L W E
Environmental
I m p a c t

Turning a

Pig's Ear into a Silk Purse

Reviving a wastewater to land irrigation system

Nick Adams

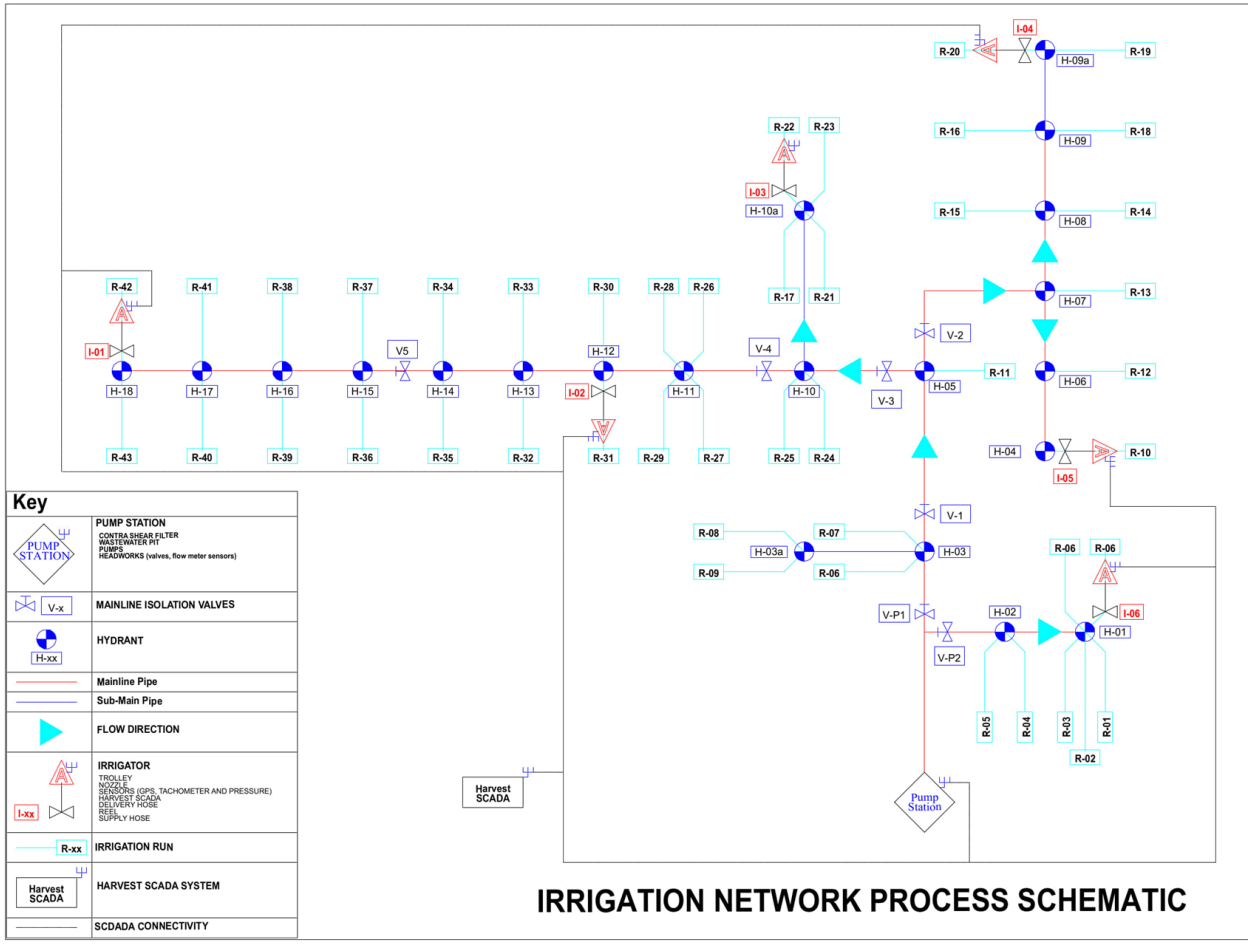
Introduction

- Real project 2 years ago
- Food-processing plant, land-based wastewater disposal
- Risk of operational and compliance failure
- Goal: Restore reliability fast while planning long-term fix

