



ENGINEERING DESIGN CALCULATION

WTR-022 — Drinking Water Analysis

Prepared by: - Date: 22/09/2026 Result: CHECK

RESULT

Engineering validation: Validated. Classified VALIDATED in the 2026-07-19 calculator audit.

WATER TEST RESULT

CANNOT CONFIRM FIT FOR DRINKING - private supply with NO microbiology tested; test E. coli before drinking

DESIGN BASIS: 60 L/min (3.60 m³/h), 8.0 operating h/day.

IN PLAIN ENGLISH - WHAT THIS MEANS

This result is not a drinking-water clearance yet. Complete the treatment and follow-up testing below, then confirm the treated water at a NATA-accredited laboratory before relying on it for drinking.

OTHER RESULTS REQUIRING ACTION

- Total hardness: 250 mg CaCO₃/L - outside the recommended water-quality range
- Iron (Fe): 800 µg/L (0.80 mg/L) - outside the recommended water-quality range

YOUR TREATMENT PROCESS

In flow order for the tested results; confirm missing evidence before final design.

Main process: Conventional media treatment

1 Iron / manganese / H₂S removal

Quantitative sizing withheld - obtain bounded laboratory results for manganese, hydrogen sulphide (H₂S), then confirm media, oxidant demand, vessel duty and backwash requirements.

2 Hardness / scale

SAC softener 16" x 65", ~100 L resin (sized on the 60 LPM service flow); each regen treats ~19.2 kL at 250 mg/L hardness, ~12 kg salt

3 Final disinfection barrier

UV-25 (light comm.) x 1 (90 W)

Detailed sizing: hardness / scale -> 'Domestic Water Softeners' (+ 'Domestic Filtration' for the whole-house filter train).

Pressure: budget withheld; establish clean and dirty loss allowances for the unsized Fe/Mn/H₂S stage before calculating residual pressure or booster duty.

GOOD TO KNOW

- Install the softener AFTER any iron / manganese removal (so Fe/Mn does not foul the resin), and blend a bypass to leave ~50-80 mg/L hardness - fully softened water is corrosive and adds sodium.
- Size any UV on UV TRANSMITTANCE (UVT), not turbidity alone: colour, organics, iron and tannin lower UVT and cut the delivered dose, so a clear-looking water can still be under-dosed. Validate the dose (≥ 40 mJ/cm² for a protozoa claim) at the DESIGN flow and worst-case UVT, keep a sediment pre-filter ahead, and fit a UV-intensity monitor with a lamp / sleeve-fouling alarm.

LABORATORY TESTING REQUIRED

Microbiological: E. coli & total coliforms (per 100 mL).

TECHNICAL CHECKS

LSI -0.39 near balanced | 60 C hot water: +0.38 near balanced

Preliminary engineering estimate. See the full disclaimer on the final page.



OTHER TREATMENT OPTIONS

Other valid ways to treat this water.

- Ozone as the oxidant / barrier: ~1.5x stronger than chlorine - an alternative for Fe/Mn oxidation (less chemical, then filter the precipitate), for destroying colour / taste / odour, and the MOST effective barrier against chlorine-resistant Cryptosporidium / Giardia. It leaves NO lasting residual and decays in minutes, so it needs a contact vessel + off-gas destructor plus a separate residual (UV / chlorine) for the pipework - size it in the Ozone Water Treatment calculator.

