TREATMENT PLANT APPROVAL 11/2023-1
Plumbing and Drainage Regulation 2019, part 4.

Queensland Government

Approval

1. The **ABSORBS 1200 Unlined sand filter** ("the System") described in the Specifications and Drawings in the attached Schedule and manufactured by **Hydroscape Pty Ltd** (ABN 15 150 605 282) ("the manufacturer") has been assessed in accordance with the Queensland Plumbing and Wastewater Code (QPW Code).
2. Approval is granted for the system as an **advanced secondary** quality wastewater treatment system, subject to compliance by the manufacturer with the requirements of the *Plumbing and Drainage Regulation 2019*, part 4 and the conditions of approval detailed below.
3. This approval, the conditions of approval and the Schedule comprise the entire Chief Executive Approval document.
4. Any modification by the manufacturer to the design, drawings or specifications scheduled to this approval must be approved by the Chief Executive.

Conditions of approval

5. The manufacture, installation, operation, service, and maintenance of the system must be in conformity with the conditions of this Treatment Plant Approval.
6. A permanent inspection/sampling point must be installed in the sand filter bed, positioned immediately adjacent to a spray hole and be no less than 1000 mm from the pipe termination or inlet.
7. The system when tested by a certification accreditation body, in accordance with AS1546.3:2017, was found to comply with the **advanced secondary** 8 EP/1200L level criteria and must continue to meet the following requirements:

Table 2.1 (Abrev) AS1546.3:2017 Advanced secondary effluent compliance criteria for an STS

Parameter	Advanced secondary effluent	
	90% of Samples	Maximum
BOD^5	≤ 10 mg/L	20 mg/L
TSS	≤ 10 mg/L	20 mg/L
*E. coli**	≤ 10 cfu/100 mL	30 cfu/100 mL
FAC[Þ]	Minimum 0.5 mg/L[†]	N/A
Turbidity [§]	N/A	10 NTU

* Where disinfection is required
Þ Where chlorine disinfection is required
† Minimum level, not 90% of samples
§ Where UV light is used for disinfection

8. Each system must be serviced in accordance with the accreditation certificate issued by SAI Global Certification (certificate number SKM41128) on 23 November 2021, and details supplied in the owner's operation and maintenance manual.

TREATMENT PLANT APPROVAL 11/2023-1
Plumbing and Drainage Regulation 2019, part 4.

9. Each system must be supplied with —

   a. a copy of this Treatment Plant Approval document.
   b. details of the system.
   c. instructions for authorised persons for its installation.
   d. a copy of the owner's manual to be given to the owner at the time of installation.
   e. detailed instructions for authorised service personal for its operation and maintenance.

10. At each anniversary of the Treatment Plant Approval date, the supplier must submit to the Chief Executive a list of all systems installed in Queensland during the previous 12 months. Where the Chief Executive is notified of any system failures the Chief Executive may randomly select several installed systems for audit. The Chief Executive will notify the supplier's nominated NATA accredited laboratory which systems are to be audited for BOD^5 and TSS. The sampling and testing of the selected systems, if required, is to be done at the supplier's expense. The following results must be reported to the Chief Executive;

    a. Address of premises.
    b. Date inspected and sampled.
    c. Sample identification number.
    d. BOD^5 for influent and effluent.
    e. TSS for influent and effluent.

11. The Chief Executive may, by written notice, cancel this approval if the manufacturer/supplier fails —

    a. to comply with one or more of the conditions of approval, or
    b. within 30 days, to remedy a breach, for which a written notice been given by the Chief Executive.

12. This approval may only be assigned with the prior written consent of the Chief Executive.

13. This approval expires on **24 March 2028** unless cancelled earlier in accordance with paragraph 10 above.

Lindsay Walker

Treatment Plant Approval
Approved by: Lindsay Walker
Delegated Authority
Department of Energy & Public Works

Director
Plumbing, Drainage and Special Projects
Date approved: 5 March 2024

Level 15,
53 Albert Street Brisbane
GPO Box 2457, Brisbane Qld 4001
Telephone +61 7 3008 2557
Website www.hpw.qld.gov.au
ABN 61 331 950 314

TREATMENT PLANT APPROVAL 11/2023-1
Plumbing and Drainage Regulation 2019, part 4.

SCHEDULE

ABSORBS 1200 Unlined sand filter

Attachment 1 – ABSORBS 1200 Unlined sand filter - CAB Certificate SKM41128
Attachment 2 – ABSORBS 1200 Unlined sand filter - Operators manual
Attachment 3 – ABSORBS 1200 Unlined sand filter - Schematic diagrams

Attachment 1 – ABSORBS 1200 Unlined sand filter - CAB Certificate SKM41128

STANDARDSMARK LICENCE

SAI Global hereby grants:

Hydroscape

ABN 15 150 605 282

37 Charles Sturt Avenue, Grange, SA 5022, Australia

StandardsMark Licence

Manufactured to:

AS 1546.3:2017 - On-site domestic wastewater treatment units - Secondary treatment systems

"the StandardsMark Licensee" the right to use the STANDARDSMARK as shown below only in respect of the goods described and detailed in the Schedule which are produced by the Licensee or on behalf of the Licensee* and which comply with the appropriate Standard referred to above as from time to time amended. The Licence is granted subject to the rules governing the use of the STANDARDSMARK and the Terms and Conditions for certification and licence. The Licensee covenants to comply with all the Rules and Terms and Conditions.

Licence No: SMK41128

Issued : 23 November 2021
Expires : 28 October 2026

Originally Certified : 29 October 2021
Current Certification : 23 November 2021

Frank Camasta
Global Head of Technical Services
SAI Global Assurance

Certified Product™ Australian Standard

JAS-ANZ
WWW.JAS-ANZ.ORG/REGISTER

** For details of manufacture, refer to the licensee*

SAI GLOBAL
INFORM. INSPIRE. IMPROVE.

Treatment Plant Approval
Approved by: Lindsay Walker
Delegated Authority
Department of Energy & Public Works

Queensland Government

SCHEDULE TO
STANDARDSMARK LICENCE

SAI Global hereby grants:

Hydroscape

37 Charles Sturt Avenue, Grange, SA 5022, Australia

StandardsMark Licence

Manufactured to:

AS 1546.3:2017 - On-site domestic wastewater treatment units - Secondary treatment systems

Model identification of the goods on which the STANDARDSMARK may be used:

Brand Name & Model ID	Treatment Capacity (Litre / Day)	Treatment Type	Compliance Type	Disinfection Method	Tank Types and Capacities	Service Interval	Date Endorsed
Absorbs	1200 L/day	Sand Filter (note: tested with liner but not required for normal use)	Advanced Secondary	None	Certified septic tank with baffle and outlet filter (Test tank 3100L with additional 900L pump chamber.	6 months or as required by inspection. (septic desludge every 4 years)	23 Nov 2021

End of Record

Licence No: SMK41128 **Issued Date:** 23 November 2021

This schedule supersedes all previously issued schedules

SAI GLOBAL
INFORM. INSPIRE. IMPROVE.

* For details of manufacture, refer to the licensee

Treatment Plant Approval
Approved by: Lindsay Walker
Delegated Authority
Department of Energy & Public Works

Queensland Government

Attachment 2 – ABSORBS 1200 Unlined sand filter - Operator's Manual

ABSORBS™
Owner's Manual

HYDROSCAPE
natural wastewater management

HYDROSCAPE Pty Ltd
37 Charles Sturt Ave
GRANGE SA 5022
Ph: 0409 840 515
ACN 149 272 551
ABN 15 150 605 282

December 2022
Hydroscape®

Treatment Plant Approval
Approved by: Lindsay Walker
Delegated Authority
Department of Energy & Public Works

Queensland Government

Version	Date	Author/s	Reviewed	Issued By
1b	06/12/2022	Tim Woods	n/a	Tim Woods
1a	10/08/2021	Tim Woods	n/a	Tim Woods

Created by	Hydroscape Pty Ltd	37 Charles Sturt Avenue GRANGE SA 5022 T 0409 840 515 ACN 149 272 551 ABN 15 150 605 282
Client		
Name of Organisation	Hydroscape Pty Ltd	
Name of Project		
Name of Document	ABSORBS™ Owner's Manual	
Project Number		
Document Version	1b	
Cover		
Sensitivity	This document and the information, ideas, concepts, methodologies, technologies and other material it contains remain the intellectual property of Hydroscape Pty Ltd. The document is not to be copied without the express permission of at least one of the above parties.	
Disclaimer	This report is presented "as is" without any warrantees or assurances. Whilst all reasonable efforts have been made to ensure the information provided in this review is current and reliable, Hydroscape Pty Ltd does not accept any responsibility for errors or omissions in the contents.	
Document Delivery	Hydroscape Pty Ltd provides this document in either printed format, electronic format or both. Electronic formats are provided for the client's convenience and Hydroscape Pty Ltd requests that the client ensures the integrity of this electronic information is maintained. Storage of this electronic information should at a minimum comply with the requirements of the Commonwealth Electronic Transactions Act (ETA) 2000.	

