

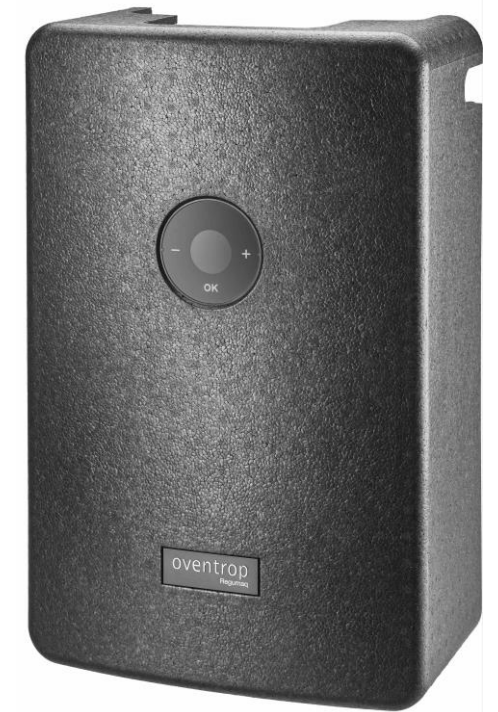


Oventrop Regumaq

Residential Highrise Heat Pump

Domestic Hot Water Solutions:

Comparison and Benefits





Case Study

Solution Comparison for Domestic Hot Water Plantrooms

Areas to Consider

- Water Hygiene
- Plant design
- Equipment costs
- Running costs
- Plant footprint

Results Overview

The basic proposed design provides a **hygienically superior** solution that is estimated to **save \$232,000 (20%)** in upfront equipment and hardware costs as well as **reduce ongoing running costs** and overall life cycle cost of the building.

Project:

- 73-level residential tower approximately 240 metres tall, situated in Melbourne.
- There are four domestic hot water plantrooms; two on level 31, one on level 55, and one on the roof.

Initial Design:

- Typical domestic hot water heat pump design.
- 6x CO₂ water source heat pumps (L31, L55).
- 2x CO₂ air source heat pumps (Roof).
- **28x 1.0kL custom-made 2205 duplex** storage tanks for **secondary-side potable** water (L31, L55, Roof).

Best-in-Class Design:

- Next generation domestic hot water heat pump design.
- 6x (or **5x**) CO₂ water source heat pumps (L31, L55).
- 2x CO₂ air source heat pumps (Roof).
- **11x 1.0kL (or 8x 1.5kL) steel buffer** tanks for **primary-side non-potable** water (L31, L55, Roof).
- 11x **Oventrop Regumaq** hygienically fresh hot water stations (L31, L55, Roof).



Case Study

Benefits of Best-in-Class Design

- Superior **hygiene** for hot potable water preparation.
 - No hot potable water reserve required; just-in-time, demand only.
 - Return loop temperature always maintained at desired set point.
 - **Eliminate risk of dangerous legionella bacteria.**
- **Maintain with 10-year Regumaq flush only (~\$500).**
- **Typical gas usage reduction up to 15%, on previous retrofit projects.**
- Precise control down to 1.0L/min per Regumaq.
- Less tanks to maintain, less leakage points, less valves and fittings, etc.
- **Self-cleaning heat exchanger to mitigate corrosion, calcification, bacteria and fouling.**
- Optimal for regenerative system concepts due to operation with a buffer storage cylinder.
- **Plant footprint reduced = increased lettable or saleable space (8-11 tanks instead of 28 tanks).**
- Energy efficient due to low excess temperature driven by just-in-time DHW production technique.
- Various recirculation loop temperature and hygiene control modes to further improve system efficiency.
- DHW network visualisation and remote settings accessibility via BMS with CS-BS data logger interfacing to Regtronic controller.

