MONDAY MORNING

Pump 2 keeps stopping. Replace it?

Three near-overflows in 2 weeks. Pump 1 is running 14 hours a day to cover. Maintenance has proposed a **$35,000 replacement**.

Approve the replacement | **Investigate first**

SPS 07 · status

Pump 1	Pump 2
Running · 14.2 h/day	Stopped · 3 incidents

Wet-well high-level alarms	3 in 14 days
Proposed replacement	$35,000

Illustrative scenario. Every example in the slides that follow is real.

TeamSolve

REAL EXAMPLES FROM THREE UTILITIES

Different sizes. The same problems.



Southington

Town of Southington, Connecticut

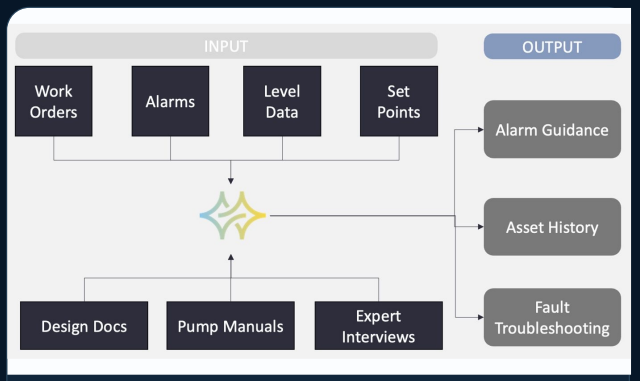
A small town with a separate Water Department and Water Pollution Control Facility, each reporting to a state regulator.



WAF

Water Authority of Fiji

Mechanical and electrical maintenance across 120+ sites and three regions, with small field crews.



Wannon Water

Wannon Water, Victoria

Sewer pump stations in Warrnambool and surrounds, trialled through the Intelligent Water Networks program.

TeamSolve

WHY IT'S HARD · 1 OF 5

The clue is on a paper sheet in a binder

AT SPS 07

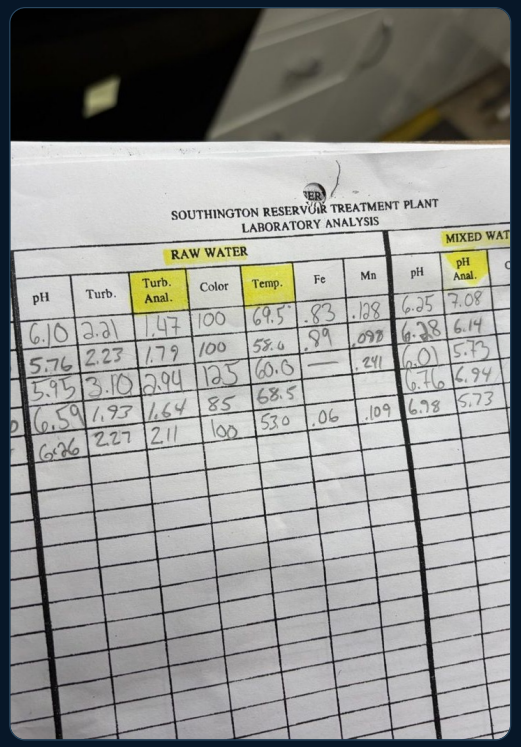
Operators check Pump 2 every week. Someone wrote "P2 not calling in auto, ran OK in hand" on the round sheet. It's in a binder at the depot.

Southington

Daily rounds, weekly treatment reports and groundwater monitoring each lived on a paper sheet or in a separate app.

WAF

Every M&E job ended with a handwritten service report: problem, diagnosis, work done, signatures.



SOUTHINGTON RESERVOIR TREATMENT PLANT
LABORATORY ANALYSIS

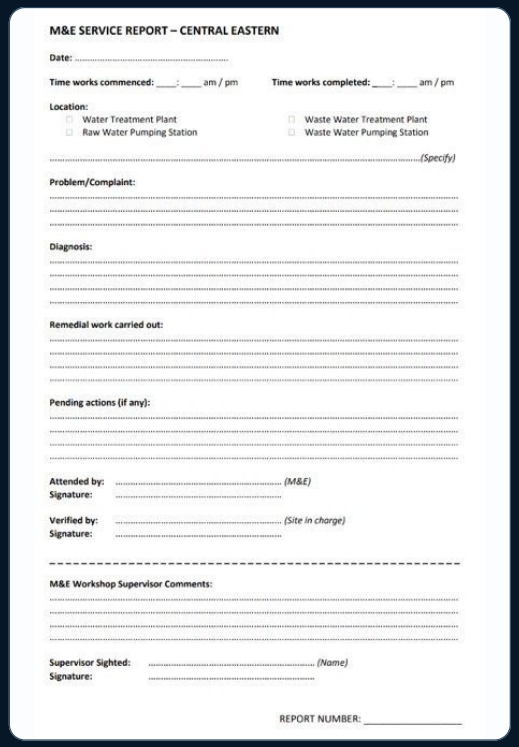
RAW WATER

pH	Turb.	Turb. Anal.	Color	Temp.	Fe	Mn
6.10	2.21	1.47	100	69.5	.83	.128
5.76	2.23	1.79	100	58.0	.89	.098
5.93	3.10	2.94	125	60.0	—	.241
6.59	1.93	1.64	85	68.5		
6.86	2.27	2.11	100	53.0	.06	.109