Contents

List of Figures

List of Tables

Introduction to the ABSORBS™ Wastewater Treatment System

This manual has been prepared as part of the quality assurance system to ensure that homeowners understand the operation and maintenance requirements of their ABSORBS™ wastewater treatment and dispersal system.

The ABSORBS™ wastewater treatment system has been designed and certified to comply with the requirements of Australian Standard AS 1546.3:2017 for advanced secondary treated effluent quality. The system design adopts international best practice passive wastewater treatment technology to deliver the highest possible "advanced secondary" treated effluent performance, on the smallest footprint achievable and with the lowest ongoing operating costs to the owner. Moreover it is the only advanced secondary system in Australia to have been tested and validated within a cold climate zone.

Unlike other AS 1546.3:2017 certified advanced secondary level treatment systems on the Australian market, the ABSORBS™ system does not require ongoing servicing every three months by a certified service agent. This does not mean there is no requirement for maintenance, but a small amount of owner-based preventative maintenance will ensure your ABSORBS™ system operates and performs as intended at the lowest possible cost to homeowners.

Patented Tunnel Technology

An application for the ABSORBS™ Tunnel (Figure 1) system and design is protected by the application for a Patent (US Patent pending). The tunnel has been designed with 'dual zone' effluent dispersal in mind and to be trafficable (low speed residential vehicle applications), two enhancements making the ABSORBS™ system a better choice for onsite wastewater management.

Trafficable load testing of the tunnel is scheduled to be undertaken by the University of South Australia and when results and installation conditions have been validated, this information will be included in the ABSORBS™ Maintenance Manual.

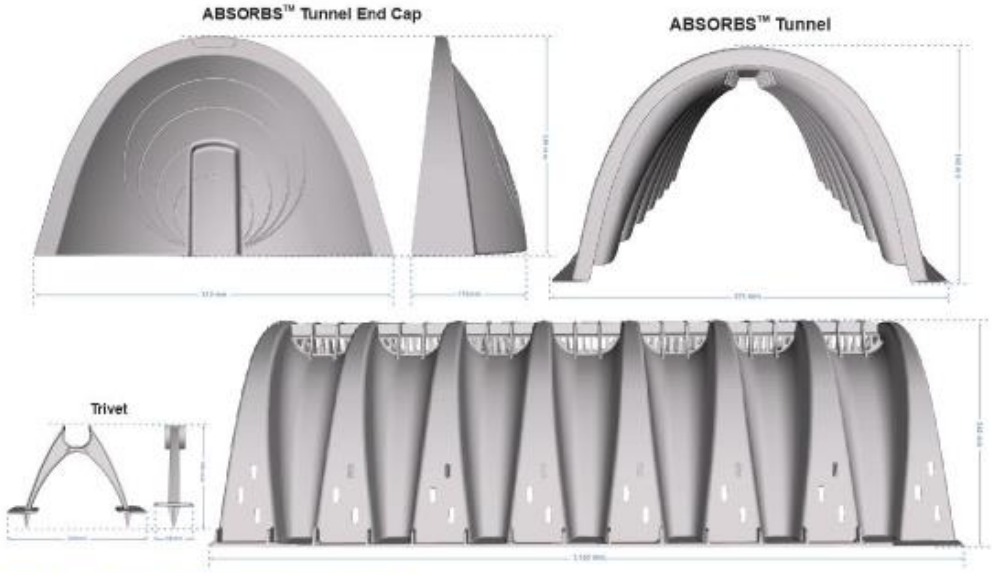


Figure 1 The ABSORBS™ tunnel and trivet system

Wastewater Treatment System Components

The ABSORBS™ wastewater treatment and dispersal system is an integrated passive advanced secondary level treatment system that complies with the requirements of Australian Standard AS1546.3:2017 for domestic Secondary Treatment Systems.

The system you have selected has the lowest maintenance requirement of any Advanced Secondary Treatment System on the Australian market. With proper scheduled maintenance according to instructions given in this manual, the ABSORBS™ system will continue to provide a high level of wastewater treatment performance for many years.

System Components

The only truly mechanical component of the ABSORBS™ system is the pump that operates for less than 10 minutes per day under normal domestic household application design flows, a feature that adds to the life of the system and the very low operating costs. Energy costs to operate your ABSORBS™ system are around 10% of the energy costs of other commercially available secondary treatment onsite treatment and dispersal systems.

The passive treatment approach and fully subsurface installation mitigates odour and noise risks that are common with other secondary treatment systems. Unlike most other secondary treatment systems, there are also no chemicals needed to operate your ABSORBS™ system, avoiding any exposure to hazardous chemicals for homeowners and wastewater-irrigated gardens.

Figure 2 shows the typical layout of your ABSORBS™ system (lined configuration).

NOTES
1. ABSORBS PUMP TO BE A PEDROLLO DM30N 1.1KW 1 PHASE OR APPROVED EQUIVALENT.
2. ALL PIPEWORK TO BE SCJ LILAC UPVC.
3. IRRIGATION SYSTEM TO COMPLY TO AS1547 2012