Oventrop Regumaq X-80





Case Study

Hardware Cost Comparison

System Hardware (relevant equipment only)	Plant 1 - L31	Plant 2 - L31	Plant 3 - L55	Plant 4 - Roof	Total Qty	Estimating Prices (AUD)	
	Serving L7 - L31	L32 - L37	L38 - L55	L56 - L73		Unit Price	Sub-Total
Initial Design - Typical Hot Water Heat Pump Design w/ Potable Water Storage Tanks							
CO2 heat pump	3	1	2	2	8	90,000	720,000
1000L custom 2205 duplex storage tank	8	3	9	8	28	15,000	420,000
							1,140,000
Best-in-Class Design - Next Generation Domestic Hot Water Heat Pump w/ Non-Potable Water Buffer Tanks							
CO2 heat pump	3	1	2	2	8	90,000	720,000
Regumaq X-80 station + circulation set + accessories	4	1	3	3	11	10,000	110,000
1000L steel buffer tank	4	1	3	3	11	6,000	66,000
Additional hardware from others	1	1	1	1	4	3,000	12,000
							908,000
Options							
1. SS buffer tanks in lieu of steel	4	1	3	3	11	10,000	110,000
2. 1500L steel buffer tank in lieu of 1000L	3	1	2	2	8	7,000	56,000
3. Combine L31 plants (eliminate 1 x HP)	3		2	2	7	6,000	42,000

Cost Savings (basic proposed alternative): 232,000 20%

Additional savings available via improved system efficiency.

Cost Savings (incl. option 1):	188,000	16%
Cost Savings (incl. option 2):	242,000	21%
Cost Savings (incl. option 3):	325,000	29%



