A1 Sewerage Designs Pty Ltd

ON-SITE SEWERAGE FACILITY REPORT

LOCAL AUTHORITY: Toowoomba Regional Council
SITE ASSESSED: Lot 2 45 Highfields Road
LOCATION: Highfields
CLIENT: Precinct Urban Planning
Date: 05/08/26

RECEIVED
30/10/2026
TOOWOOMBA
REGIONAL COUNCIL

TABLE OF CONTENTS:

1. INTRODUCTION
1.1 BACKGROUND
1.2 CLASSIFICATION OF SOILS
1.3 EXISTING FACILITIES
1.4 ENVIRONMENTAL CONCERNS

2. TREATMENT AND DISPOSAL OPTIONS
2.1 WASTEWATER VOLUME
2.2 MINIMUM LAND APPLICATION AREA SIZE
2.3 METHOD OF LAND APPLICATON AREA

3. EFFLUENT QUALITY

4. HORIZONTAL AND VERTICAL SEPARATION DISTANCES

5. WASTEWATER VOLUMES

6. CONDITIONS

7. OPERATION AND MAINTENANCE

8. CONCLUSION

Report and Design prepared by Neil Holder

ABN No15 588 441 635
Drainage Licence No 21778
Endorsements
- Onsite Sewerage Maintenance

Certificates:
- CNTIL011Domestic Wastewater (Treatment Plant)
- CNQ12 Site Assessment & Design Coarse for onsite sewerage facility
- Cert1V in Domestic Wastewater Management

1. INTRODUCTION

1.1 BACKGROUND

The Client has requested the preparation of a written report outlining the effluent disposal strategy on the property described in this report.

A site and soil evaluation has been undertaken to demonstrate that an On-site sewerage facility producing secondary or advanced secondary quality effluent (As nominated in table 1 in this report) when installed and maintained in the correct manner is suitable for discharge via surface irrigation. The subsequent land application area has been suitably sized in accordance with AS/NZS 1547: and is located in the best practical location at the time of report preparation for the property described in this report. The effluent is generated from a Dwelling and consists of domestic origin. The evaluations and recommendations contained within this report are carried out in accordance with All relevant codes. Prior to construction or alteration of any facility or land application area generating wastewater, ***an approval must be sought and granted from the Local authority***.

1.2 CLASSIFICATION OF SOILS

Testing comprised of samples taken from within the site. A textural classification of the soil type in accordance with AS/NZS 1547: was conducted. The range of Soil has been identified as follows:

Soil Depth (mm)	Soil Category	Indicative Drainage Class	Structure	Soil Texture	Indicative Permeability (Ksat) (m/day)	Design Irrigation Rate (DIR)mm /day
	1	Rapid Draining	Structureless	Graves/sands	>3.0	5
	2	Free Draining	Weakly Structured	Sandy Loams	>3.0	5
	2	Good to moderate	Massive	Sandy Loams	1.4 – 3.01	4
	3	Good to moderate	High / Moderately	Loams	1.5 -3.0	4
	3	Moderate to slow	Weakly Structured	Loams	0.5 - 1.5	4
	4	Moderate to slow	High / Moderate	Clay Loam	0.5 - 1.5	3.5
	4	Slow to Poor	Weakly Structured	Clay Loam	0.12 – 0.5	3.5
	4	Poor	Massive	Clay Loam	0.06 – 0.12	3.5
	5	Slow to Poor	Strongly Structured	Light Clay	0.12 – 0.5	3
	5	Poor	Moderately Structured	Light Clay	0.06 – 0.12	3
	5	Very Poor	Weakly Structured	Light Clay	< 0.06	3
600	6	Poor	Strongly Structured	Medium to Heavy Clays	0.06 – 0.5	2
	6	Very Poor	Moderately Structured	Medium to Heavy Clays	<0.06	2
	6	Very Poor	Weakly Structured	Medium to Heavy Clays	<0.06	2

1.3 ENVIRONMENTAL CONCERNS

Consideration has been giving to the location of dams, bores, watercourses, intermittent water courses and ground water at the time of investigation any future development is the responsibility of others.

