Government of Western Australia
Department of Water and Environmental Regulation

Licence

Licence number	L8807/2013/2
Licence holder	Rottnest Island Authority
Registered business address	Level 1, E-Shed Victoria Quay FREMANTLE WA 6160
File number	ILS2013/000004-1
Duration	20/01/2023 to 19/01/2043
Date of amendment	28/04/2023
Premises details	Rottnest Island Wastewater Treatment Plant Kingsway, The Basin ROTTNEST ISLAND WA 6161 Legal description - Part Lot 10976 on Deposited Plan 216860 Certificate of Title Volume LR3096 Folio 976 As defined by the coordinates in Schedule 2

Prescribed premises category description (Schedule 1, *Environmental Protection Regulations 1987*)	**Assessed design capacity**
Category 54: Sewage facility	500 m^3/day

This licence is granted to the licence holder, subject to the attached conditions, on 28 April 2023, by:

Hayden Nebel
Digitally signed by Hayden Nebel
Date: 2023.04.28 09:33:12 +08'00'

SENIOR INDUSTRY REGULATION OFFICER
REGULATORY SERVICES
an officer delegated under section 20 of the *Environmental Protection Act 1986* (WA)

Licence history

Reference number	Date	Summary of changes
L8807/2013/1	20/01/2014	New licence issued due to cessation of the previous licence following non-payment of annual fee.
L8807/2013/1	13/10/2017	Amendment Notice 1 to incorporate infrastructure constructed under works approval W5857/2015/1.
L8807/2013/1	08/01/2018	Amendment Notice 2 to change the extent of the premises boundary.
L8807/2013/1	06/05/2020	Changes to the extent of the premises boundary and addition of septage waste for acceptance and treatment at the premises.
L8807/2013/1	15/12/2021	Amendment for the installation of a standby flow balance system and other administrative updates to the licence.
L8807/2013/2	18/01/2023	Licence renewal version 2.
L8807/2013/2	28/04/2023	Department initiated amendment to correct errors.

Interpretation

In this licence:

(a) the words ‘including’, ‘includes’ and ‘include’ in conditions mean “including but not limited to”, and similar, as appropriate;

(b) where any word or phrase is given a defined meaning, any other part of speech or other grammatical form of that word or phrase has a corresponding meaning;

(c) where tables are used in a condition, each row in a table constitutes a separate condition;

(d) any reference to an Australian or other standard, guideline, or code of practice in this licence:

  (i) if dated, refers to that particular version; and

  (ii) if not dated, refers to the latest version and therefore may be subject to change over time;

(e) unless specified otherwise, any reference to a section of an Act refers to that section of the EP Act; and

(f) unless specified otherwise, all definitions are in accordance with the EP Act.

NOTE: This licence requires specific conditions to be met but does not provide any implied authorisation for other emissions, discharges, or activities not specified in this licence.

Licence conditions

The licence holder must ensure that the following conditions are complied with:

Waste acceptance

1. The licence holder must only accept onto the premises waste of a waste type, which does not exceed the corresponding rate at which waste is received, and which meets the corresponding acceptance specification set out in Table 1.

Table 1: Types of waste authorised to be accepted onto the premises

Waste type	Controlled waste code	Rate at which waste is received	Acceptance specification
Sewage	K130	Combined total of no more than 500 m^3/day.	Accepted via sewer inflows at the Sewage Input as shown in Schedule 1: Figure 2
Septage	K210	Septage waste acceptance must be less than 100 tonnes per annual period.	Accepted via carrier load with a fixed hose connection to the Septage Input Sump Pump as shown in Schedule 1: Figure 2

2. The licence holder must ensure where waste does not meet the acceptance criteria set out in condition 1, it is removed from the premises by the delivery vehicle or, where that is not possible, stored in a quarantined storage area or container and removed to an appropriately authorised facility as soon as practicable.

Waste processing

3. The licence holder must ensure that the waste types specified in Table 2 are only subjected to the corresponding process(es), subject to the corresponding process limits and/or specifications.

Table 2: Waste processing

Waste type	Process(es)	Process limits and specifications
Sewage	Screening and grit removal Biological, chemical and physical treatment Disinfection	(a) Screenings must be discharged to screening bins located above a concrete hardstand and enclosed once full; (b) Screenings must be disposed to an appropriately licensed waste facility; (c) Screened wastewater must be directed to a flow balance tank prior to entering the treatment train; and (d) Treatment of sewage and septage must not exceed 500 m^3/day.
Septage		

Waste type	Process(es)	Process limits and specifications
Sludge and waste activated sludge	Chemical treatment, dewatering and temporary storage	(a) Sludge must be discharged to sludge storage bins located above a concrete hardstand and enclosed once full; and (b) Sludge must be disposed from the premises to an appropriately licensed waste facility using a Controlled Waste Carrier.

Infrastructure and equipment

4. The licence holder must ensure that the infrastructure and equipment listed in Table 3 and located at the corresponding infrastructure location is maintained and operated in accordance with the corresponding operational requirement set out in Table 3.