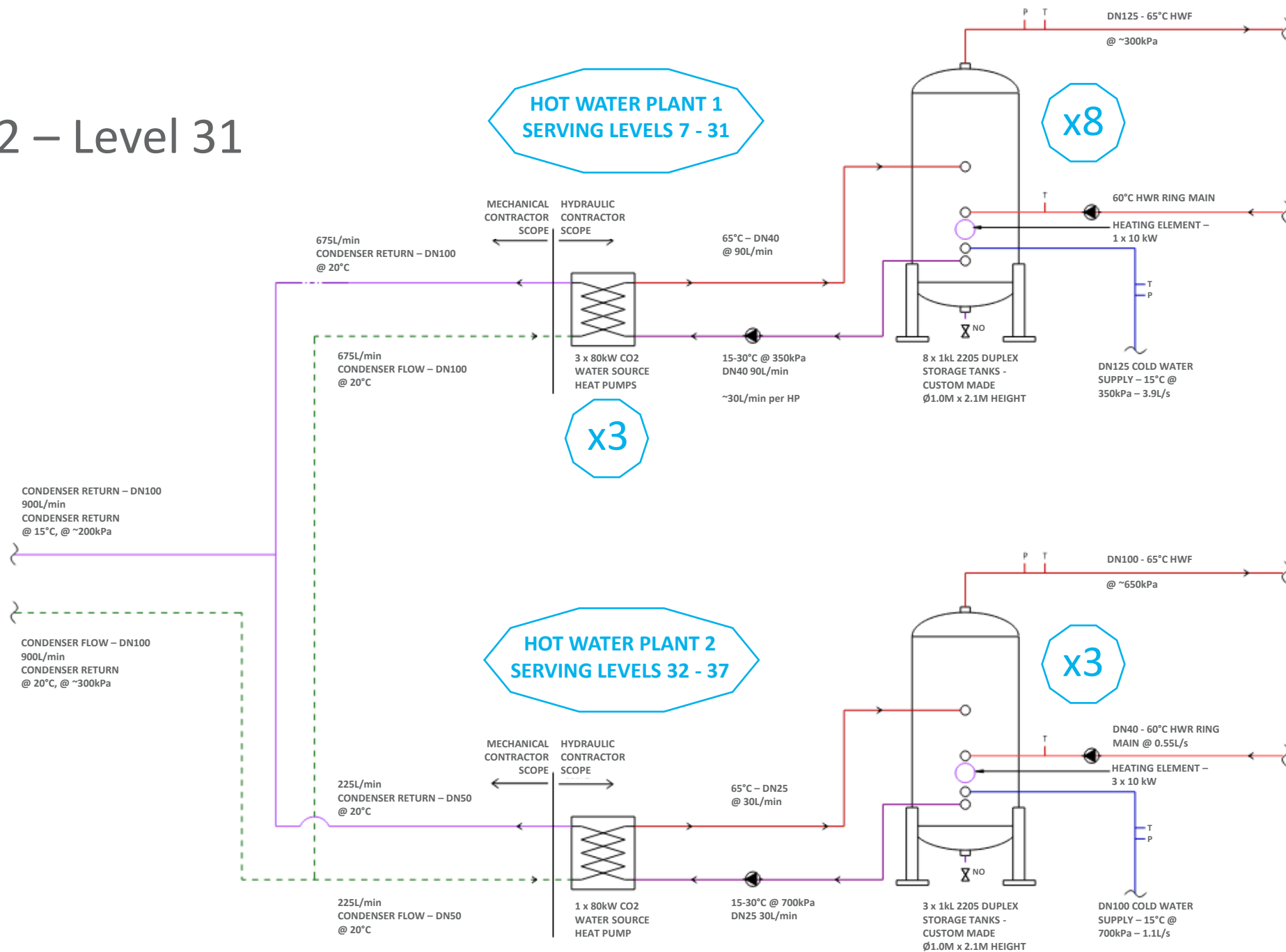
Case Study

Plantrooms 1 & 2 – Level 31

Initial Design

11 x 1000L custom-made
2205 duplex tanks required
for potable hot water storage
across both plants.

Must plants be separate?
Assuming no architectural
constraints, if system
pressure is below 320kPa,
plants can be combined as
total pressure will be below
the heat pump's maximum
allowable pressure of 500kPa.





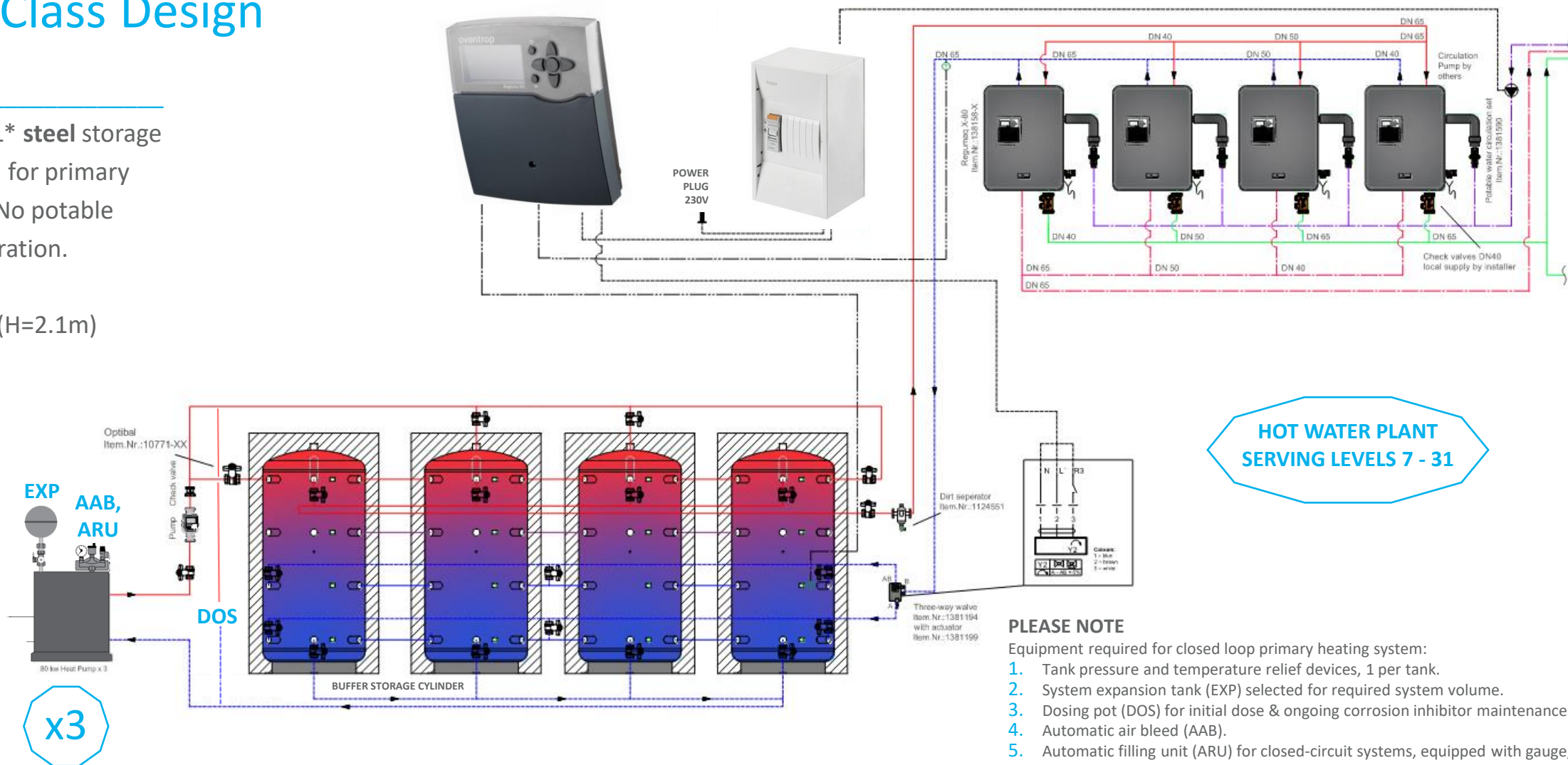
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Plantroom 1 – Level 31

Best-in-Class Design

Only 4 x 1000L* **steel** storage tanks required for primary circuit buffer. No potable water consideration.