2. TREATMENT AND DISPOSAL OPTIONS

2.2 WASTEWATER VOLUME (Q)

The information used to calculate the wastewater Volume has been taken from AS/NZS 1547:. Typical Wastewater volumes are calculated on averages depending on the source available at the time (e.g. Reticulated or Tank only) and are based on the number of equivalent persons occupying the premises; this generally has been indicated by the client or owner taking into consideration the number of bedrooms. The formula used is as follows: Q = Litres/person/day x (EP) equivalent persons
WATER REDUCTION TO BE INSTALLED = 4.5/3 L Water Closets, 9 Litre per minute flow restrictors to all water-use outlets excluding bath and aerator faucets.
Households using Reticulated Supply **Standard Water reduction for**
Indicative 4 bedroom Dwelling building envelope (150 x 6 x1)/2 Total Daily Flow 900L/D =450m2

MINIMUM LAND APPLICATION AREA SIZE

The information used to calculate the size of the land application area has been taken from AS/NZS 1547: Based on the wastewater volume and the soil category the minimum recommended land application area has been derived with the calculations supplied on the site plan. The formula used is as follows: Area = (Q x days/week)/Design Irrigation Rate

2.4 METHOD OF LAND APPLICATION AREA

The land application area for secondary quality effluent generally produced by Treatment Plants may be achieved through several applications in accordance with the Queensland Plumbing and Wastewater Code and AS/NZS 1547: The Effluent quality in Table 1 indicates that the quality of effluent proposed for this property is suitable for surface irrigation.

Secondary and advanced secondary quality is generally produced by Treatment Plants. These facilities require maintenance as per Department of Energy and public works . The maintenance of these units is imperative to ensure continued compliance with effluent quality standards.

3. EFFLUENT QUALITY

Table 1 - Effluent quality based on level of treatment

Description	Primary effluent mg/L	Secondary Effluent mg/L	Advanced Secondary Effluent mg/L
Biochemical Oxygen Demand	-	20	10
Suspended Solids	-	30	10
Thermotolerant Coliform ORG/100ml	-	200	10

4. HORIZONTAL AND VERTICAL SEPARATION DISTANCES:

The table listed below provide guidance on effluent quality and horizontal separation distances as set out by the Queensland Plumbing and Wastewater Code

Table T4 – Setback distances for subsurface *land application area for a grey water treatment plant or for an on-site sewage treatment plant*

Table T5- Setback distances for surface *irrigated land application area for a grey water treatment plant or an on-site sewage treatment plant*

Table T7- Setback distances for *on-site sewerage facilities and grey water use facilities*

5 Wastewater Volumes

Table T4 – Setback distances for subsurface *land application area for a grey water treatment plant or for an on-site sewage treatment plant*

Feature	Horizontal Separation Distance (Metres)		
Distances from the edge of trench/bed excavation or subsurface irrigation distribution pipe work to the nearest point of the feature	**Down Slope**	**Up Slope**	**Level**
Property boundaries, pedestrian paths, footings of buildings, walkways, recreation areas, retaining wall footings.	2	4	2
In ground swimming pools	6	6	6
In ground potable water tank	6*	6*	6*

Note: For Primary effluent the distance from an in-ground potable water tank must be 15 metres.

Table T5- Setback distances for surface irrigated land application area for a grey water treatment plant or an on-site sewage treatment plant

The separation distances are based on a spray plume with a diameter not exceeding 1m or a plume height not exceeding 0.3m above the finished surface level. Distances are given in metres from the edge of the irrigated wetted area to any point of the feature.

Feature	Horizontal Separation Distance (Metres)
Property boundaries, pedestrian paths and walkways.	2
Water edge of a swimming pool.	6
Dwellings, recreation areas.	10*

Note: For Primary effluent the distance from an in-ground potable water tank must be 15 metres.