DETAILED COMPLIANCE RESULTS

Parameter	Result	Min GV	Max guideline	Pass / Fail
E. coli	not tested	-	0 / 100 mL (H)	NOT TESTED
pH	7.2 pH	6.5	8.5 (A)	PASS
Electrical conductivity	0.75 mS/cm (750 uS/cm)	-	no ADWG GV	logged
Total dissolved solids	450 mg/L	-	600 (A)	PASS
Turbidity	1.2 NTU	-	5 (A)	PASS
True colour	not tested	-	15 (A)	NOT TESTED
Temperature	18 C	-	no ADWG GV	logged
Total hardness	250 mg CaCO ₃ /L	60	200 (A)	FAIL
Total alkalinity	180 mg CaCO ₃ /L	-	no ADWG GV	logged
Sodium (Na)	not tested	-	180 (A)	NOT TESTED
Chloride (Cl)	not tested	-	250 (A)	NOT TESTED
Sulfate (SO ₄)	not tested	-	500 H / 250 A	NOT TESTED
Nitrate (as NO ₃)	not tested	-	50 (H)	NOT TESTED
Nitrite (as NO ₂)	not tested	-	3 (H)	NOT TESTED
Ammonia (as NH ₃)	not tested	-	0.5 (A)	NOT TESTED
Iron (Fe)	800 µg/L (0.80 mg/L)	-	0.3 (A)	FAIL
Manganese (Mn)	not tested	-	0.1 H / 0.05 A	NOT TESTED
Hydrogen sulphide (H ₂ S)	not tested	-	0.05 (A)	NOT TESTED
Arsenic (As)	<2 µg/L (<0.0020 mg/L)	-	0.01 (H)	PASS (< guideline)
Fluoride (F)	not tested	-	1.5 (H)	NOT TESTED
Chlorine residual	not tested	-	5 (H)	NOT TESTED
Lead (Pb)	not tested	-	0.005 (H)	NOT TESTED

Preliminary engineering estimate. See the full disclaimer on the final page.



Parameter	Result	Min GV	Max guideline	Pass / Fail
Copper (Cu)	not tested	-	2 H / 1 A	NOT TESTED
Zinc (Zn)	not tested	-	3 (A)	NOT TESTED
Aluminium (Al)	not tested	-	0.2 (A)	NOT TESTED
Nickel (Ni)	not tested	-	0.02 (H)	NOT TESTED
Cadmium (Cd)	not tested	-	0.002 (H)	NOT TESTED
Chromium (Cr)	not tested	-	0.05 (H)	NOT TESTED
Selenium (Se)	not tested	-	0.004 (H)	NOT TESTED
Uranium (U)	not tested	-	0.02 (H)	NOT TESTED
Barium (Ba)	not tested	-	2 (H)	NOT TESTED
Boron (B)	not tested	-	4 (H)	NOT TESTED
Mercury (Hg)	not tested	-	0.001 (H)	NOT TESTED
Antimony (Sb)	not tested	-	0.003 (H)	NOT TESTED
Molybdenum (Mo)	not tested	-	0.05 (H)	NOT TESTED

NOTES AND DESIGN BASIS

Source-led engine: the lead process is chosen from the dominant problem, then only the pre-treatment that lead needs is added; interaction rules retire redundant stages (RO/NF removes hardness/nitrate/fluoride/arsenic; UF supersedes a sediment filter; no free chlorine to a TFC membrane).

Graded against the Australian Drinking Water Guidelines (NHMRC ADWG, current online edition). (H)=health, (A)=aesthetic guideline value. Results normalised to mg/L (hardness/alk as CaCO₃).

DESIGN GUIDE ONLY - confirm with a NATA analysis, the media/membrane vendor data and a jar/pilot test, and validate any pathogen-critical disinfection (UV dose, RO) per ADWG / local health.



WATER SAMPLE AND DESIGN INPUTS

Design / peak flow rate

60 LPM

Operating hours per day

8 h/day

How the treated water reaches the house

Direct / online - pressurised straight to the house (no storage tank)

Turbidity behaviour

Stable

E. coli

Not tested

pH

7.2

Total dissolved solids

450 mg/L

Temperature

18 C

Total alkalinity

180 mg CaCO₃/L

Arsenic (As)

<2 µg/L

Available supply pressure

350 kPa

Water source

Bore / groundwater

Low-pH correction method (used only if pH < 6.5)

Auto - soda-ash if also softening, else a calcite filter

Upstream catchment risk

No known upstream contamination

Total coliforms

Not tested

Electrical conductivity

0.75 mS/cm

Turbidity

1.2 NTU

Total hardness

250 mg CaCO₃/L

Iron (Fe)

800 µg/L

Chromium species (if known)

Unknown / total chromium only

Disclaimer: This report is a preliminary engineering estimate produced by Tenselo for guidance only. All figures must be independently checked by a suitably qualified engineer against current manufacturer data and the relevant AS/NZS standards before construction, procurement or tender submission. Tenselo accepts no liability for any loss or damage arising from use of this report.