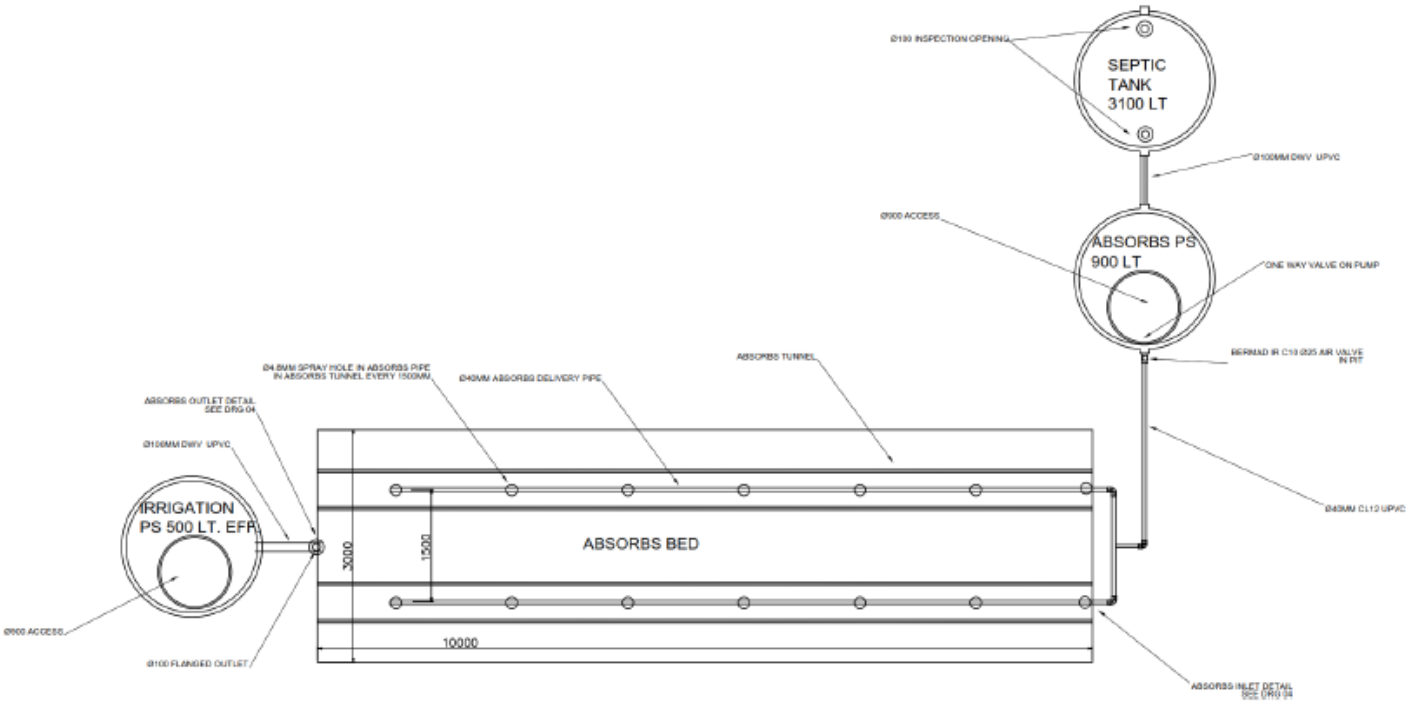


Figure 2 Typical ABSORBS™ system layout (lined configuration)

Nature of Domestic Wastewater

Domestic wastewater is a combination of water from inside the home and reflects homeowner habits and lifestyle. Most of the water (approx. 70%) originates from toilet flushing and bathrooms, with the remainder coming from water used in the laundry and kitchen. Individual household water use profiles vary according to the number of occupants and their behavioural habits, as well as the number and nature of water-using appliances. Wastewater contaminants like organic matter, suspended solids, grease, nitrogen and phosphorus come primarily from toilets and kitchen sinks, while other minor contaminants like detergents, pharmaceuticals and salts originate from showers and washing machines.

The constituents and volume of wastewater entering your ABSORBS™ system is dictated by the living habits of the household's occupants. In most cases, your ABSORBS™ system will perform properly without any special requirements of homeowners. However, there are some measures that can be taken to enhance system performance and lessen the risk of premature degradation of performance and maintenance requirements.

Prohibited Discharges

One of the key strategies to ensure the operating performance and life of your system is to ensure only normal domestic wastewater enters the treatment and dispersed system. The constituents of normal domestic wastewater are described above.

A list of things that should NOT be discharged to your wastewater treatment and dispersal system is detailed below. Unless otherwise approved by the relevant authority, no person shall permit or cause the following discharges into an on-site wastewater system:

- Any storm water, including roof and rainwater tank overflow, and surface drainage waters;
- Any pool back flush waters from a swimming pool or water softener;
- Any discharge of back flush from a spa bath/pool in excess of 680 litres capacity;
- Any Sanitary napkin, clothing, plastic material or liner;
- Any trade waste;
- Any petrol or other flammable or explosive substance whether solid, liquid or gaseous;
- Any other material or substance which, in the opinion of the relevant authority, would impair the effective working of an on-site wastewater system or community wastewater management system.

Note: this information is an important consideration for the installation and maintenance of your ABSORBS™ wastewater system. Any non-standard connections to your ABSORBS™ system are also prohibited unless approved by the relevant statutory agency. System owners should contact their local regulatory authority for further advice regarding prohibited discharges or connections pertaining to their jurisdiction.

Further common substances that are known to inhibit water treatment are provided by Water Services Association of Australia (2012) Australian Sewage Quality Management Guidelines, Table C5 and are listed in Table 7 Appendix D.

Note: Before tipping anything down a household drain to your wastewater system, check the active ingredients against the list in. Table 7 Appendix D. Failing to do so could cause your system to fail and lead to expensive maintenance and/or repairs.

Nature of Domestic Wastewater

Domestic wastewater is a combination of water from inside the home and reflects homeowner habits and lifestyle. Most of the water (approx. 70%) originates from toilet flushing and bathrooms, with the remainder coming from water used in the laundry and kitchen. Individual household water use profiles vary according to the number of occupants and their behavioural habits, as well as the number and nature of water-using appliances. Wastewater contaminants like organic matter, suspended solids, grease, nitrogen and phosphorus come primarily from toilets and kitchen sinks, while other minor contaminants like detergents, pharmaceuticals and salts originate from showers and washing machines.

The constituents and volume of wastewater entering your ABSORBS™ system is dictated by the living habits of the household's occupants. In most cases, your ABSORBS™ system will perform properly without any special requirements of homeowners. However, there are some measures that can be taken to enhance system performance and lessen the risk of premature degradation of performance and maintenance requirements.

Prohibited Discharges

One of the key strategies to ensure the operating performance and life of your system is to ensure only normal domestic wastewater enters the treatment and dispersed system. The constituents of normal domestic wastewater are described above.

A list of things that should NOT be discharged to your wastewater treatment and dispersal system is detailed below. Unless otherwise approved by the relevant authority, no person shall permit or cause the following discharges into an on-site wastewater system:

- Any storm water, including roof and rainwater tank overflow, and surface drainage waters;
- Any pool back flush waters from a swimming pool or water softener;
- Any discharge of back flush from a spa bath/pool in excess of 680 litres capacity;
- Any Sanitary napkin, clothing, plastic material or liner;
- Any trade waste;
- Any petrol or other flammable or explosive substance whether solid, liquid or gaseous;
- Any other material or substance which, in the opinion of the relevant authority, would impair the effective working of an on-site wastewater system or community wastewater management system.

Note: this information is an important consideration for the installation and maintenance of your ABSORBS™ wastewater system. Any non-standard connections to your ABSORBS™ system are also prohibited unless approved by the relevant statutory agency. System owners should contact their local regulatory authority for further advice regarding prohibited discharges or connections pertaining to their jurisdiction.

Further common substances that are known to inhibit water treatment are provided by Water Services Association of Australia (2012) Australian Sewage Quality Management Guidelines, Table C5 and are listed in Table 7 Appendix D.

Note: Before tipping anything down a household drain to your wastewater system, check the active ingredients against the list in. Table 7 Appendix D. Failing to do so could cause your system to fail and lead to expensive maintenance and/or repairs.

- Don't tip large amounts of cooking oil, grease or food scraps down the drain, as this can overload your system.

A useful instructional video on the maintenance of septic systems has been prepared by the City of Casey, Victoria and can be seen at https://youtu.be/qsef3f2kAcc

Installed System

Configuration shown in Table 2 may vary from manufacturer to manufacturer, however, the components will be the same. It is important you become familiar with your system become familiar with your system for appropriate service (Table 1) and troubleshooting (Table 2). Albeit the ABSORBS™ system has the lowest possible maintenance requirement you will need to understand your system.

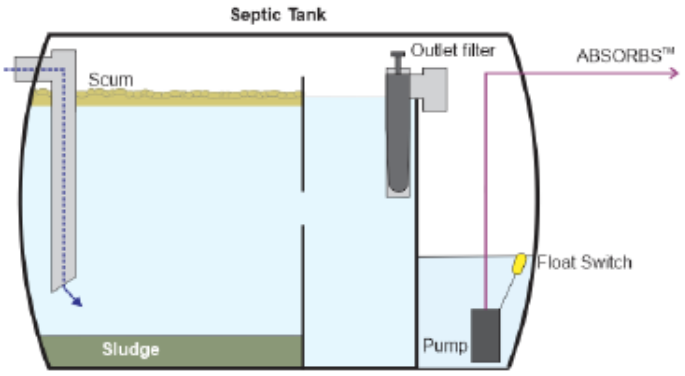


Figure 3 Schematic of your pre-treatment system

Outlet Filter

The primary tank is fitted with a bristle-type outlet filter to retain suspended solids and prevent them entering the ABSORBS™ bed (Figure 4). Outlet filters are a simple, cost-effective way to improve the performance of the septic tank. They have been demonstrated to reduce BOD by approx. 25%, total suspended solids by approx. 30% and oils and grease by up to 40%. The filters are encouraged under Australian Standard AS1547:2012 for any system using only an advanced septic tank for pre-treatment.