Table T7- *Setback distances for on-site sewerage facilities and grey water use facilities (Protection of surface water and groundwater)*

Feature	Separation	Distance	(Metres)
For onsite – see Appendix 1	Advanced Secondary	Secondary	Primary*
For grey water – see T1	High	Medium	Low
Top of bank of permanent water 'course; or Top of bank of Intermittent water course; or Top of bank of a lake, bay or estuary or, Top water level of a surface water source used for agriculture, aquaculture or stock purposes or; Easement boundary of unlined open stormwater drainage channel or drain Bore or a dam user or likely to used for human and or domestic consumption	10	30	50
Unsaturated soil depth to a permanent water table (vertically)	0.3	0.6	1.2

Note: Primary effluent typically has a BOD (Biological Oxygen Demand) of between 120-240mg/L and Total Suspended Soils of between 65-180mg/L.

6. CONDITIONS

1. The installation and operation of a domestic aerated sewage treatment plant shall comply with the conditions of authorisation as issued by the Department of Energy and Public W.

2. The effluent distribution system shall be designed to accept outflow from the wastewater-treatment unit and to convey it securely to the land-application system where it shall be distributed uniformly and effectively. The quality of the effluent produced from differing facility types is indicated in Table 1. The set back distance for the type of facility and land application area is indicated in Tables T4, T5 and T7.

3. The irrigation area shall have an adequate depth of natural topsoil (imported topsoil if necessary) to store the applied effluent and to support the growth of evergreen vegetation to maximize evaporation-transpiration.

4. When a pump system is used, the pump chamber shall be fitted with a high water-level alarm and a minimum storage volume of 24 hours flow shall be provided within the wastewater-treatment and pumping system.

5. Activities such as recreational games, gardening areas, or grazing animals shall be controlled or prohibited so that soil compaction or interference with the function of the land-application area is minimized.

6. Spray-irrigation systems shall be constructed so that there is no pooling or run-off of the effluent within or from the surface of the land-application area.

7. Surface water shall be diverted around the perimeter and up-slope of the land-application area.

8. The wastewater-treatment unit shall be installed in or on stable soil

9. The manufacturer shall forward necessary Instructions to maximise the best performance of the On-site facility. The instructions shall cover, but not necessarily be restricted to:

    a) Commissioning/service instructions
    b) Service schedule
    c) Type of cleaning products to use and avoid

10. Unless allowed for by the design, the land-application area shall not be:

    a) Paved or sealed
    b) Subject to vehicular traffic (other than a pedestrian-controlled lawnmower)
    c) Subject to regular foot traffic such as pathways and clothesline areas

11. The wastewater system shall be installed:

    a) So as not to affect any structural elements of buildings
    b) In compliance with setbacks as provided for in the Queensland Plumbing and Wastewater Code.
    c) With due consideration for future desludging operations and maintenance

12. The Land application shall:

    a) Have boundaries clearly delineated by appropriate vegetation or other type of border
    b) Have no run-off or seepage of effluent to beyond the designated area.
    c) Have no casual access by humans or animals
    d) Allow no spray to reach areas normally occupied by humans or animals
    e) Have adequate free draining soil to maximize absorption

13. All systems shall:

    a) Distribute the effluent evenly within the designated area
    b) Control the droplet size, throw and plume height of the sprinkler system so that the risk of aerosol dispersion and effect of wind drift distributing any effluent beyond the designated area is negligible
    c) Have warnings complying with AS1319 or NZS/AS1319 at the boundaries of the designated area in at least two places, clearly visible to property users, with wording such as, 'Recycled Water – Avoid Contact – DO NOT DRINK'.
    d) Ensure that the effluent does not come into contact with people, domestic or farm animals or any crops intended for human consumption

14. The pump and irrigation system shall:

    a) Have a separate effluent storage chamber provided that it has a storage volume to match the electrical starting requirements of the irrigation pump motor and to cope with the design flow
    b) Have performance characteristics that match the hydraulic characteristics of the irrigation system
    c) Be able to discharge at least 50% more than the maximum 30 minute flow rate