*or 3 x 1500L (H=2.1m)





Case Study

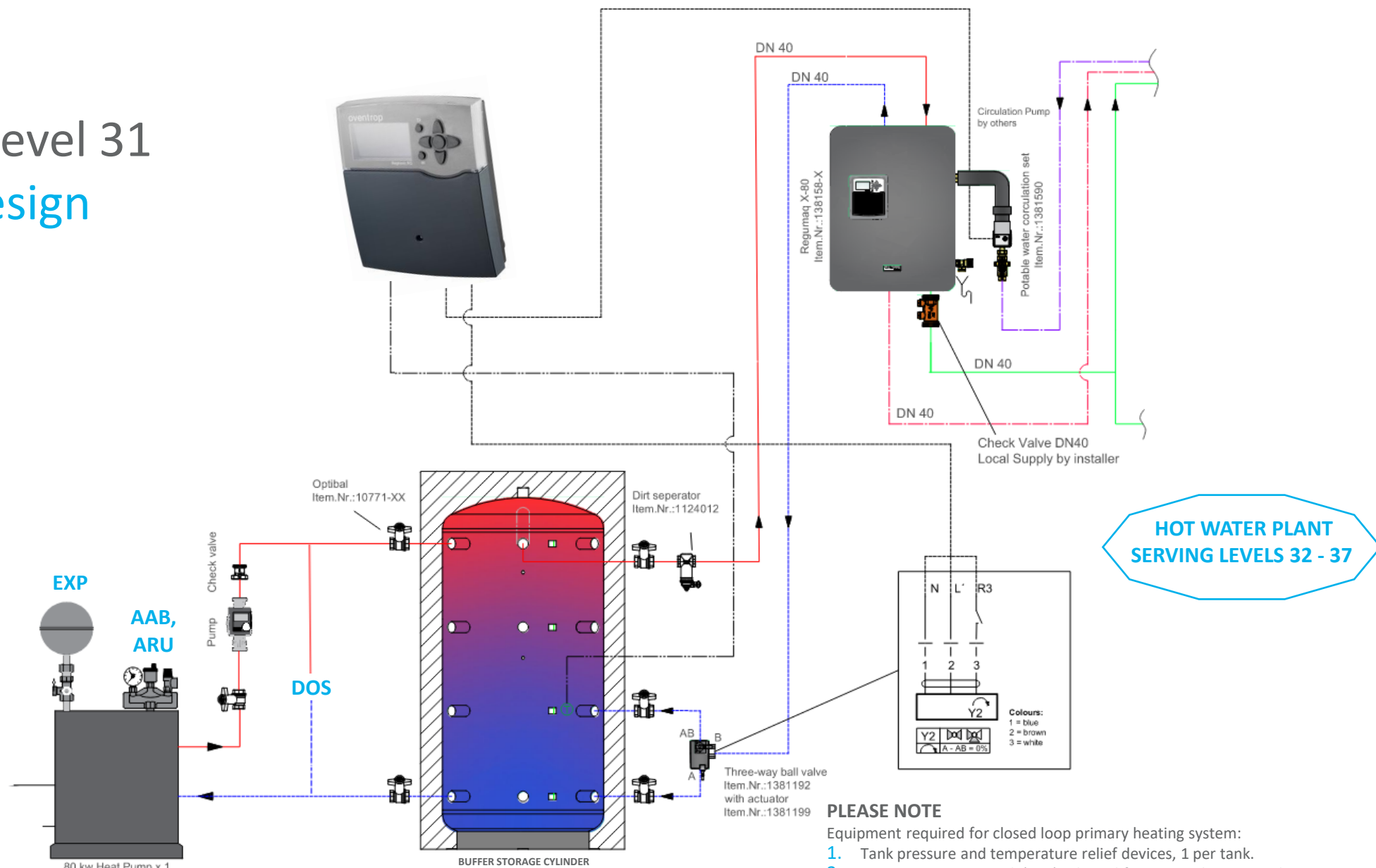
Plantroom 2 – Level 31

Best-in-Class Design

Only 1 x 1000L **steel** storage tank required for primary circuit buffer. No potable water consideration.