MIXED WAT

pH	pH Anal.
6.25	7.08
6.38	6.14
6.01	5.73
6.76	6.94
6.98	5.73

SOUTHINGTON · Raw water lab sheet, filled in by hand at the plant



M&E SERVICE REPORT – CENTRAL EASTERN

Date: .....

Time works commenced: ___:___ am / pm Time works completed: ___:___ am / pm

Location:
☐ Water Treatment Plant ☐ Waste Water Treatment Plant
☐ Raw Water Pumping Station ☐ Waste Water Pumping Station

.....(Specify)

Problem/Complaint:
.....
.....
.....

Diagnosis:
.....
.....
.....
.....

Remedial work carried out:
.....
.....
.....
.....

Pending actions (if any):
.....
.....
.....
.....

Attended by: ..... (M&E)
Signature: .....

Verified by: ..... (Site in charge)
Signature: .....

M&E Workshop Supervisor Comments:
.....
.....
.....
.....

Supervisor Sighted: ..... (Name)
Signature: .....

REPORT NUMBER: _____

WAF · The paper M&E service report used for every job

TeamSolve

WHY IT'S HARD · 2 OF 5

Every copy is a chance to get it wrong

AT SPS 07

Each month someone retypes Pump 2's run hours into a spreadsheet. 1,420 becomes 142, and the trend says the pump stopped working in May.

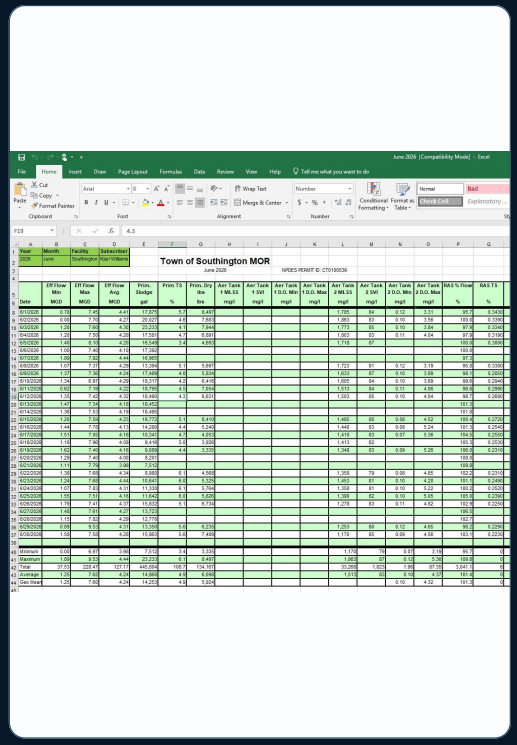
Southington

One lab result was handled by **three people** and copied **four times** before it reached the state regulator.

Bench sheet → Daily log → Lab system → Excel → State



SOUTHINGTON · How their team described it: the game of telephone



SOUTHINGTON · The monthly operating report, rebuilt in Excel by hand

TeamSolve

WHY IT'S HARD · 3 OF 5

The work gets done. The follow-up gets lost.

AT SPS 07 · 11 OCTOBER

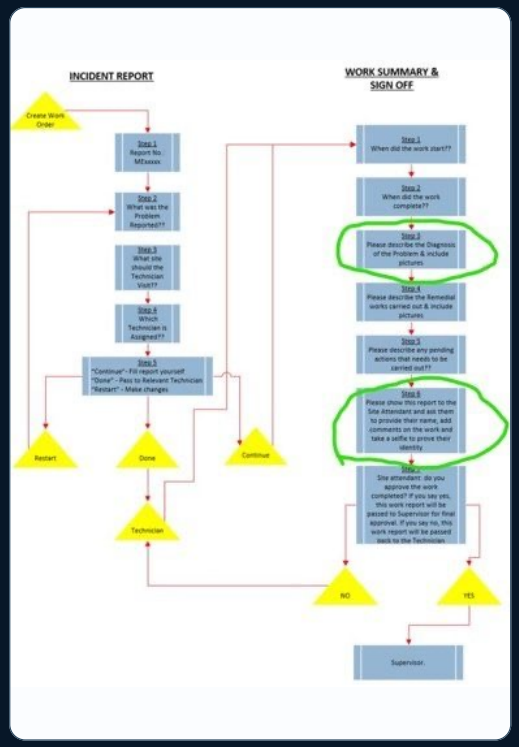
A contractor replaced the level transmitter. The work order says "range verification pending". Nobody closed that loop.