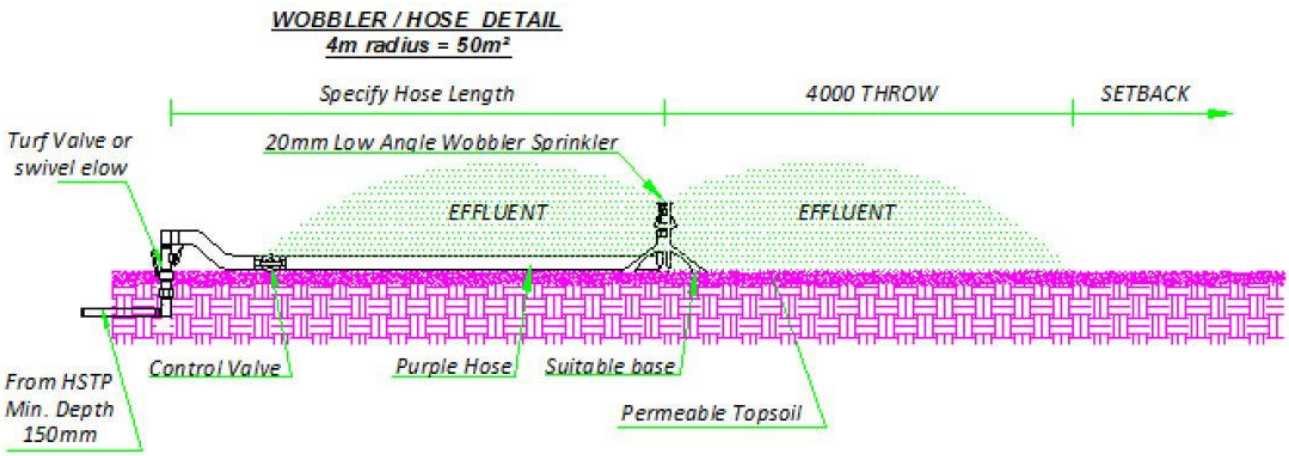
15. The pipes and fittings shall:

    a) Be rated to withstand a minimum of 150% of the shut-off head of the irrigation pump
    b) Have a semi-flexible robust system of pipes and fittings (Class 12 Polyethylene or PVC)
    c) Ensure the supply line from the HSTP to the distribution area is buried to a minimum depth of 150mm
    d) Have pipe laterals connecting spray heads buried to a depth of at least 150mm and the irrigation system shall be permanently installed. The presence of the buried pipes shall be indicated, e.g. using underground marking tape to AS/NZS2648.1.
    e) The number of outlets required depends on the type and capacity of the distribution orifices or drippers, and the absorption capacity of the soil.

16. Spray systems shall:

    a) Distribute the effluent through coarse spray heads suitable for use with effluent
    b) Shall distribute the effluent evenly and shall not produce aerosols
    c) Comply with setback requirements. Allowance shall be made for wind-carried spray from spray-irrigation systems when determining final setback clearances to boundaries, dwellings and food crops

Typical Spray Irrigation Diagram



7. OPERATION AND MAINTENANCE

1. The installation and operation of a domestic On-site sewerage treatment plant shall comply with the conditions of authorisation as issued by the Department of Energy and Public Works.
2. **The manufacturer** shall supply the owner/operator of a plant, an operation manual explaining the effective operation of the plant, including details of materials and cleaning substances, etc, to be prevented from being used with the system. The owner/operator shall make themselves familiar with these operating instructions supplied by the manufacturer of the treatment plant and shall comply with but not limit to the following;
3. Scrape all dishes to remove fats, grease, etc before washing
4. Keep all possible solids out of the system

Don't put sanitary napkins and other hygiene products into the system

5. Use biodegradable soaps
6. Use a low-phosphorous detergent
7. Use a low-sodium detergent
8. Use detergents in the recommended quantities
9. Don't use powerful bleaches, whiteners, nappy soaker, spot removers and disinfectants
10. Don't put chemicals or paint down the drain
11. Servicing shall be carried out as per Conditions of installation and shall be maintained throughout the operational life of the treatment plant.