The Key Ingredients

- Collaborative operations staff + local supplier
- Supportive management
- Clear understanding of problem + consequences
- Understanding existing assets and performance
- Smart, targeted technology

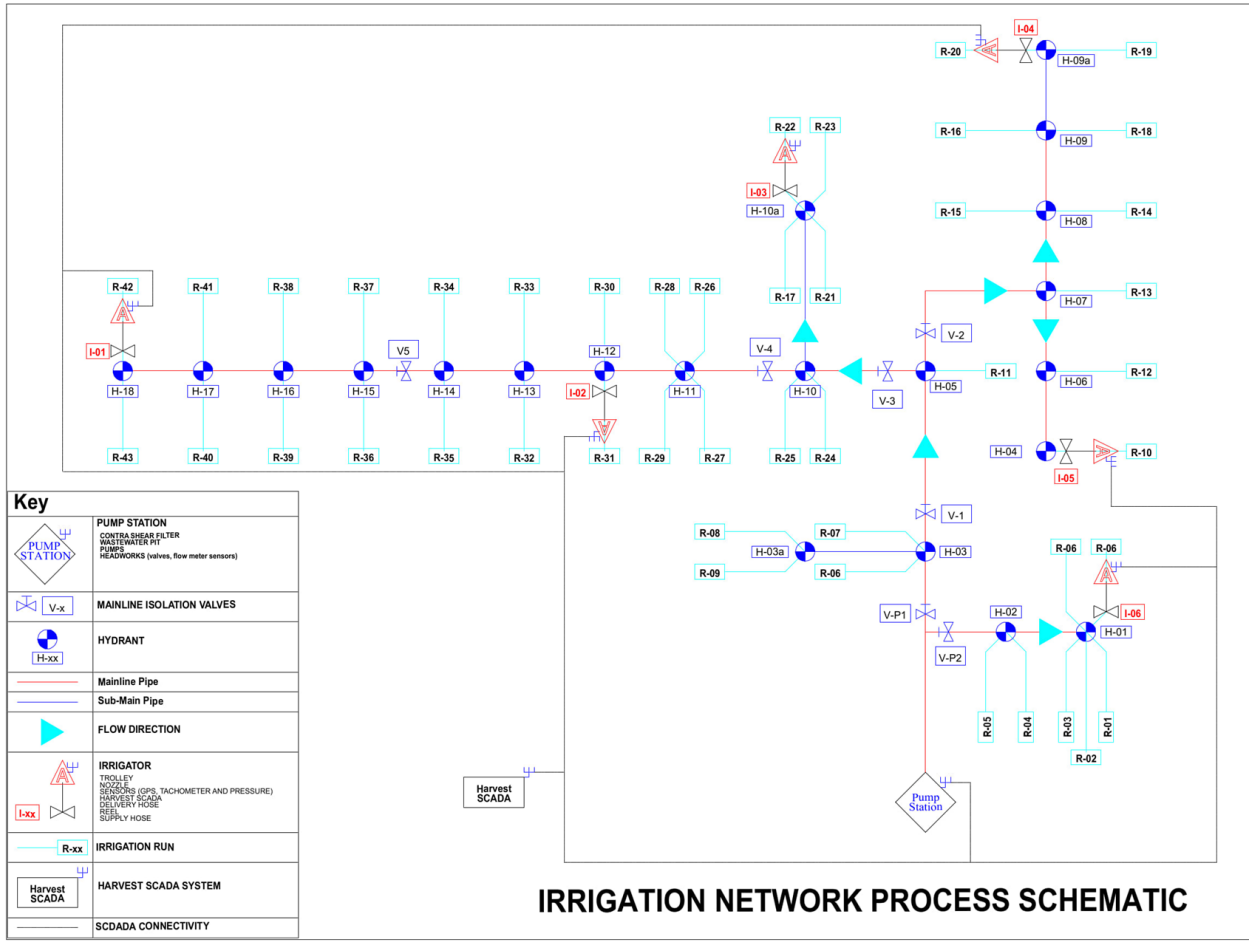
Understand it Before You Fix It



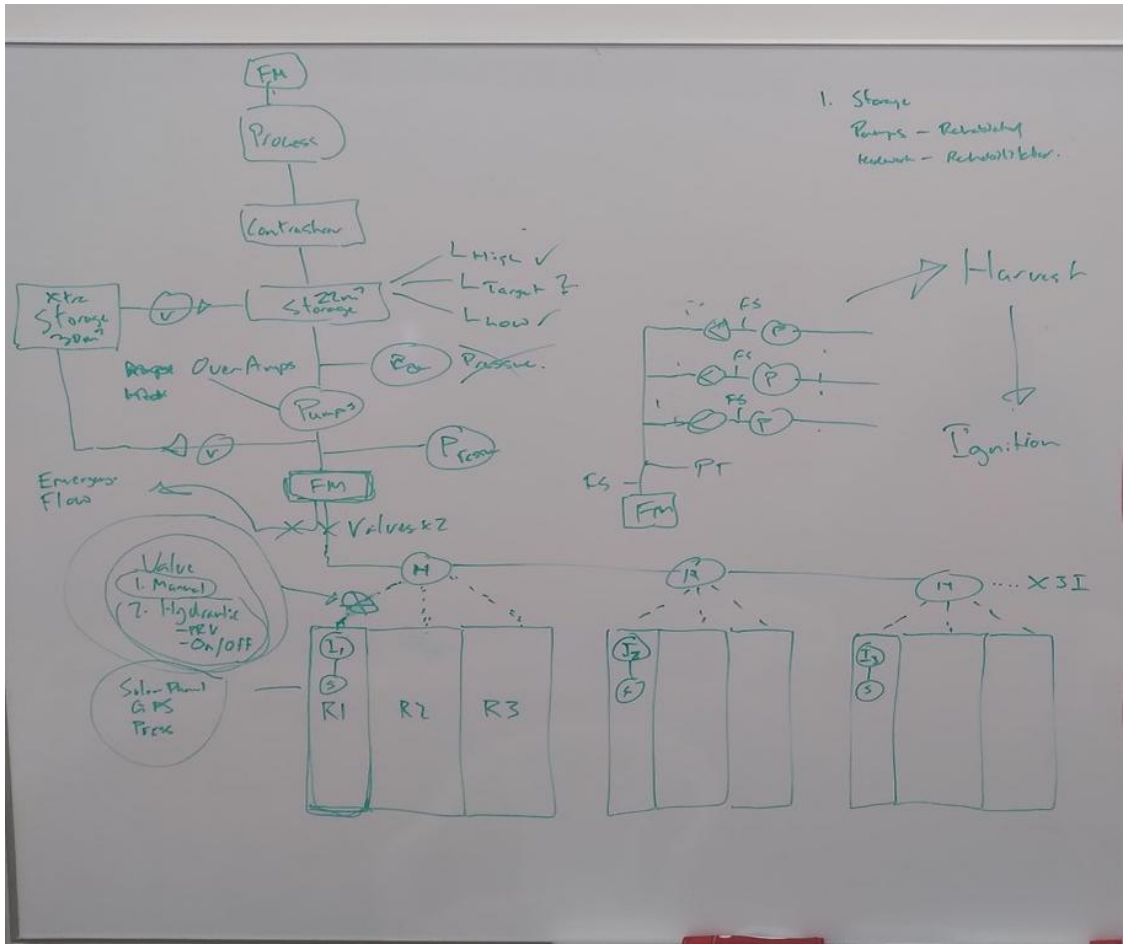
Understand it Before You Fix It

A Structured Diagnostic Approach

- Gathered drawings, historic data, and system notes
- Walked the system with farm manager + plant engineer
- Measured actual performance: flow, pressure, speed
- Identified root causes, not symptoms
- Workshopped with farm manager and plant engineer
- Built staged plan: immediate → short → medium → long term