WAF

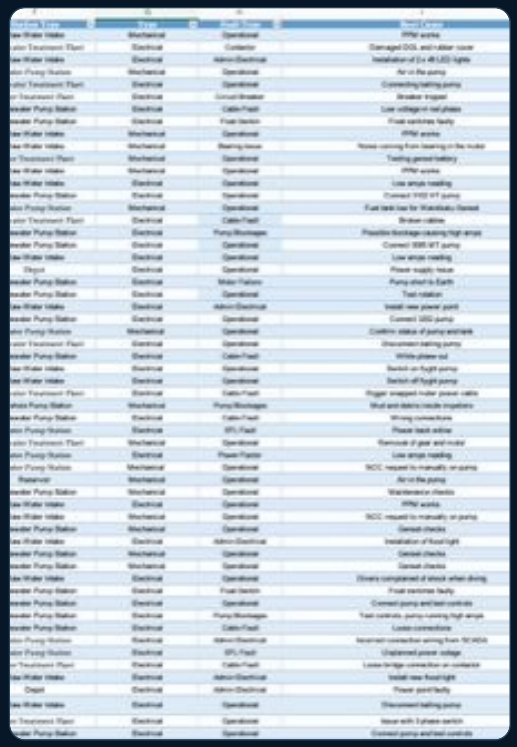
Their own list of risks: **inconsistent documentation, lost records** and **loss of historical maintenance data**.

WAF

Maintenance history was kept in a spreadsheet per year, separate from the job reports.



WAF · The real sign-off path, mapped with the team. Note the loops back.



WAF · A year of maintenance history in one spreadsheet

TeamSolve

WHY IT'S HARD · 4 OF 5

Five systems, five logins, no single story

AT SPS 07

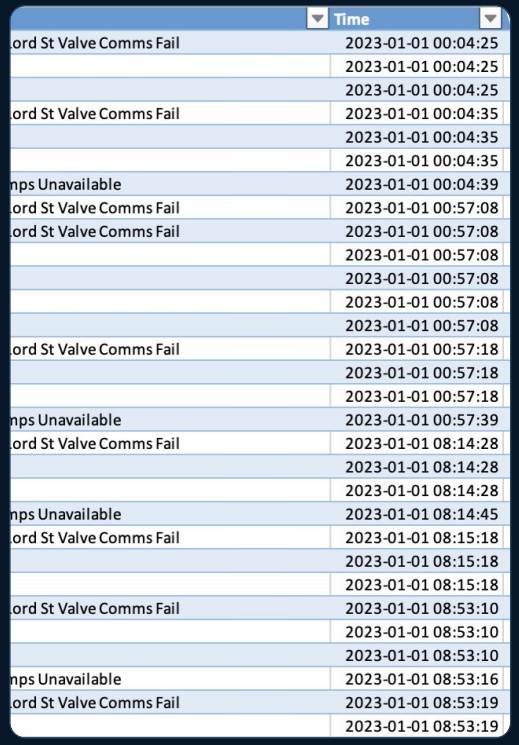
SCADA has the level trend. The maintenance system has the work orders. The alarm log adds dozens of rows a day. The manual is a PDF on a shared drive.

[redacted]

One trial brought together **1,000** work orders, **35,000** SCADA alarms, **10,000** level readings, **50** manuals and drawings, and **6** expert interviews.

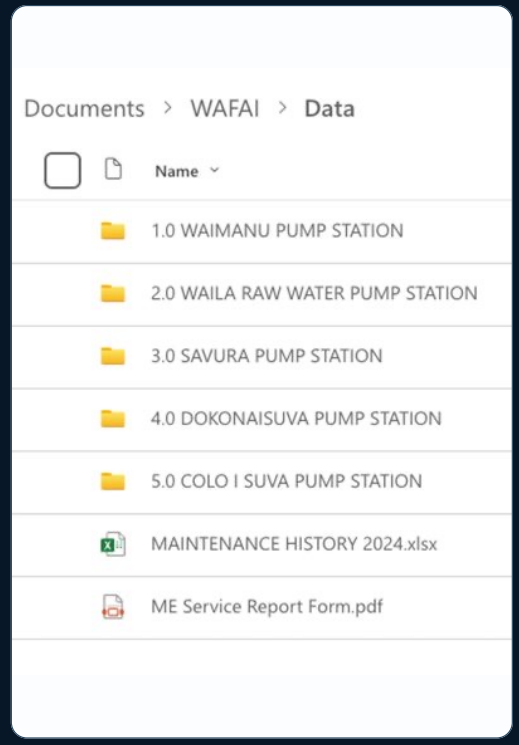
[redacted]

Drawings, manuals and history sat in folders by pump station.