Hydroscape recommend to only use quality approved bristle-type outlet filters (Figure 4). Outlet filters are widely available or can be obtained by contacting Hydroscope.

Maintenance of outlet filters should be undertaken every 6 months. This is the responsibility of the householder and is simple to do. Video instructions on how to clean an outlet filter are available here https://youtu.be/8HgpqYu_Kj4

Note: It is recommended to wear appropriate Personal Protective Equipment that includes waterproof gloves and safety glasses. If you experience a splash, remove contaminated clothes and wash skin with soap and water as soon as practicable.

Bristle filter

Figure 4 Examples of suitable outlet filter

Treated Effluent Delivery System

Pumps

For most installations a single-phase transfer pump such as the Pedrollo D30n will be nominated by the LCA/designer to achieve the required manifold pressure to deliver the water uniformly across the distribution manifold. This outcome has the benefit of ensuring even distribution of treated wastewater for ABSORBS™ dispersal beds positioned at different elevations and across multiple beds and provides much greater flexibility as to where the beds can be installed to best meet the site conditions.

Any installations using a pump will also necessitate the installation of a high-level warning alarm such as the Rhombus alarm shown together with a typical Pedrollo pump set up in Figure 5.

Figure 5 Typical Pump and alarm panel installation showing circuit breaker and isolation switch

Alarms

Secondary wastewater treatment systems must be provided with an alarm to alert occupants of critical component failures or malfunction.

The alarm must have an audible and visual (indicator light) component with a 24-hour mute function for the audible alarm (Figure 6). The fault indicators should be located inside the premises, preferably in a readily visible location within the kitchen or laundry.

AWTS systems come with their own alarm system. On systems comprising a septic tank with pumped effluent dispersal such as the ABSORBS™ where an alarm is required, Hydroscape installs the SJE Rhombus alarm for reliability and simplicity of operation and maintenance.

In the event of a high-water level in the septic tank (e.g. due to pump failure), the Rhombus alarm panel will activate a flashing light and audible buzzer to alert the need for maintenance attention.

The audible signal can be muted for 24 hours by depressing the silence button; however, the strobe light will remain on until the problem is rectified and the water level drops back to the usual operating range. The Rhombus panel also has a 'test' button that allows for checking the function of the strobe and buzzer during service and maintenance. The manufacturer recommends weekly testing.

Figure 6 Alarm showing visual indicator and silence and test buttons

Wastewater Dispersal System Components

ABSORBS™ Bed

In order for the ABSORBS™ system to function effectively over the long term it is important to allow a continuous exchange of oxygen into the dispersal bed. Oxygen that is consumed within the biological oxidation process in treating wastewater is constantly replenished by atmospheric oxygen that diffuses naturally into the filter media through the top, base and side walls of the system. It is therefore important that the top surface and bed fringe areas remain clear of driveways, paving, weed mats or anything that will prevent air diffusing into the filter. Turf/lawn is the preferred final landscaping outcome over and around the filter bed and should be maintained in 'good' growing condition (actively growing turf shown in Figure 7); however, the ground above the ABSORBS™ bed area can also be covered with gravel, woodchips or pinebark. Only light intermittent watering should be provided for plants within the ABSORBS™ bed area to maximise oxygen transfer and prevent waterlogging.

The area adjacent to the ABSORBS™ bed is suited to a range of vegetative covers including turf, ground covers and shrubs (suitable plants are listed in Appendix C). Large woody trees should not be planted immediately adjacent to the ABSORBS™ bed area to avoid potential damage to the bed. Where large trees are required, a minimum setback distance of 3 m should be adhered to. The most effective selections are plants with high winter water demand (this assists in keeping soil from becoming saturated and therefore naturally aerobic during winter months when evaporation rates are low and precipitation high) and are tolerant of high nitrogen and phosphorus loads. Alternatively, plants with consistent growing outputs across the range of seasons are also suitable.

ABSORBS™ Distribution Manifold

The ABSORBS™ pressure distribution technique is an advanced proprietary dispersal platform designed to ensure uniform and balanced delivery of pressure dosed effluent over the entire dispersal design area.

It has been designed to increase the surface-to-air contact of discharged wastewater, improving the aerobic condition of the waste stream prior to uniform intermittent delivery over the entire footprint of the ABSORBS™ bed. This water distribution further enhances wastewater treatment, prevents dispersal bed failure, and mitigates odour risks.

Sequencing Valve

In some locations the site and soil conditions will require a split system or very large system that requires zoning into smaller sub networks to ensure consistent hydraulic flow across the entire effluent dispersal network. The LCA/designer may nominate a K-Rain sequencing valve (also known as 'sequential indexing' valve). The intermittent alternation provides a 'rest and recovery' period for the filter beds to adequately drain and remain unsaturated, therefore naturally rejuvenating between dosing cycles. The valve also provides the opportunity to install dispersal beds at varying elevations without compromising hydraulic efficiency which is not possible with gravity-dosed systems and offer improved reliability over throttling/balancing valves.

An air relief valve is positioned at the highest point of the ABSORBS™ system preventing cavitation within the valve housing and assists with reliable seating engagement of the valve disc to the valve seat (see Figure 7 for set up of air and K-Rain valves). Full operational details on the K-Rain 6000 valve are available from the K-Rain website (https://www.krain.com/6000-series-indexing-valves).

Figure 7 ABSORBS™ system showing valve boxes with sequencing, air relief and flushing valves

Flushing Valves

Wastewater from the pump enters the ABSORBS™ beds and terminates at the distal point of each dispersal bed with a 40mm full flow lilac coded flush valve positioned within a heavy-duty lilac valve enclosure (valve box, Figure 7). The lilac colour is to indicate wastewater and therefore not suitable for potable uses.

Flushing of the system should be undertaken every 12 months. The valves are to be opened for three pump cycles or until the water is free of coarse material (biofilm) then closed.

Note: It is recommended to wear appropriate Personal Protective Equipment that includes waterproof gloves and safety glasses. If you experience a splash wash with soap and water as soon as practicable.

Flush water will drain into the gravel bed under the valve boxes. These boxes are not to be driven on by any vehicle.

Do not cross connect any potable water service onto the valves.

System Warranty Description and Conditions

All mechanical and electrical components (pump, pump controller, alarms) are provided to give a minimum service life of 5 years and have a minimum warranty period of 12 months. The ABSORBS™ system and all non-mechanical/electrical components have a standard warranty period of 12 months during which time all costs associated with labour and materials for any warranty claim will be supplied free of charge by the manufacturer. The minimum service life of all non-mechanical/electrical components including the filter bed, plastic liner, tunnels, pressure dosing pipework and trivets is 15 years.

Hydroscape's liability under the product warranty specifically excludes the cost of removal and/or replacement installation of the ABSORBS™ system under the following conditions: damage to the system and components due to ordinary wear and tear, unapproved alteration, accident or natural disaster, misuse, abuse or neglect of the system in any way that goes against the recommended operating and maintenance procedures outlined in this Manual; failure of the system due to improper design, improper installation, excessive water usage above the specified design loading, improper grease disposal, or improper operation; not using the specified materials during system construction, specifically the use of incorrect sand media not meeting Arris' specified requirements (i.e. effective particle size (d10) of 0.25–1.1 mm and sand uniformity coefficient (Uc) of <4.0).