Legend:

- Heating supply
- Heating return
- Potable water cold (PWC)
- Potable water hot (PWH)
- Potable water circulation (PWH-C)
- Direction of flow
- 230V line
- Sensor line



**HOT WATER PLANT
SERVING LEVELS 32 - 37**

PLEASE NOTE

Equipment required for closed loop primary heating system:

1. Tank pressure and temperature relief devices, 1 per tank.
2. System expansion tank (EXP) selected for required system volume.
3. Dosing pot (DOS) for initial dose & ongoing corrosion inhibitor maintenance.
4. Automatic air bleed (AAB).
5. Automatic filling unit (ARU) for closed-circuit systems, equipped with gauge, non-return valve, stop cock & strainer on inlet.

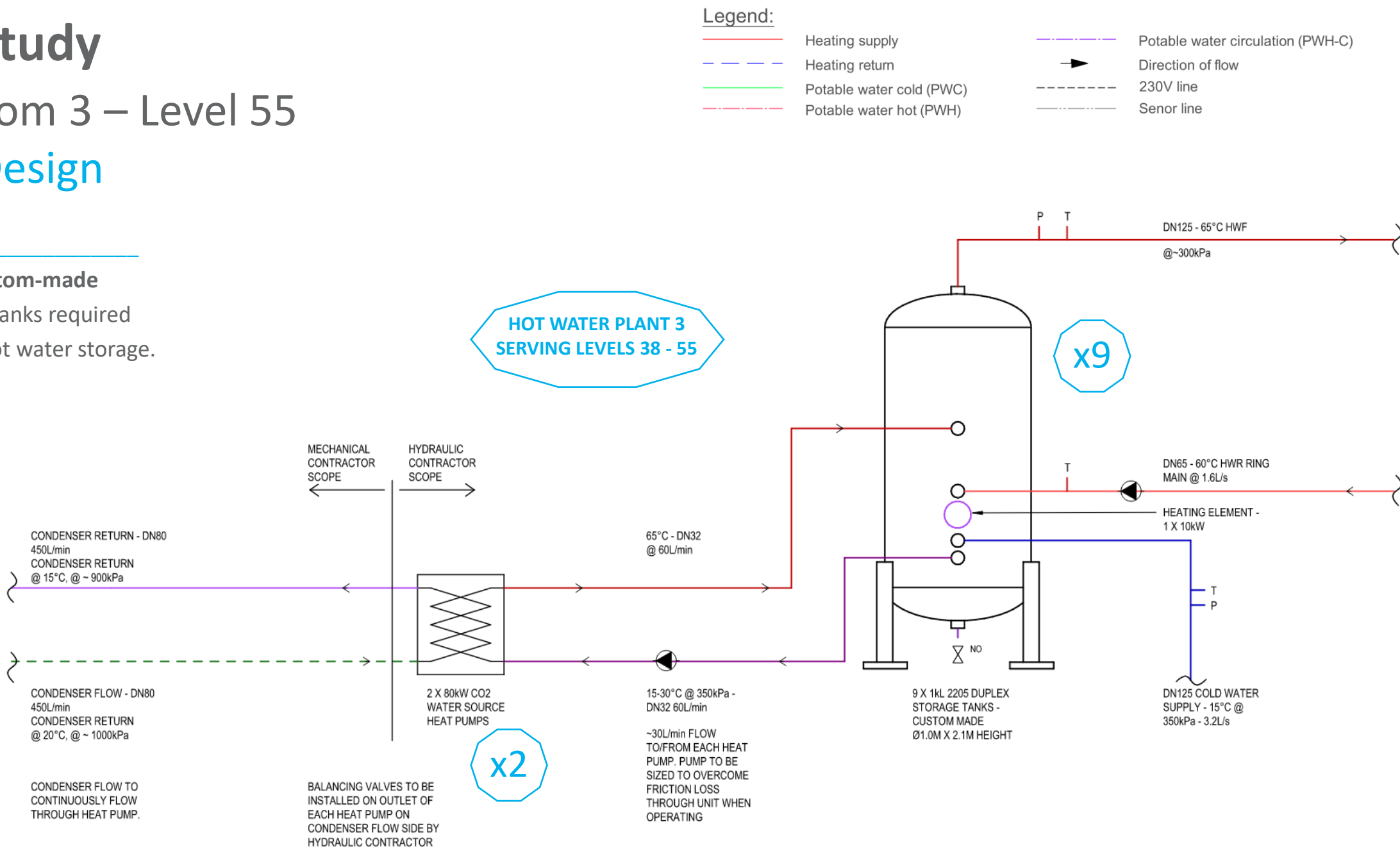


Case Study

Plantroom 3 – Level 55

Initial Design

9 x 1000L **custom-made**
2205 duplex tanks required
for potable hot water storage.





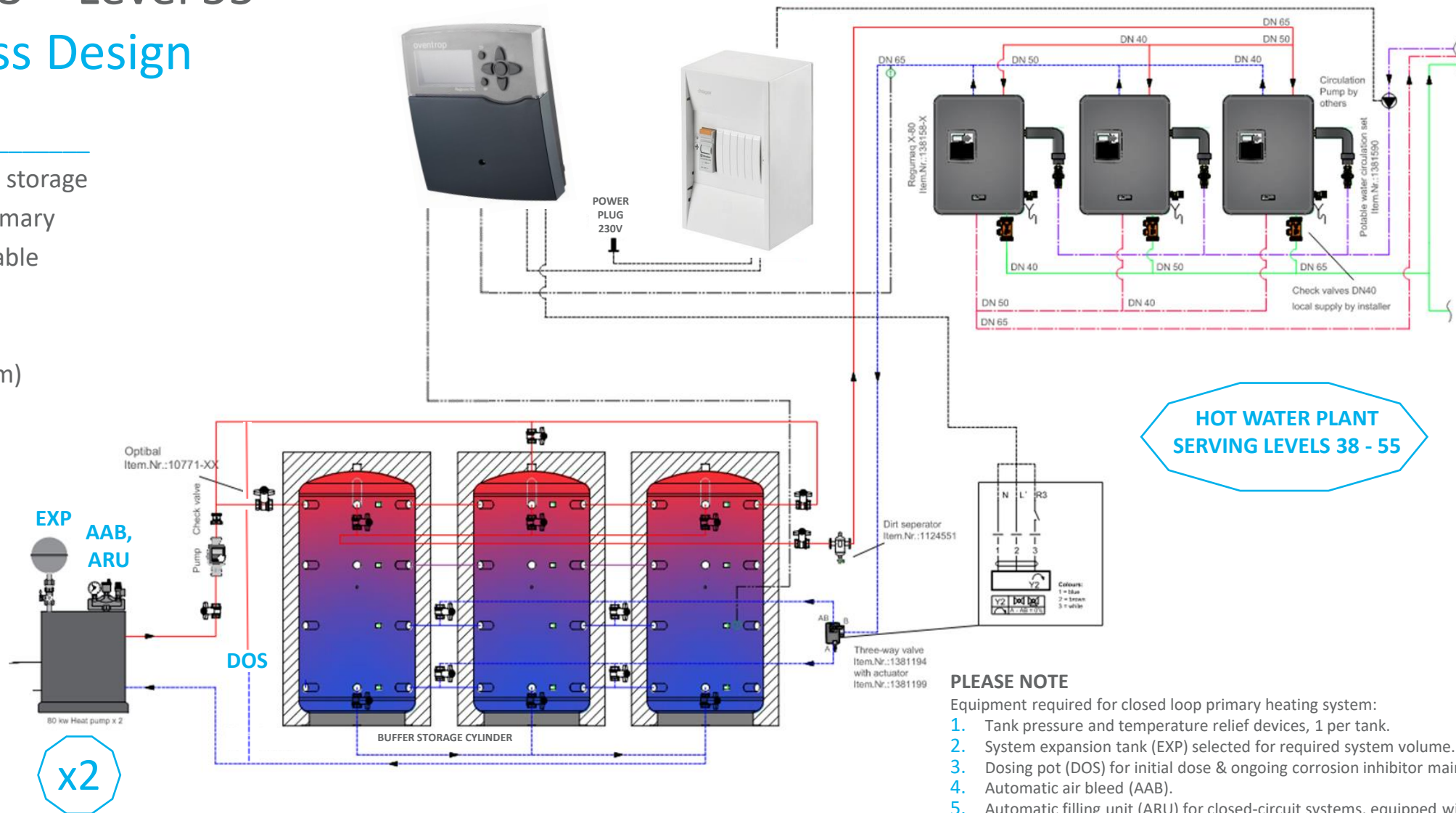
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Plantroom 3 – Level 55

Best-in-Class Design

Only 3 x 1000L* **steel** storage tanks required for primary circuit buffer. No potable water consideration.