	Time
ord St Valve Comms Fail	2023-01-01 00:04:25
	2023-01-01 00:04:25
	2023-01-01 00:04:25
ord St Valve Comms Fail	2023-01-01 00:04:35
	2023-01-01 00:04:35
	2023-01-01 00:04:35
nps Unavailable	2023-01-01 00:04:39
ord St Valve Comms Fail	2023-01-01 00:57:08
ord St Valve Comms Fail	2023-01-01 00:57:08
	2023-01-01 00:57:08
	2023-01-01 00:57:08
	2023-01-01 00:57:08
	2023-01-01 00:57:08
ord St Valve Comms Fail	2023-01-01 00:57:18
	2023-01-01 00:57:18
	2023-01-01 00:57:18
nps Unavailable	2023-01-01 00:57:39
ord St Valve Comms Fail	2023-01-01 08:14:28
	2023-01-01 08:14:28
	2023-01-01 08:14:28
nps Unavailable	2023-01-01 08:14:45
ord St Valve Comms Fail	2023-01-01 08:15:18
	2023-01-01 08:15:18
	2023-01-01 08:15:18
ord St Valve Comms Fail	2023-01-01 08:53:10
	2023-01-01 08:53:10
	2023-01-01 08:53:10
nps Unavailable	2023-01-01 08:53:16
ord St Valve Comms Fail	2023-01-01 08:53:19
	2023-01-01 08:53:19

WANNON WATER · Raw SCADA alarm history: thousands of rows



WAF · Pump station records in shared folders

TeamSolve

WHY IT'S HARD · 5 OF 5

The person who knew has retired

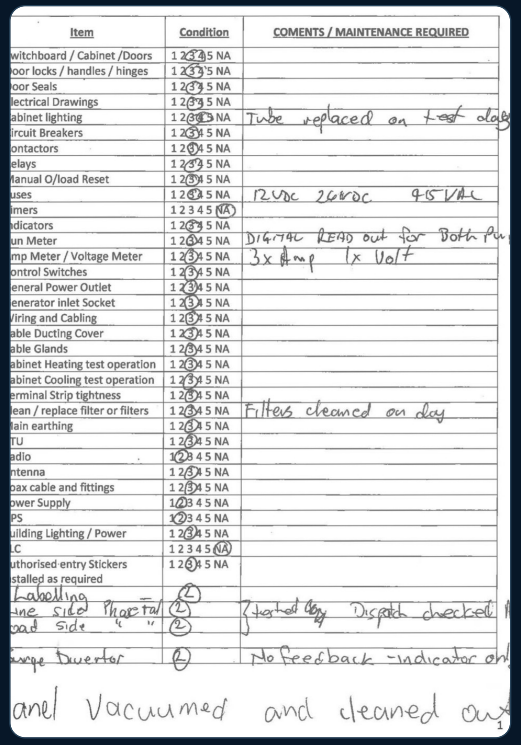
AT SPS 07

The senior operator who retired last year would have said: "After a transmitter swap, check the scaling first." It was never written down. Or it was, in his handwriting.

Wannon Water

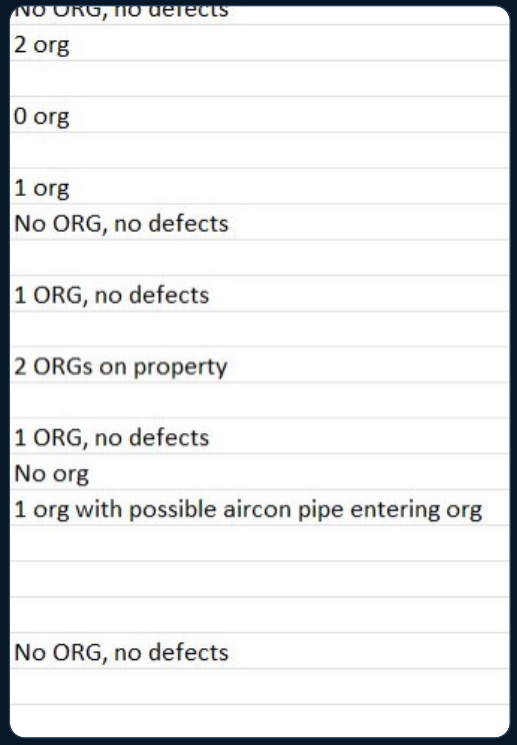
The trial started from an ageing workforce, slow onboarding and handwritten, cryptic logs only the author could read.