Service and Maintenance Recommendations

Table 1 Service and maintenance recommendations

COMPONENT	SERVICING REQUIREMENTS	SERVICE INTERVALS
Septic tank	Sludge/scum accumulation testing 6 to 12 monthly, and full de-sludge every 4 years or when required by licensed liquid waste contractor	Every 4 years or as required by inspection
Outlet Filter	Remove and clean 6 monthly or as required. Clean filters by brushing with bristle brush and rinsing into septic tank. Instructions on how to clean an outlet filter are available here https://youtu.be/8HgpqYu_Kj4 Note: operator to wear appropriate Personal Protective Equipment that include waterproof gloves and glasses. If you experience a splash wash with soap and water as soon as practicable	6 monthly or as required
Pump and high-level alarm	System check and service. If there is a problem, contact Hydroscape or the installer or email info@hydroscape.com.au	3 months
Flushing valves	Flush valves should be opened and purged to check flow through ABSORBS™ dispersal bed and to flush any debris collected inside the distribution lateral plumbing. This should be done during servicing as part of testing pump function. Note: operator to wear appropriate Personal Protective Equipment that include waterproof gloves and glasses. If you experience a splash wash with soap and water as soon as practicable	6 months
ABSORBS™ beds	Visual inspection for effluent ponding or leaks	Ongoing
K-rain 6000 series hydro-indexing valve (where fitted)	Check operation by opening each of the flushing valves at the end of each lateral. Refer to K-rain valve trouble shooting guide if valve does not function as described. Turn off all flushing valves and replace all valve box covers after function check. Refer https://www.krain.com/6000-series-indexing-valves	6 months
Vegetation	Maintain an effective cover of suitable winter active vegetation over the bed	Ongoing

System Faults and Troubleshooting

Table 2 System faults and trouble shooting

Fault	Action/Response	Recommended Agent
Drain blocked causing gurgling, slow drainage or internal flooding	Check inlet of septic tank to determine if tank inlet square is blocked with physical obstruction. Plunge tank inlet or call plumber to unblock if necessary. Internal sewer lines may also be blocked with roots or obstruction and require clearing by a licenced plumber. Check also the septic tank outlet filters. The filters may be choked with biomass and require cleaning. Clean filters by brushing with bristle brush and rinsing into septic tank. *Disposable gloves and eye protection should be worn during filter cleaning.*	Local plumber or site manager
Ponding/leakage around trench area	Possible leaking taps/cistern in household causing system overload. Check that stormwater infiltration from down pipes or swales is not diverted into the septic tank or dispersal bed areas. Possible broken pipe damaged from vehicles driving over system.	Hydroscape
High level alarm	Pump may be faulty, tripped circuit breaker causing loss of power supply to pump, blockage at inlet screen or pump float switch obstructed. Check circuit breaker for pump power, remove pump and clean and check float switch is free to move.	Hydroscape

Appendix A. Certificate of Compliance

Appendix B. As Constructed Drawings

Appendix C. Suitable Plant List for Planting Adjacent the ABSORBS™ Bed

The below tables provide a list of plants recommended (shrubs, perennials/ground cover, climbers) and not recommended (trees) for planting immediately adjacent to your ABSORBS™ bed, but not within the bounds of the ABSORBS™ bed itself. The ground immediately above the ABSORBS™ bed area should only be planted with lawn or covered with gravel, woodchips or pinebark, and only light intermittent watering should be provided for plants within the ABSORBS™ bed area.

Shrubs

Table 3 Shrubs suitable for ABSORBS™ bed mid row planting

Botanical Name	Common Name	Approximate h eight in metres
Abeliax grandiflora	Abelia	2-3
Acacia floribunda	Gossamer Wattle	2-4
Argyranthemum frutescena	Marguerite Daisy	1
Chamelaucium uncinatum	Geraldton Wax	2-4
Cyperus alternifolius	Umbrella Grass	0.5-1
Cyperus papyrus	Papyrus	1-2
Dryandra Formosa		1-3
Eremophila spp.		1-2
Grevillea spp. (apart from G. rosmarinifolia)		1-3
Hebe spp.	Veronica	0.5-1
Iris pseudacorus	Yellow Flag Iris	0.5-1
Melaleuca decussate	Cross Leaved Honey Myrtle	1-2
Phormium tenax	New Zealand Flax	2-2.5
Senna spp. (S. artemisioides)		1-3

Perennials/Ground Cover

Table 4 Ground covers suitable for ABSORBS™ bed mid row planting

Botanical Name	Common Name	Approximate height in metres
Aster novi-belgii	Perennial Aster	0.5-1
Canna		1-2
Chrysanthemum maximum	Shasta Daisy	1
Impatiens spp.		0.4
Salvia uliginosa	Bog Salvia	0.4
Viola hederacea, eminens or sieberana		0.4

Climbers

Table 5 Climbers suitable for ABSORBS™ bed mid row planting

Botanical Name	Common Name	Approximate height in metres
Bougainvillaea spp.		Variable
Clematis microphylla		
Hardenbergia violacea	Purple Coral Pea	Variable
Hibbertia scandens	Snake Vine	Variable
Jasminum grandiflorum		Variable
Jasminum officinale	Common Jasmine	Variable
Jasminum polyanthum		Variable
Kennedia rubicunda	Dusky Coral Pea	Variable
Passiflora spp.	Passion Flower	Variable
Vitis coignetiae	Glory Vine	Variable

Trees (NOT recommended for planting adjacent to ABSORBS™ bed)

Table 6 Trees NOT recommended for ABSORBS™ bed planting

Botanical Name	Common Name	Approximate height in metres
Agonis flexuosa	Willow Myrtle	5-6
Allocasuarina verticillata	Drooping She Oak	3-5
Banksia spp.		3-10
Callistemon salignus	White Bottlebrush	3-6
Callistemon viminalis	Red Bottlebrush	3-6
Casuarina cunninghamiana	River She Oak	6-10
Eucalyptus camaldulensis	River Red Gum	15-20
Eucalyptus cosmophylla	Cup Gum	5-6
Eucalyptus grandis	Flooded Gum	10-20
Eucalyptus robusta	Swamp Mahogany	6-9
Eucalyptus saligna	Sydney Blue Gum	15-20
Hymenosporum flavum	Native Frangipani	3-6
Melaleuca nesophila	Western Tea Myrtle	2-4
Melaleuca quinquenervia	Broad Paperbark	5-7
Syzygium paniculatum	Bush Cherry	8-10
Tristaniopsis laurina	Kanuka	3-5

If the above trees are to be planted adjacent to your ABSORBS™ bed, a minimum setback distance of 3 m should be imposed.

Appendix D. Common Substances That Affect Wastewater Treatment

Table 7 Typical threshold concentrations (mg/L) for common substances in sewage that are known to inhibit activated sludge, nitrification and anaerobic digestion processes.