*or 2 x 1500L (H=2.1m)

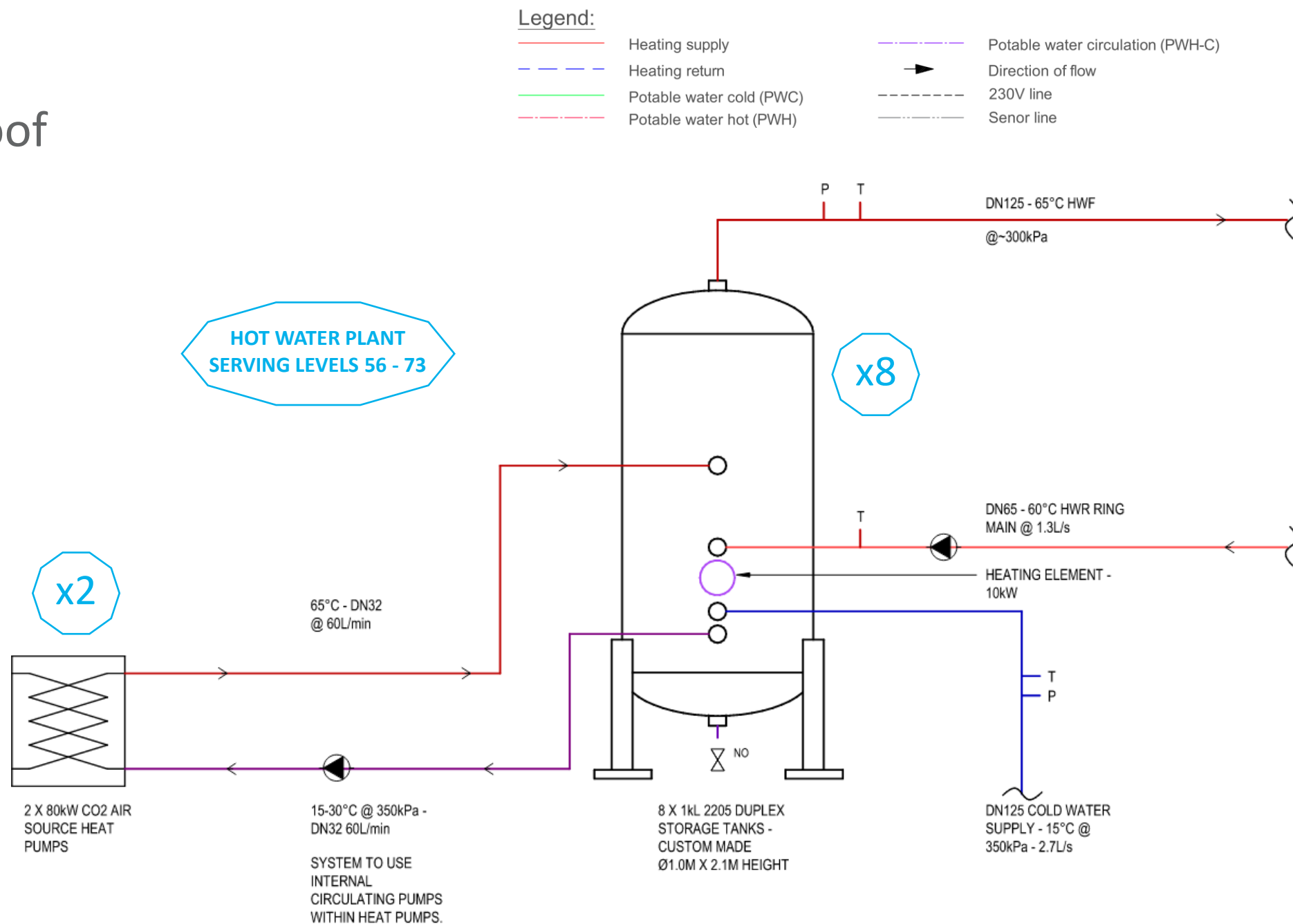


Case Study

Plantroom 4 - Roof

Initial Design

8 x 1000L **custom-made**
2205 duplex tanks required
for potable hot water storage.