33% of NSW LWU frontline operators expected to leave or retire within 10 years (NSW DCCEEW, 2025)



Item	Condition	COMENTS / MAINTENANCE REQUIRED
witchboard / Cabinet /Doors	1 2 3 4 5 NA	
oor locks / handles / hinges	1 2 3 4 5 NA	
oor Seals	1 2 3 4 5 NA	
lectrical Drawings	1 2 3 4 5 NA	
abinet lighting	1 2 3 4 5 NA	Tube replaced on test day
ircuit Breakers	1 2 3 4 5 NA	
ontactors	1 2 3 4 5 NA	
elays	1 2 3 4 5 NA	
lanual O/load Reset	1 2 3 4 5 NA	
uses	1 2 3 4 5 NA	12Vdc 24Vdc 415Vac
imers	1 2 3 4 5 NA	
ndicators	1 2 3 4 5 NA	
un Meter	1 2 3 4 5 NA	DIGITAL READ out for Both Pu
mp Meter / Voltage Meter	1 2 3 4 5 NA	3x Amp 1x Volt
ontrol Switches	1 2 3 4 5 NA	
eneral Power Outlet	1 2 3 4 5 NA	
enerator inlet Socket	1 2 3 4 5 NA	
iring and Cabling	1 2 3 4 5 NA	
able Ducting Cover	1 2 3 4 5 NA	
able Glands	1 2 3 4 5 NA	
abinet Heating test operation	1 2 3 4 5 NA	
abinet Cooling test operation	1 2 3 4 5 NA	
erminal Strip tightness	1 2 3 4 5 NA	
lean / replace filter or filters	1 2 3 4 5 NA	Filters cleaned on day
lain earthing	1 2 3 4 5 NA	
TU	1 2 3 4 5 NA	
adio	1 2 3 4 5 NA	
ntenna	1 2 3 4 5 NA	
oax cable and fittings	1 2 3 4 5 NA	
ower Supply	1 2 3 4 5 NA	
PS	1 2 3 4 5 NA	
uilding Lighting / Power	1 2 3 4 5 NA	
LC	1 2 3 4 5 NA	
uthorised entry Stickers stalled as required	1 2 3 4 5 NA	
Labelling	1 2	
ine side Phase Tail	1 2	Started by Dispatch checked
oad side " "	1 2	
urge Diverter	1 2	No feedback - indicator on
anel Vacuumed and cleaned ou		

WANNON WATER · A handwritten historic inspection log



No ORG, no defects
2 org
0 org
1 org
No ORG, no defects
1 ORG, no defects
2 ORGs on property
1 ORG, no defects
No org
1 org with possible aircon pipe entering org
No ORG, no defects

WANNON WATER · "2 ORGs on property". Clear only to whoever wrote it.

TeamSolve

THE DETECTIVE WORK

Let’s investigate Pump 2, one record at a time

Each step adds a clue to the case file. Each one uses a real example from the three utilities.

Capture it right

1 Field data capture
2 Quality control of field data

Bring in what you have

3 Worksheets and spreadsheets
4 Handwritten historic records
5 Manuals, SOPs and drawings
6 SCADA time series

Make sense of it

7 History by conversation
8 Expert knowledge, kept
9 AI reading of complex trends
10 Streamlined reporting
11 Management dashboards

TeamSolve

CASE FILE | 1 · Runs fine by hand | 2 · Happened before | 3 · Controller stop | 4 · Changed 11 Oct | 5 · The instrument

24 OCT · FIELD CHECK, CAPTURED ON A PHONE

Pump 2 run in hand for 20 minutes: current 41 A, no unusual noise or vibration. Photos attached. Supervisor approved the record.

CUE 1

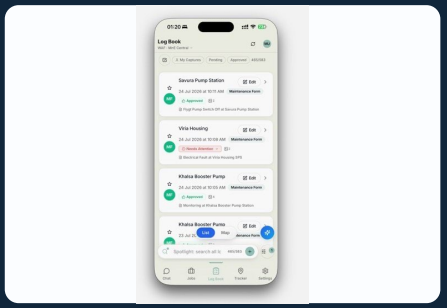
The pump runs fine when tested by hand

CAPABILITY 1

Field data capture

The paper form, rebuilt as is on a phone or tablet. Works offline. Readings, photos, location and sign-off in one record.



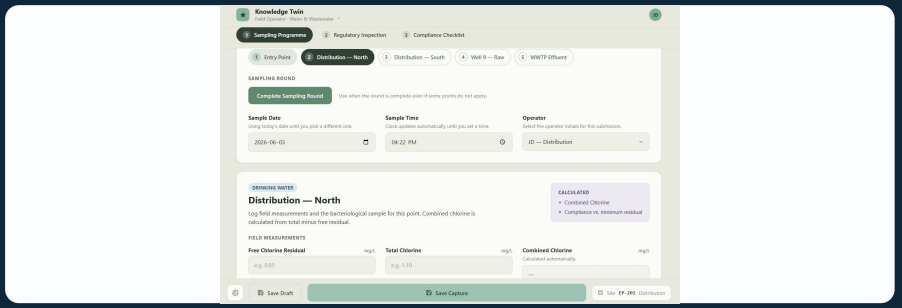


SOUTHINGTON readings at the equipment · **WAF** every job with photos and status

CAPABILITY 2

Quality control of field data

Values checked against expected ranges, calculations done by the form, and a supervisor's approval before a record is final.