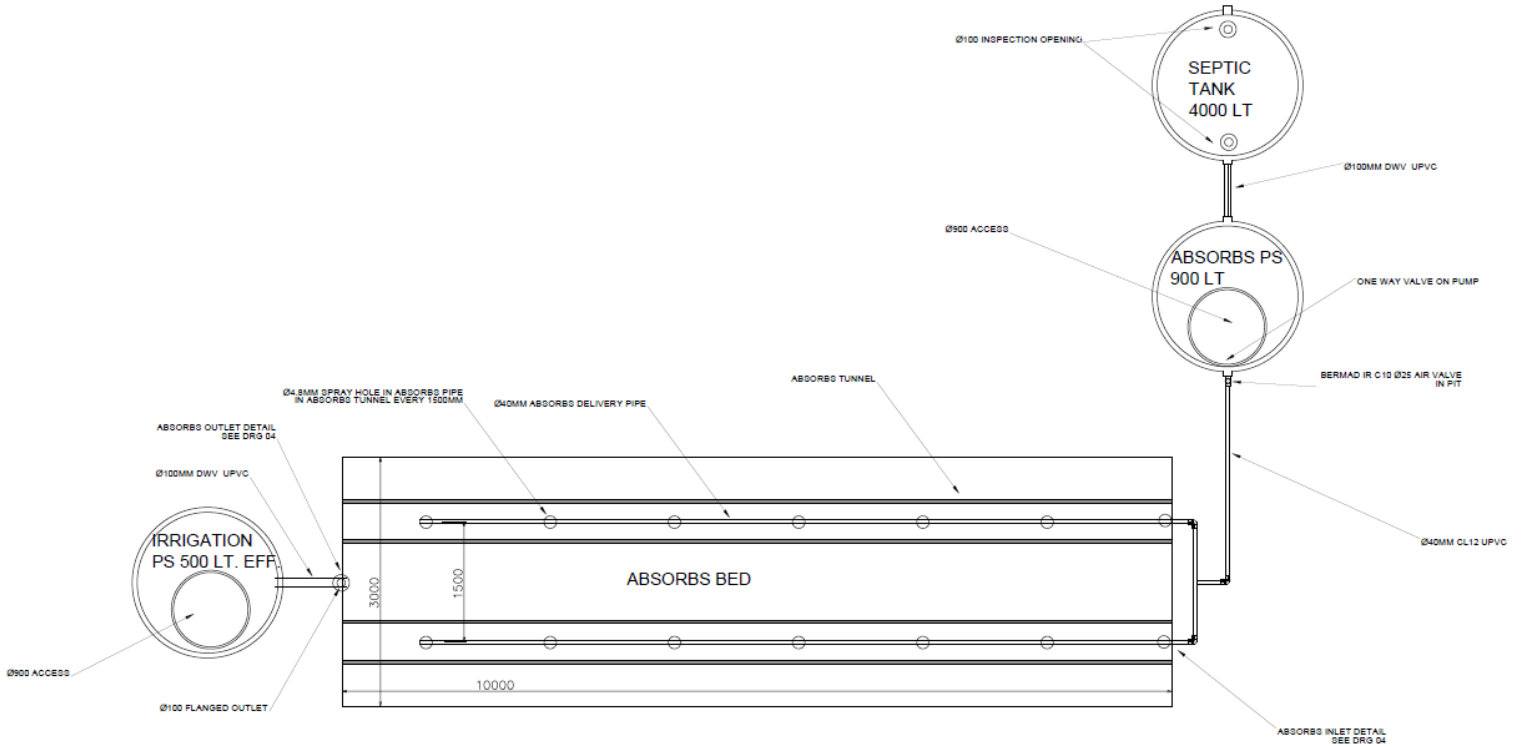
Pollutant	Activated Sludge	Anaerobic Digestion	Nitrification
Acenaphthene	NI# at 10	Not Available	Not Available
Acrolein	NI at 62	Not Available	Not Available
Acrylonitrile	NI at 152	5	Not Available
Ammonia	480	1500-3000	Not Available
Arsenic	0.04-0.4	0.1-1	Not Available
Benzene	125	Not Available	Not Available
Benzidine	5	S	Not Available
Boron	0.05-10	2	Not Available
Cadmium	0.5-10	0.02-1	5-9
Calcium	2500	Not Available	Not Available
Carbon tetrachloride	NI at 10	2.9	Not Available
Chlorobenzene	NI at 1	0.96	Not Available
1,2,4-tridilorobenzene	NI at 6	Not Available	Not Available
Hezachlorobenzene	5	Not Available	Not Available
1,2-dichloroethane	NI at 258	1	Not Available
1,1,1-trichloroethane	NI at 10	Not Available	Not Available
Hexachloroethane	NI at 10	Not Available	Not Available
1,1-dichloroethane	NI at 10	Not Available	Not Available
1,1,2-trichloroethane	NI at 5	Not Available	Not Available
1,1,2,2-tetrachloroethane	NI at 201	20	Not Available
Bis-(2-chloroethyl)ether	NI at 10	Not Available	Not Available
2-chloroethyl vinyl ether	NI at 10	Not Available	Not Available
2-chloranaphthalene	NI at 10	Not Available	Not Available
2,4,6-trichlorophenol	50	Not Available	Not Available
Pata-chloro-meta-cresol	NI at 10	Not Available	Not Available
Chloroform	NI at 10	1	10
2-chlorophenol	NI at 10	Not Available	Not Available
1,2-dichlorobenzene	5	0.23	Not Available
1,3-dichlorobenzene	5	Not Available	Not Available
1,4-dichlorobenzene	5	1.4	Not Available
1,1 -dichloroethylene	NI at 10	Not Available	Not Available
1,2-trans-dichloroethylene	NI at 10	Not Available	Not Available
2,4-dichlorophenol	NI at 75	Not Available	Not Available

Pollutant	Activated Sludge	Anaerobic Digestion	Nitrification
1,2-dichloropropane	NI at 182	Not Available	Not Available
1,3-dichloropropylene	NI at 10	Not Available	Not Available
2,4-dimethylphenol	NI at 10	Not Available	Not Available
2,4-dinitrotoluene	5	Not Available	Not Available
2,6-dinitrotoluene	5	Not Available	Not Available
1,2-diphenylhydrazine	5	Not Available	Not Available
Ethylbenzene	NI at 10	Not Available	Not Available
Fluoroanthene	NI at 5	Not Available	Not Available
bis-(2-chloroisopropyl)ether	NI at 10	Not Available	Not Available
Chloride	Not Available	20000	180
Chloromethane	NI at 180	3..3	Not Available
Methylene chloride	Not Available	100	Not Available
Chloroform	NI at 10	Not Available	Not Available
Dichlorobromomethane	NI at 10	Not Available	Not Available
Trichlorofluoromethane	NI at 10	0.7	Not Available
Chlorodibramomethane	NI at 10	Not Available	Not Available
Hexachlorobutadiene	NI at 10	Not Available	Not Available
Hexachlorocyclopentadiene	NI at 10	Not Available	Not Available
Chromium (Tot.)	0.1-20	1.5-50	0.25-1
Chromium (Hex.)	1	50	Not Available
Copper	0.1-1	0.5-100	0.05-0.5
Iodine	10	Not Available	Not Available
Iron	5-500	5	Not Available
Isophorone	NI at 15.4	Not Available	Not Available
Lead	0.1-10	50-250	0.5-1.7
Manganese	10	Not Available	Not Available
Magnesium	Not Available	1000	50
Mercury	0.1-5	1400	2-12.5
Napthalene	500	Not Available	Not Available
Nickel	1-5	2-200	0.25-5
Nitrobenzene	500	Not Available	Not Available
2-nitrophenol	NI at 10	Not Available	Not Available
4-nitrophenol	NI at 10	Not Available	Not Available
2,4-dinitrophenol	1	Not Available	Not Available
N-nitrosodiphenylamine	NI at 10	Not Available	Not Available

Pollutant	Activated Sludge	Anaerobic Digestion	Nitrification
1,2-dichloropropane	NI at 182	Not Available	Not Available
1,3-dichloropropylene	NI at 10	Not Available	Not Available
2,4-dimethylphenol	NI at 10	Not Available	Not Available
2,4-dinitrotoluene	5	Not Available	Not Available
2,6-dinitrotoluene	5	Not Available	Not Available
1,2-diphenylhydrazine	5	Not Available	Not Available
Ethylbenzene	NI at 10	Not Available	Not Available
Fluoroanthene	NI at 5	Not Available	Not Available
bis-(2-chloroisopropyl)ether	NI at 10	Not Available	Not Available
Chloride	Not Available	20000	180
Chloromethane	NI at 180	3..3	Not Available
Methylene chloride	Not Available	100	Not Available
Chloroform	NI at 10	Not Available	Not Available
Dichlorobromomethane	NI at 10	Not Available	Not Available
Trichlorofluoromethane	NI at 10	0.7	Not Available
Chlorodibramomethane	NI at 10	Not Available	Not Available
Hexachlorobutadiene	NI at 10	Not Available	Not Available
Hexachlorocyclopentadiene	NI at 10	Not Available	Not Available
Chromium (Tot.)	0.1-20	1.5-50	0.25-1
Chromium (Hex.)	1	50	Not Available
Copper	0.1-1	0.5-100	0.05-0.5
Iodine	10	Not Available	Not Available
Iron	5-500	5	Not Available
Isophorone	NI at 15.4	Not Available	Not Available
Lead	0.1-10	50-250	0.5-1.7
Manganese	10	Not Available	Not Available
Magnesium	Not Available	1000	50
Mercury	0.1-5	1400	2-12.5
Napthalene	500	Not Available	Not Available
Nickel	1-5	2-200	0.25-5
Nitrobenzene	500	Not Available	Not Available
2-nitrophenol	NI at 10	Not Available	Not Available
4-nitrophenol	NI at 10	Not Available	Not Available
2,4-dinitrophenol	1	Not Available	Not Available
N-nitrosodiphenylamine	NI at 10	Not Available	Not Available

Attachment 3 – ABSORBS 1200 Unlined sand filter - Schematic diagrams.