Brain Storming



Existing System:

Contra Shear

↓

Buffer Pond

↓

Pumps-
VSD-

↓

Hydrants Approx
40

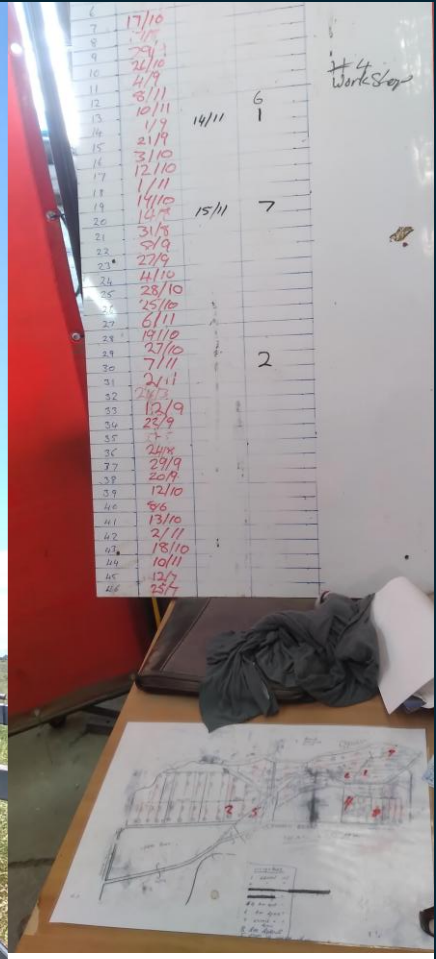
↓

Hardhose
Irrigator

The Problem: Irrigation System on the Brink of Failure.