12. Conservation of water will reduce the volume of effluent requiring disposal to the land-application area. Conservation measures include:
    - Installation of water-conservation fittings
    - Taking short showers instead of baths
    - Only washing clothes when there is a full load
    - Only using the dishwasher when there is a full load

13. Rainwater Tanks shall be situated to prevent airborne contamination by reclaimed effluent. In-ground rainwater tanks shall be positioned a minimum of 6m from HSTP installations and all effluent disposal areas.

14. The effluent disposal area shall comply with the set back distances listed in the Disposal area conditions

15. **Operating Problems** – The warning signs are obvious:
    - Absorption field is wet or soggy with wastewater ponding on the surface of the ground
    - There is a smell of sewerage near the septic tank or disposal area
    - The drains and toilets run slowly
    - The alarm is activated
    -
16. **Advice** on the consequences of failure
    - Spread of infectious disease
    - Breeding of mosquitoes and attraction of flies and rodents
    - Nuisance and unpleasantness
    - Pollution and infection of waterways, beaches, streams and shellfish beds
    - Contamination of bores, wells and groundwater
    - Alteration of the local ecology
    -
17. The surface irrigation disposal area shall:-

    - be landscaped with shrubs, trees or grass suitable for reclaimed effluent
    - have a minimum depth of 100 millimetres of soil capable of containing moisture,
    - not to be used for passive or active recreational purposes
    - exclude pedestrian traffic
    - not contain any barbecues or other like structures
    - not contain paths except for maintenance purposes
    - not be used for growing fruit or vegetables
    - not be located on land subject to water logging and/or subject to flooding
    - be completed including landscaping and planting prior to the occupation of the premises to ensure no pooling or run-off of irrigated effluent occurs

- have warning signs always visible to persons undertaking any activity near a spray irrigation area
- Evenly distribute the effluent over the entire effluent irrigation area without spray drift, pooling and/or run off from the area. The owner is responsible for regular rotation of the hose/s.
- Only use heavy droplet sprinklers and must be suitable for use with reclaimed effluent, with a plume height not exceeding 300 millimetres above the finished level of the surface of the disposal area or low angle wobbler as per diagram as several councils have advised they prefer this method of distribution .. A suitable number of sprays or sprinklers shall be installed to ensure that the total effluent irrigation area is evenly covered
- Only distribute the effluent contained wholly within the confines of the surface irrigation disposal area and shall not pond or enter any gully, water course, stormwater system or adjoining premises
- Not be altered without the written approval of Council

18. **Homeowners** and occupiers are legally responsible to keep their on-site wastewater system and disposal area in good order.

8. CONCLUSION

This report has been prepared to demonstrate the Sustainability of On-site sewerage generated from a Dwelling to adequately receive and contain effluent generated within the confines of the property. The calculations, restraints, land application area and on-site sewerage facility have been shown on the attached drawing plan.

From the information supplied to Neil Holder and subsequent site investigation, the proposed single domestic dwelling indicated in this report and site plan is capable of sustainable domestic on-site sewerage management.

Neil Holder certifies that the site procedures and design have been undertaken in accordance with the On-site Sewerage Code , the Queensland Plumbing and Wastewater Code and On-site Domestic Waste-water management AS/NZS 1547:

Should you require any further information regarding this report please do not hesitate to contact the author Mr Neil Holder on mobile 0400968681

Please Note:

This report has not taken into consideration changes in earthworks. The designer must be consulted if changes to earthworks are proposed.

This report has not taken into consideration natural disaster and unforeseen occurrences such as underground springs, flooding, fire or the like and as such the designer can not be held responsible.

The owner is responsible for the ongoing maintenance of the on-site sewerage facility and land application area,(Have a service contract in place) if the owner does not maintain the on-site facility and land application area the designer can not be held responsible.

Future development on the property is not the responsibility of the designer.



NEIL HOLDER

05/08/2026