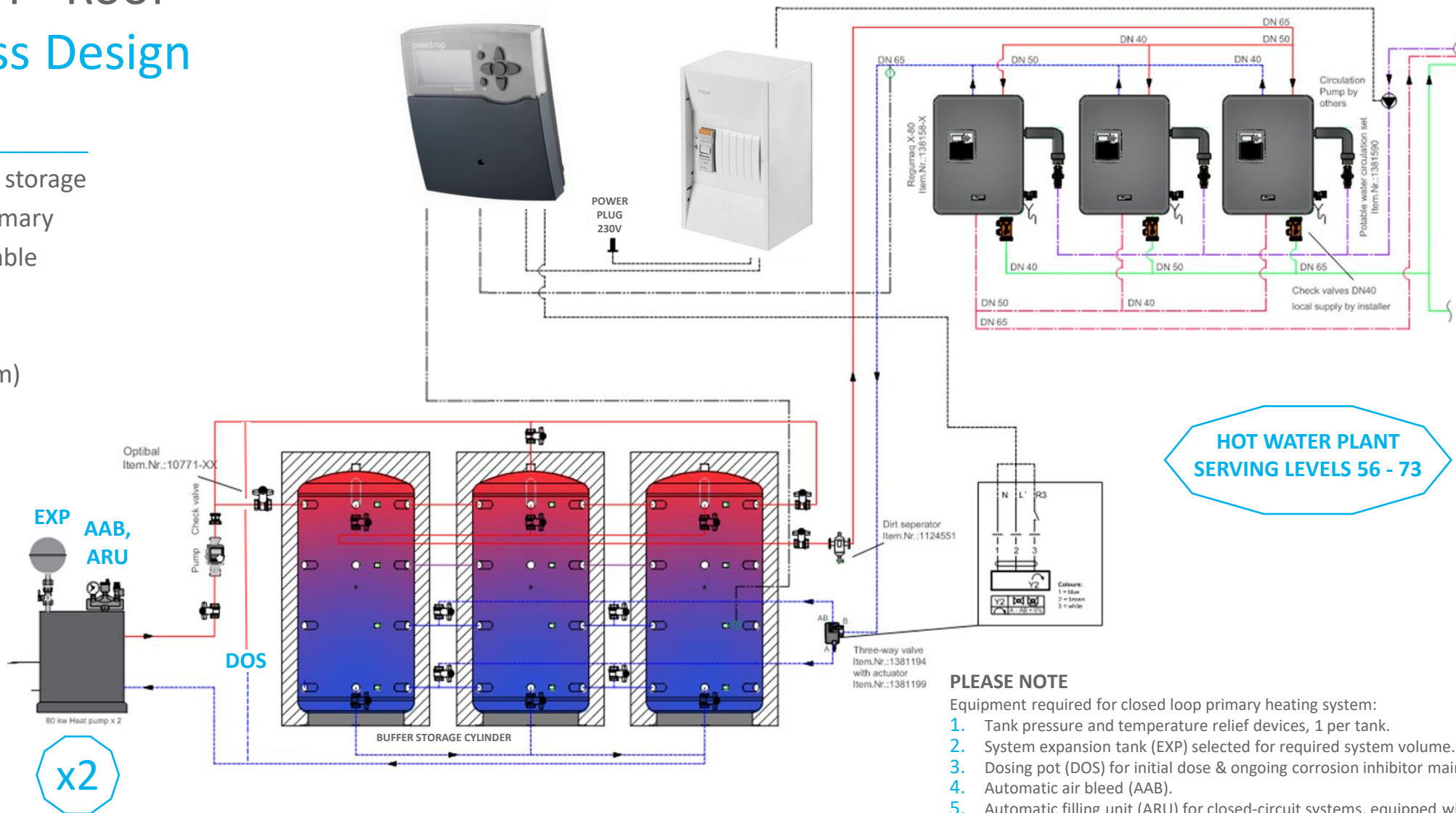
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Plantroom 4 - Roof

Best-in-Class Design

Only 3 x 1000L* **steel** storage tanks required for primary circuit buffer. No potable water consideration.

*or 2 x 1500L (H=2.1m)



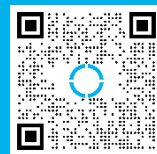
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