SOUTHINGTON · Combined chlorine calculated and checked against the minimum residual

TeamSolve

CASE FILE | 1 · Runs fine by hand | 2 · Happened before | 3 · Controller stop | 4 · Changed 11 Oct | 5 · The instrument

2019 LOGBOOK PAGE, NOW SEARCHABLE

Handwritten: “P2 inhibit after LT replaced. Rescaled 0–5 m. OK.” Found by searching the station’s history, not by asking around.

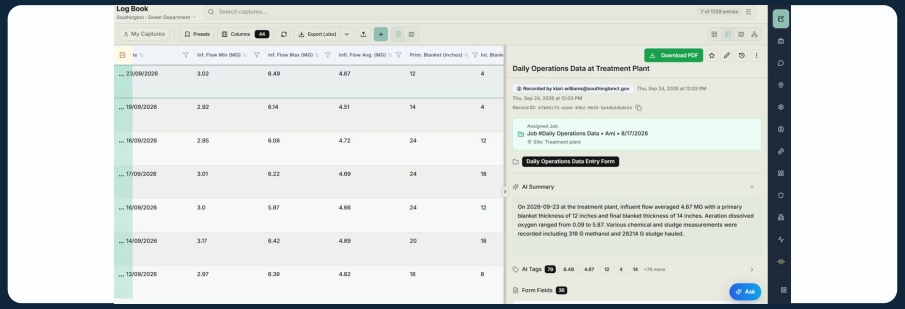
CUE 2

The same fault has happened before

CAPABILITY 3

Worksheets and spreadsheets

Years of bench sheets, round sheets and Excel files imported, so history starts on day one, with a summary of each record.

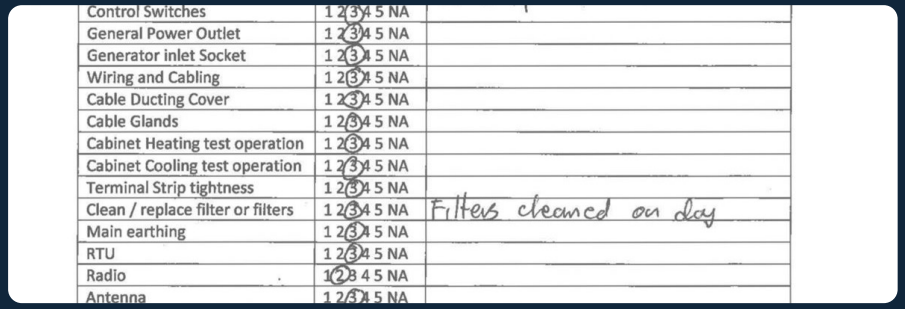


SOUTHINGTON · Daily operations data in the Log Book, with an AI summary of each record

CAPABILITY 4

Handwritten historic records

Scanned logbooks and checklists read, including handwriting and shorthand, and linked to the right asset.



WANNON WATER · Handwritten historic logs were part of the trial data

TeamSolve

CASE FILE | 1 · Runs fine by hand | 2 · Happened before | 3 · Controller stop | 4 · Changed 11 Oct | 5 · The instrument

CONTROLLER MANUAL §7.3 + SCADA, 26 OCT

Manual: below the minimum level, the controller stops the pump to stop it running dry. SCADA: the controller read **0.3 m** while the independent float showed **2.4 m** and rising.

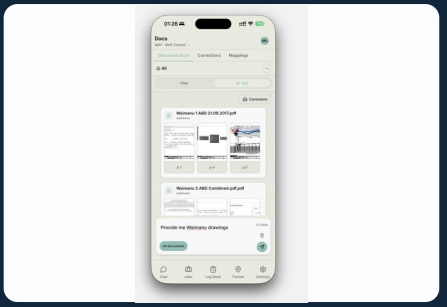
CUE 3

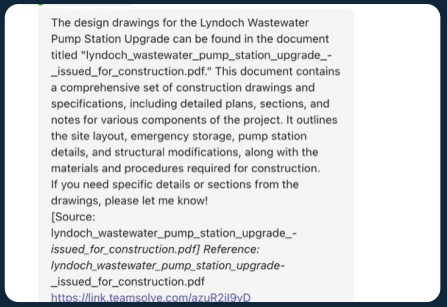
The controller stopped the pump. No motor fault.

CAPABILITY 5

Manuals, SOPs and drawings

Documents read and indexed, so a technician can ask for what they need instead of searching folders.