NOTES
1. ABSORBS PUMP TO BE A PEDROLLO DM30N 1.1KW 1 PHASE OR APPROVED EQUIVALENT.
2. ALL PIPEWORK TO BE SCJ LILAC UPVC.
3. IRRIGATION SYSTEM TO COMPLY TO AS1547 2012



					DESIGN BY	M SHORT	14/02/2022
					DRAWN BY	C FARRELL	15/2/2022
					DRAFTING CHECK	MICHAEL SHORT	15/2/2022
					DESIGN CHECK	C FARRELL	14/2/2022
2	20/4/22	CF	MS	DIMENSION	FINAL APPROVAL		
1	9/3/2022	CF	MS	VALVES SHOWN			
REV	DATE	BY	APP.	AMENDMENT DETAILS			

GROMENG
152 DECIL ST.
SOUTH MELBOURNE VIC 3205
PHONE 03 9645 0025

arris water treatment & technology
Head Office – Queensland
44 Wentworth Terrace
Rockhampton QLD 4700
Australia

Scale 1:50
HOR 0 2.5 m
VER 0 2.5 m
Scale 1:50

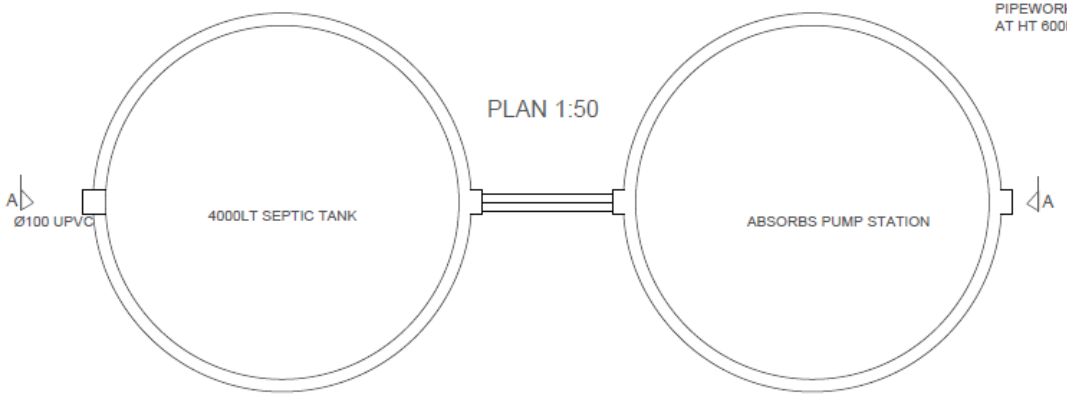
DRAWING TITLE
LAYOUT
ABSORBS
SEWAGE TREATMENT

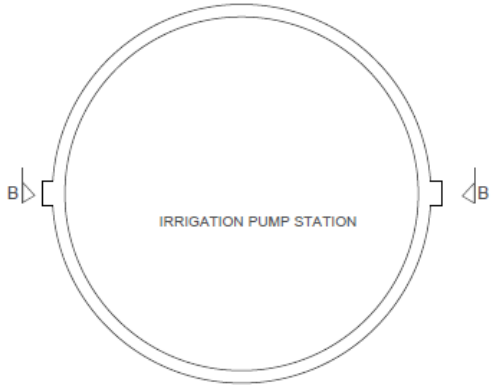
Project No. 15022
Drawing No. 01
A3
Drawing Status : FOR APPROVAL
REV 2

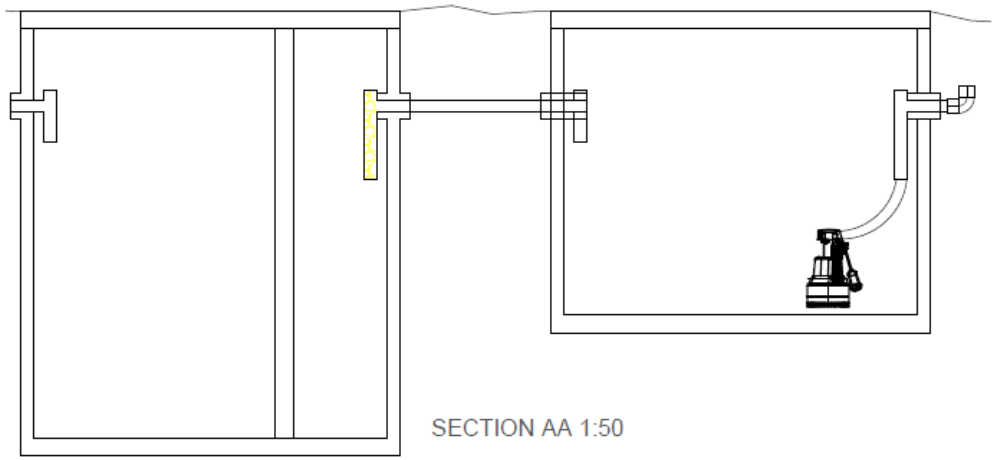
Treatment Plant Approval
Approved by: Lindsay Walker
Delegated Authority
Department of Energy & Public Works

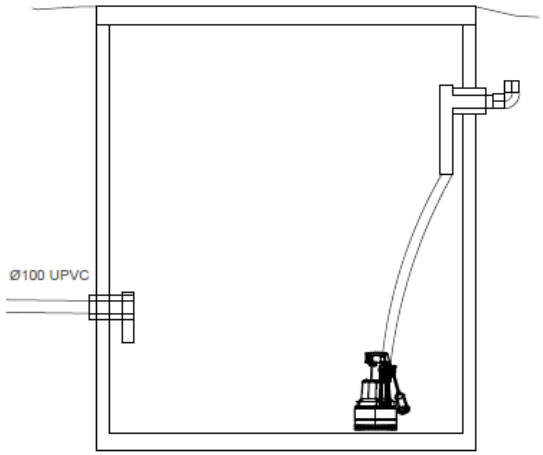
Queensland Government

NOTES 1. ALL SEPTIC AND PUMP TANKS TO BE AS1546.1 2008 COMPLIANT
2. ADSORB PUMP TO BE A PEDROLLO DM30N 1.1KW 1 PHASE OR APPROVED EQUIVALENT. PUMP PIPEWORK TO BE 50MM UPVC. PUMP LINE TO HAVE A SS ONE WAY VALVE. PUMP CUTIN AT HT 600MM. CUTOUT AT 400MM.









REV	DATE	BY	APP.	AMENDMENT DETAILS

DESIGN BY	T SHORT	14/02/2022
DRAWN BY	C FARRELL	15/02/2022
DRAFTING CHECK		
DESIGN CHECK		
FINAL APPROVAL		

GROMENG
152 CECIL ST.
SOUTH MELBOURNE VIC 3205
PHONE 03 9645 0025

arris water treatment & technology
Head Office – Queensland
44 Wentworth Terrace
Rockhampton QLD 4700
Australia