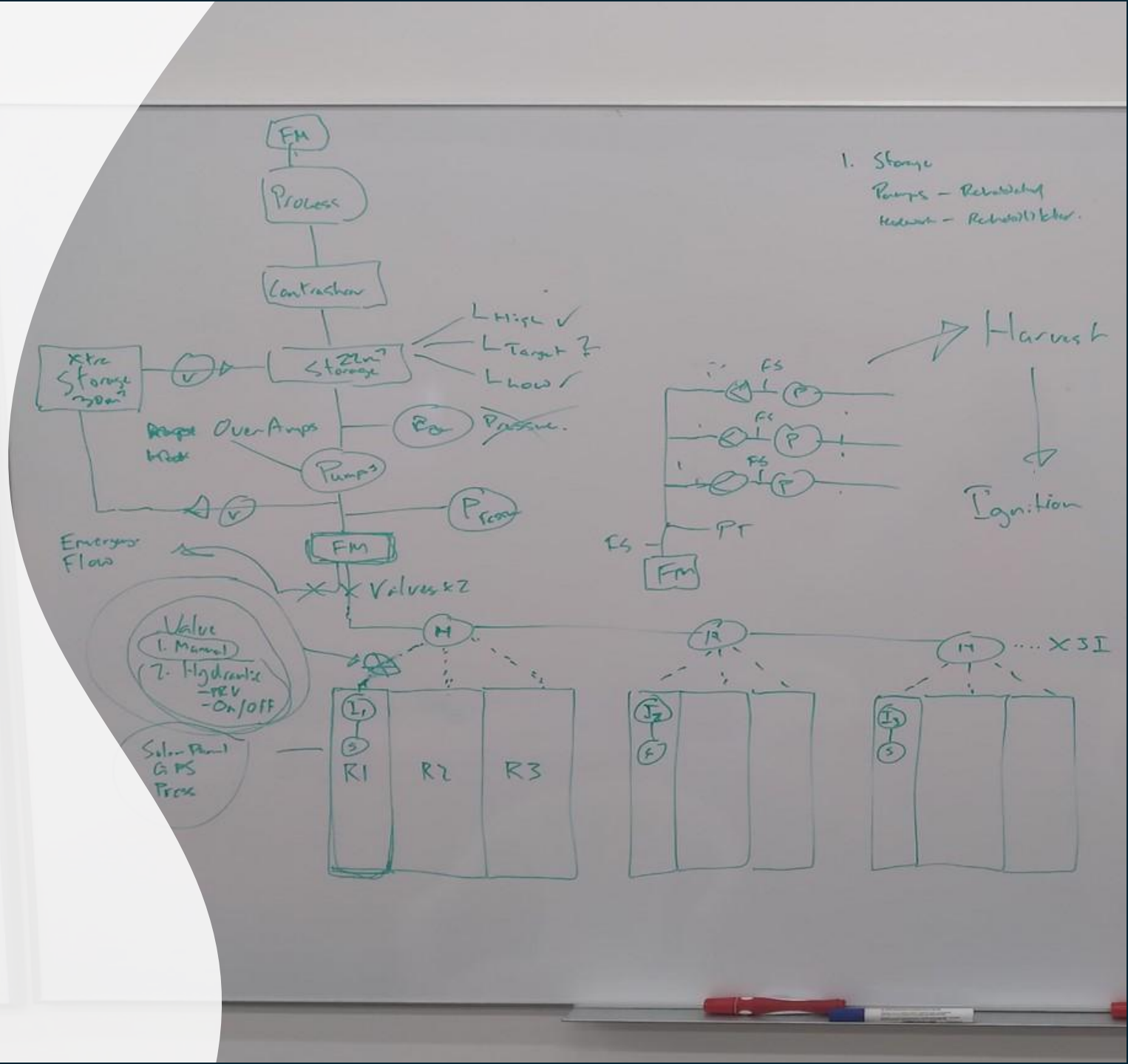
High Risk, Low Resilience

- Travelling irrigators with **inconsistent performance**
- **No Real** Time Monitoring
- **Manual operation** → **high risk** of:
  - Over application
  - Ponding/runoff
  - Stopped irrigators still applying
  - Undetected pipe failures
- **Consent conditions** strict and unforgiving



Replace or Resurrect
Engineering Under Time Pressure

- **New fixed sprinkler system** = best long term solution
- But design–procure–build **timeline too slow**
- **Resurrecting existing system** = immediate improvement
- **Low capital, fast results**
- Decision: **run both tracks** in parallel



Immediate Fix
Stabilising the Highest-Risk Issues

- Smaller Nozzles
  25mm/run
  50mm/run allowed
- Monitored with Harvest
- **Repaired irrigators** (e.g., shut off valves)
- Tightened Procedures

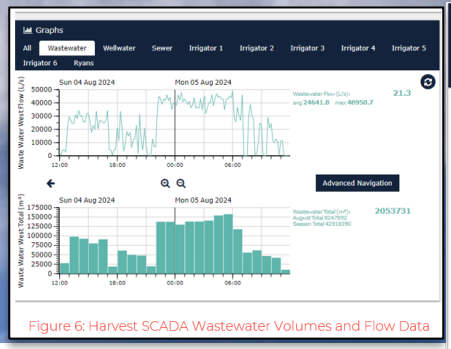
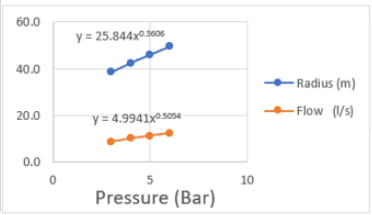
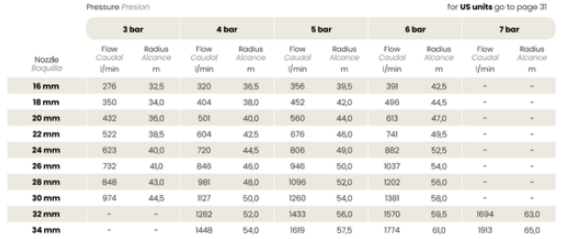