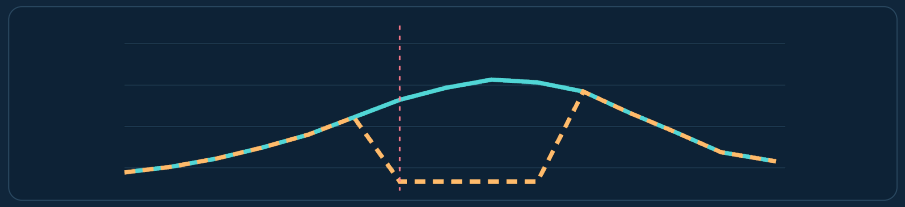


WAF “Provide me Waimanu drawings” · **WANNON** station drawings, with the source

CAPABILITY 6

SCADA time series

Levels, run hours and alarms read in, read-only, and lined up against the work orders.



Solid: independent float · Dashed: controller level · Pump 2 stopped · Illustrative

WANNON WATER · 35,000 alarms and 10,000 level readings linked to 1,000 work orders

TeamSolve

CASE FILE | 1 · Runs fine by hand | 2 · Happened before | 3 · Controller stop | 4 · Changed 11 Oct | 5 · The instrument

ASKED: “WHAT CHANGED AT SPS 07 SINCE 1 OCTOBER?”

WO-10274, 11 Oct: level transmitter LT-07 replaced, range verification pending. From a senior operator interview: “After a transmitter swap, check the scaling before blaming the pump.”

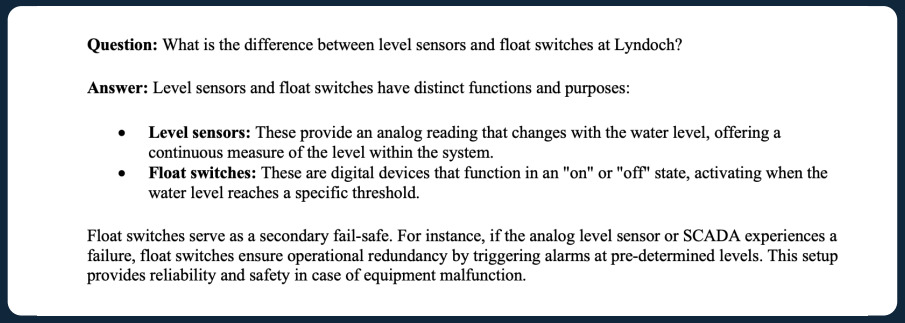
CUE 4

Something changed on 11 October

CAPABILITY 7

History by conversation

Ask a question, get the answer from your own records, with the work order or document it came from.



Question: What is the difference between level sensors and float switches at Lyndoch?

Answer: Level sensors and float switches have distinct functions and purposes:

- **Level sensors:** These provide an analog reading that changes with the water level, offering a continuous measure of the level within the system.
- **Float switches:** These are digital devices that function in an "on" or "off" state, activating when the water level reaches a specific threshold.

Float switches serve as a secondary fail-safe. For instance, if the analog level sensor or SCADA experiences a failure, float switches ensure operational redundancy by triggering alarms at pre-determined levels. This setup provides reliability and safety in case of equipment malfunction.

WANNON WATER · The float is the fail-safe check, just like at SPS 07

CAPABILITY 8

Expert knowledge, kept and shared

Interviews with senior operators turned into guidance anyone can find, so it stays when they retire.

“It’s like having a senior on call. You can just ask instead of digging around.”

WANNON · Kaitlyn Ward, Operator

“I wish I had something like this when I first started.”

WANNON · Zach Mirtschin, Senior Operator

TeamSolve

CASE FILE | 1 · Runs fine by hand | 2 · Happened before | 3 · Controller stop | 4 · Changed 11 Oct | 5 · The instrument

AI READING OF 6 WEEKS OF SCADA, ALARMS AND WORK ORDERS

All 3 stops were in automatic mode, after 11 Oct, each at the same 0.3 m reading while the float showed the well filling. Pump current normal. The pattern points to the level instrument.

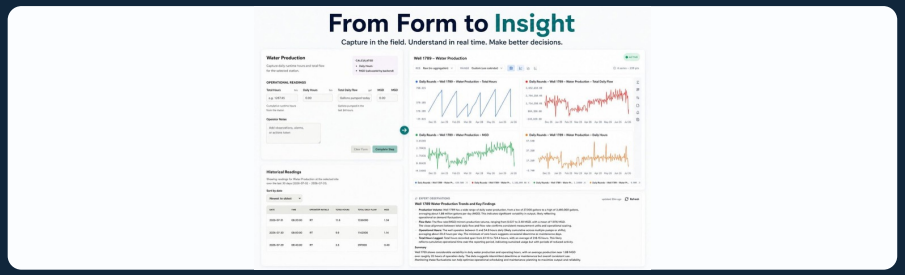
CUE 5

It’s the instrument, not the pump

CAPABILITY 9

AI interpretation of complex trends

Months of readings summarised in plain language: ranges, averages, odd days, likely causes.