Scale 1:50
HOR 0 25 m
VER 0 25 m
Scale 1:50

DRAWING TITLE
DETAIL
SEPTIC TANK & PUMP STATIONS
SEWAGE TREATMENT

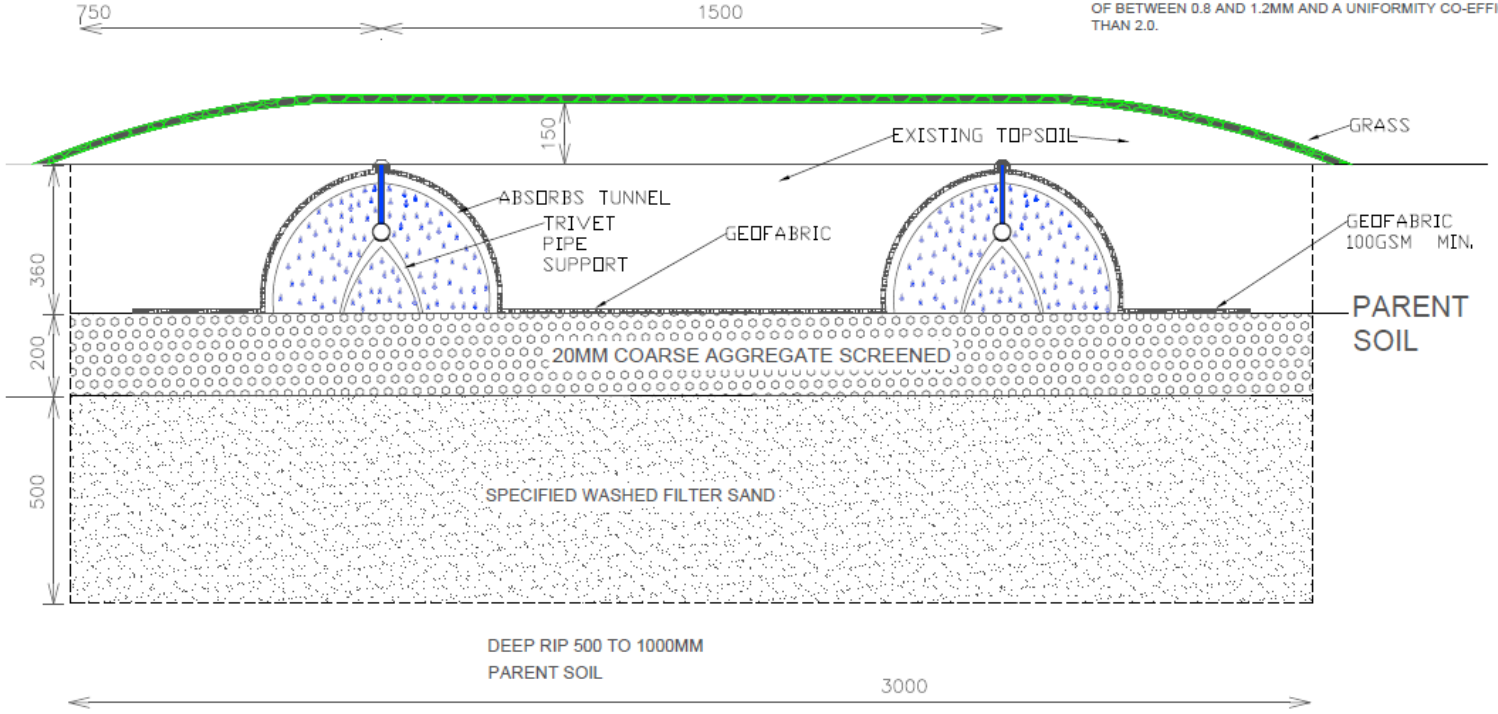
Drawing Status : FOR APPROVAL

Project No. 15022
Drawing No. 02
A3
REV 0

Treatment Plant Approval
Approved by: Lindsay Walker
Delegated Authority
Department of Energy & Public Works

Queensland Government

NOTES 1. TRENCH TO BE LEVELED WITHIN 10MM OVER LENGTH BEFORE SAND PLACED.
2. ABSORBS SPRAY TO BE TESTED TO 1.2M HEIGHT BEFORE BACKFILL.
3. SPRAY DELIVERY PIPE TO BE Ø40 LILAC CLASS 12 UPVC DRILLED WITH A 4.8MM HOLE EVERY 1500MM TOP.
4. LATERAL SPACING BETWEEN ABSORBS TUNNEL CENTERS MAY VARY BETWEEN 1000 AND 1500MM WITH AUTHORIZATION OF DESIGN ENGINEER.
5. SPECIFIED WASHED SAND MUST HAVE AN EFFECTIVE PARTICLE SIZE (D10) OF BETWEEN 0.8 AND 1.2MM AND A UNIFORMITY CO-EFFICIENT (UC) OF LESS THAN 2.0.



REV	DATE	BY	APP.	AMENDMENT DETAILS
3	17/5/22	CF	MS	NO BASE
2	20/4/22	CF	MS	LINER CHANGE
1	9/3/2022	CF	MS	GEOFABRIC DEF.

DESIGN BY	T SHORT	14/02/2022
DRAWN BY	C FARRELL	15/2/2022
DRAFTING CHECK	MS	15/2/22
DESIGN CHECK	CF	15/2/2022
FINAL APPROVAL		

GROMENG
arris water treatment & technology
152 CECIL ST.
SOUTH MELBOURNE VIC 3205
PHONE 03 9645 0025
Head Office – Queensland
44 Wentworth Terrace
Rockhampton QLD 4700
Australia

HOR 0 Scale 1:10 0.5 m
VER 0 Scale 1:10 0.5 m

DRAWING TITLE
TRENCH DETAIL
ABSORBS
SEWAGE TREATMENT

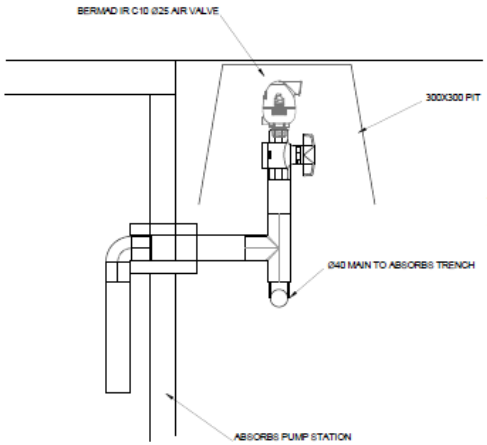
Drawing Status : FOR APPROVAL

Project No. 152022
Drawing No. 03
A3
REV 3

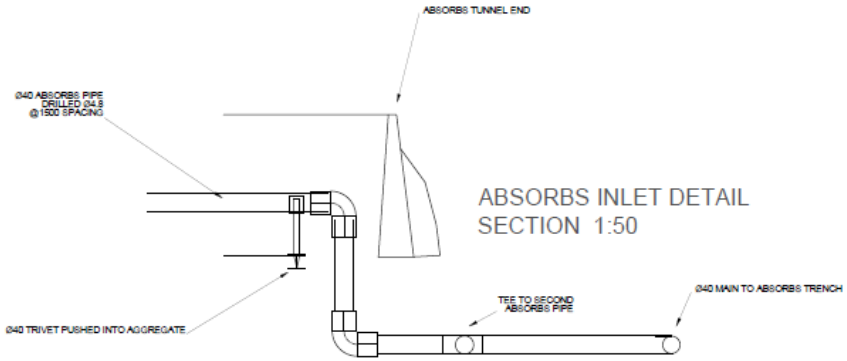
Treatment Plant Approval
Approved by: Lindsay Walker
Delegated Authority
Department of Energy & Public Works

Queensland Government

NOTES 1. TRENCH TO BE LEVELED WITHIN 10MM OVER LENGTH BEFORE SAND PLACED.
2. TRENCH SPRAY TO BE TESTED TO 1.2M HEIGHT BEFORE BACKFILL
3. SPRAY DELIVERY PIPE TO BE Ø40 LILAC CLASS 12 UPVC DRILLED WITH 4.8MM HOLE EVERY 1500MM TOP.



AIR VALVE PIT
SECTION 1:50



ABSORBS INLET DETAIL
SECTION 1:50

REV	DATE	BY	APP.	AMENDMENT DETAILS
2	6/6/22	CF	MS	NO IRR
1	20/4/22	CF	MS	LINER SPEC

FINAL APPROVAL

DESIGN BY	T. SHORT	14/02/2022
DRAWN BY	C. FARRELL	15/02/2022
DRAFTING CHECK		
DESIGN CHECK		

GROMENG
arris water treatment & technology
Head Office – Queensland
44 Wentworth Terrace
Rockhampton QLD 4700
Australia
152 CECIL ST
SOUTH MELBOURNE VIC 3205
PHONE 03 9645 0025

Scale 1:10
HOR 0 0.5 m
VER 0 0.5 m
Scale 1:10

DRAWING TITLE
CONNECTION DETAIL
ABSORBS
SEWAGE TREATMENT

Project No. 15022
Drawing No. 04
A3
Drawing Status : FOR APPROVAL
REV 2

Treatment Plant Approval
Approved by: Lindsay Walker
Delegated Authority
Department of Energy & Public Works

Queensland Government