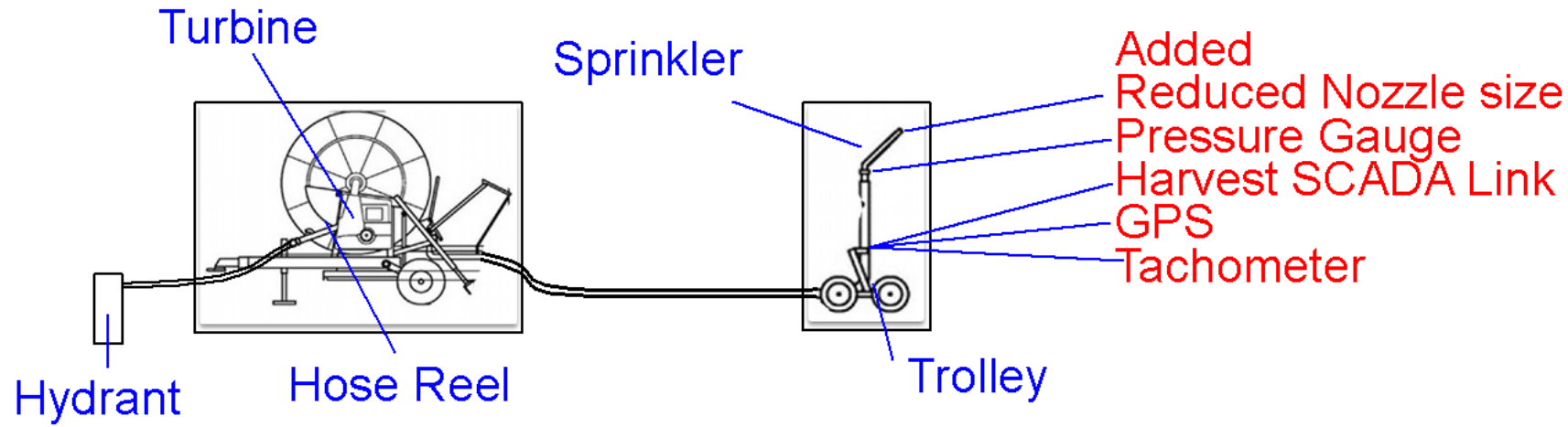
Figure 6: Harvest SCADA Wastewater Volumes and Flow Data

Irrigator Performance Data.		Expected	Upper	Lower
Application rate/ Irrigation Run	mm	20.4	29.3	17.0
Nozzle Diameter	mm	22	22	22
Speed	m/hr	20	15	25
Nozzle flow	l/s	8.7	11.3	10.1
	m^3/hr	31.3	40.6	36.2
Nozzle Pressure	Bar	3	5	4
Radius	m	38.4	46.2	42.6



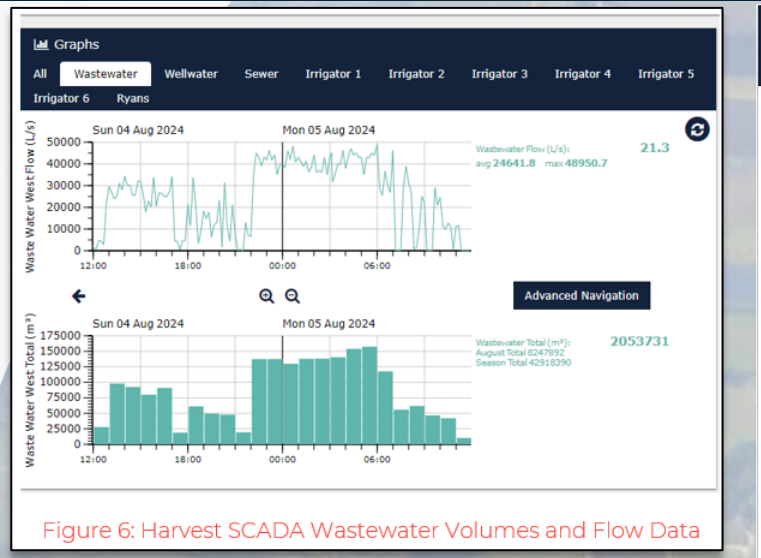
Based on Manufacturer Data			
Nozzle Diameter	22	mm	
Pressure (Bar)	Flow (l/min)	Radius (m)	Flow (l/s)
3	522	38.5	8.7
4	604	42.5	10.1
5	676	46.0	11.3
6	741	49.5	12.4
K		25.84	4.9941
n		0.36	0.51