SOUTHINGTON · Expert observations on a year of Well 1789 production

CAPABILITY 9 · IN THE FIELD

“Why is runtime high at Lyndoch?”

Mostly heavy, sustained rain, not mechanical faults. Seniors estimated up to an hour a day saved on trend review.



WANNON WATER · Answer drawn from level data and field reports, with sources

TeamSolve

THE ANSWER

The pump wasn't broken.

LT-07 replaced — 11 Oct → **Range set 0–10 m** — should be 0–5 m → **False low level** — 0.3 m vs 2.4 m actual → **Pump 2 stopped** — dry-run protection

Fix: rescale the transmitter.
Cost: one site visit, not $35,000.

No single system held the answer. It took the field check, a 2019 logbook, the manual, SCADA, a work order and one retired operator's advice, connected.

WHAT THE INVESTIGATION USED

Field capture · quality control · worksheets · handwritten logs · documents · SCADA · conversation · expert knowledge · AI trend reading

Illustrative. Qualified staff verify instruments and make changes under site procedures.

TeamSolve

THEN CLOSE THE LOOP

AFTER THE FIX

Incident report generated from the records. SPS 07 back to green on the manager's dashboard. New rule on every station's commissioning checklist: verify scaling after any transmitter change.

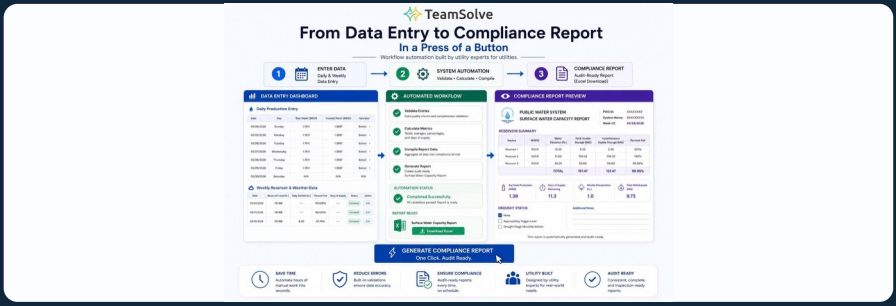
NOW INSTITUTIONAL

The next crew won't need the retired operator

CAPABILITY 10

Streamlined reporting

"The expected automation and removal of manual processes can save operators 2–3 days each month." Douglas Arndt, Southington

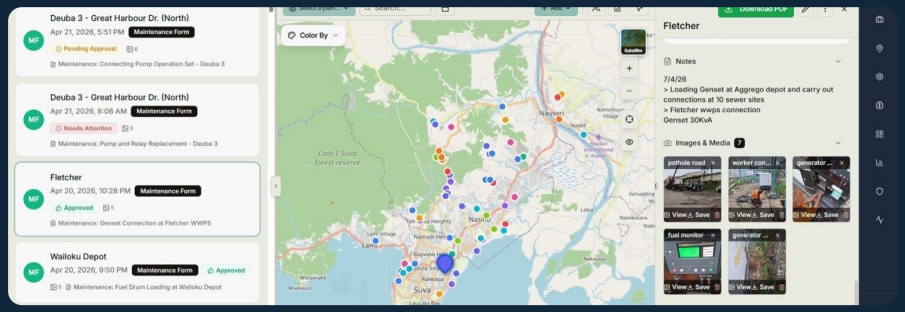


SOUTHINGTON · From daily entries to an audit-ready report, one click

CAPABILITY 11

Management dashboards

Managers see what's happening across every site, without waiting for someone to pull it together.



WAF · Every job across the network on one map, with status and approvals

TeamSolve

WHAT IT'S MEANT IN PRACTICE

Real results from the three utilities

Southington

1×

A lab result is entered once at the bench, not copied four times

2–3 days

a month of operator time expected to be saved (Douglas Arndt)

~80%

of M&E fieldwork now recorded digitally, across 120+ sites

55 · 0

daily users, and no reported issues with usability, accuracy or reporting

2–3 months

shorter learning curve for junior operators (trial estimate)

1 hour/day

up to this much saved by seniors on SCADA trends and work-order history (trial estimate)

TeamSolve

START MONDAY

Start with one workflow.
90-Day no obligation Platform Access

STEP 1

Pick the workflow that hurts most

Daily plant rounds or pump station checks are a good start.

STEP 2

Put the paper form on phones, as is

Map it with your operators. Make sure it works offline.

STEP 3

Connect one source and ask

SCADA or work orders, read-only. Bring in old logs as you go.

Find your stage in 2 minutes. Then try the Pump 2 case at our table.

mudasser@teamsolve.com | **teamsolve.com**