Medium Term Fix

- **Added Automatic shut-off Valves**
- Added app to control Irrigators remotely
- Staff **training**
- Developed Living Irrigation M**anagement** Plan



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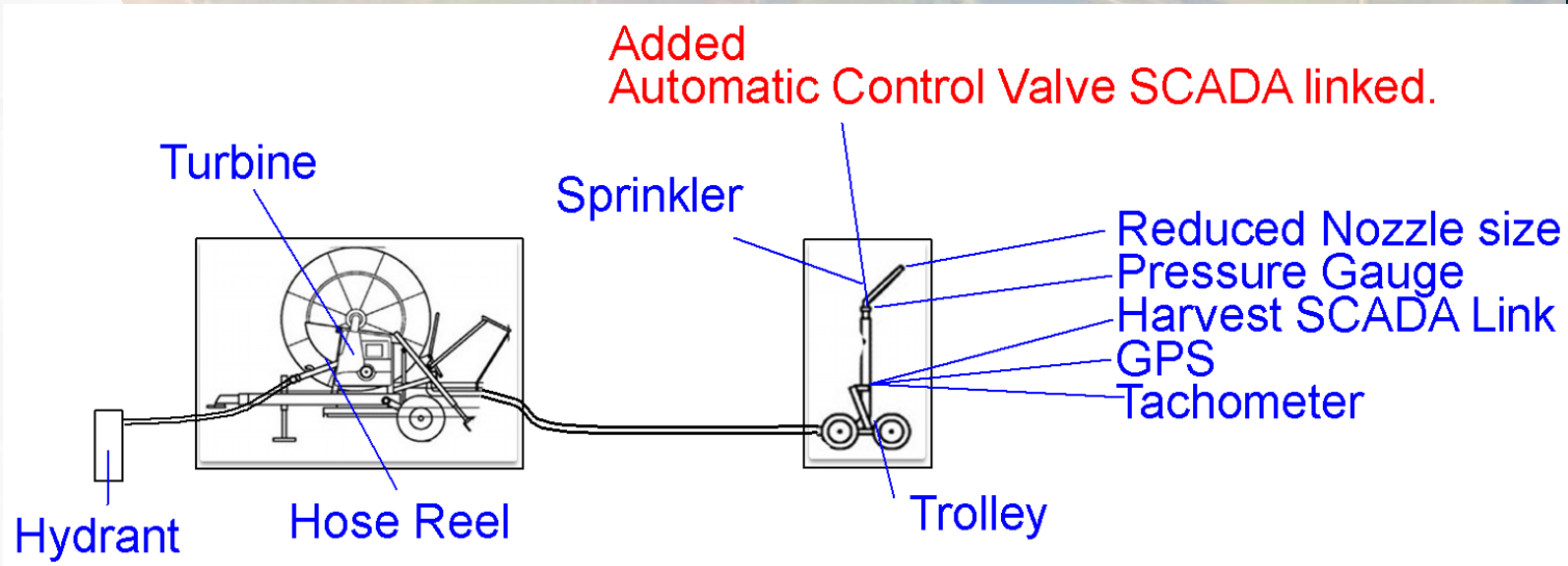

Long Term Fixes

Long Term Fix

Future Proofing the System

- Integrate with Factory SCADA
- Prepare for long term upgrades
  - New irrigation system
  - Deficit irrigation
  - Soil moisture sensors
  - Enlarged Buffer storage

Smart Tech + People = Turnaround
Targeted Upgrades, Not a Tech Dump

- **People** → operators, supplier, management
- **Pressure sensors** → detect over application + failures
- **Tachometers** → confirm irrigator speed
- **GPS** → verify run locations + setbacks
- **SCADA** → monitoring, alarms, reporting
- **Documentation** → Irrigation Management Plan

LOWE Environmental Impact

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