Table 3: Infrastructure and equipment requirements

Infrastructure and equipment		Operational requirement	Infrastructure location
1.	Primary Screens	(a) Must be connected to the Odour Scrubbing Unit; and (b) In the event of an overflow, wastewater must be directed to the Emergency Storage Basin.	Labelled 'Primary Inlet Screen' in Figure 2 and Figure 3
2.	Primary Flow Balance Tank	(a) Must have a capacity of at least 0.5 ML; (b) Must be connected to the Odour Scrubbing Unit; (c) Level sensors and a high-level alarm connected to the Telemetry and Control System must be maintained; (d) A jet mixer must be used to keep solids in suspension and to prevent short-circuiting within the flow balance tank; and (e) In the event of an overflow, wastewater must be directed to the Standby Flow Balance System before use of the Emergency Storage Basin.	As depicted in Figure 2
3.	Standby Flow Balance System	(a) Must have a connected capacity of at least 150 kL; (b) Must be connected to the Odour Scrubbing Unit; (c) Level sensors and a high-level alarm connected to the Telemetry and Control System must be maintained on all tanks; (d) In the event of an overflow or high-level alarm being triggered in the Standby Flow Balance tanks, wastewater must be directed to the Emergency Storage Basin; and (e) Plant Sump outputs must be diverted to the Secondary Screens during operation of the Standby Flow Balance System.	As depicted in Figure 2 and Figure 3

Infrastructure and equipment		Operational requirement	Infrastructure location
4.	Emergency Storage Basin	(a) Must be lined with a 1.5 mm HDPE liner to achieve a permeability less than 1 x 10^{-9} m/s; and (b) Wastewater directed to the Emergency Storage Basin must be pumped back to the Primary Flow Balance Tank for treatment when there is available capacity to do so.	Labelled 'Emergency Overflow Basin' in Figure 2
5.	Infiltration Basin	(a) Only to be used when treated wastewater reuse or storage options are not available.	As depicted in Figure 2
6.	Secondary Screens	(a) Must be connected to the Odour Scrubbing Unit.	As depicted in Figure 2 and Figure 3
7.	Biological Reactor Trains	(a) Each train must be comprised of a 105 kL anoxic tank, 210 kL aerobic tank and a 35 kL post anoxic tank; (b) Tanks must be provided with mixers; (c) Mixers must be used to suspend solids and provide good contact between the incoming wastewater and the mixed liquor; and (d) Overflow from the biological reactor must be directed via gravity to the plant sump.	Labelled 'MBR' in Figure 2
8.	Membrane Filtration Trains	(a) Membrane permeability must be maintained by: (i) Aeration at the base of the membrane to dislodge solids from the membrane surface; (ii) Periodic relaxing and back-pulsing of the membranes; (iii) Periodic chemical cleaning of the membranes; and (b) Membrane performance must be continuously monitored via the site SCADA system.	
9.	Chlorine Disinfection System	(a) Residual free chlorine levels must be monitored to ensure sufficient disinfection.	N/A
10.	Recycled Water Tank	(a) Must have a capacity of at least 1 ML; and (b) Residual free chlorine levels must be monitored to ensure sufficient disinfection.	As depicted in Figure 2
11.	Tank 6	(a) Must have a capacity of at least 9.1 ML; (b) Fitted with an alarm to shut off treated wastewater intake when the tank is at 98% capacity; and (c) In the event of an overflow treated wastewater must be diverted to Tank 3.	N/A
12.	Tank 3	(a) Must be operated as backup treated wastewater storage if the capacity of Tank 6 is exceeded; and (b) Must have a capacity of at least 2.5 ML	N/A

Infrastructure and equipment		Operational requirement	Infrastructure location
13.	Chemical Storage Tanks	(a) Must be sufficient in size to hold chemical volumes for 30 days of continuous operation of the wastewater treatment plant and be located in separate bunded areas in accordance with *AS3780-2000: Storage and handling of corrosive substances*; and (b) Duty/standby pumps must be provided for process dosing systems.	N/A
14.	Odour Scrubbing Unit	(a) Must be comprised of a biological scrubber and activated carbon filter; (b) Treated air must be discharged from a 3m high vent; and (c) Must be operational when screening activities are taking place and/or the Flow Balance Tanks contains wastewater.	As depicted in Figure 4
15.	Sludge Dewatering Facility	(a) Filter presses to be located in a 7.5m x 4.5m area bunded with one row of 90mm x 190mm x 390mm concrete blocks that drains to the Plant Sump; (b) Polymer storage tank to be located within a concrete bunded area 4.6m x 3.6m and bunded with one row of 90mm x 190mm x 390mm concrete blocks; (c) Sludge must be discharged to sludge storage bins located above a concrete hardstand with a 600mm wide x 50mm high roll over bund and drain to the Plant Sump; and (d) Full sludge storage bins must be sealed and secured prior to storage.	Labelled 'Dewatering Building' in Figure 2
16.	Plant Sump	(a) Must be covered at all times, excluding during an active carrier connection.	Labelled 'Sump Pump' in Figure 2
17.	Vehicle Washdown Area	(a) Controlled Waste Carrier vehicle washdown must take place above a bunded hardstand; and (b) Vehicle washwater must be directed to the Plant Sump and pumped to the Flow balance tank.	As depicted in Figure 2
18.	WWTP Underground Pipework	(a) Must be housed in concrete culverts and laid to fall to the Plant Sump.	N/A
19.	Telemetry and Control System	(a) The system is to have remote monitoring capabilities allowing operators to be notified of alarms off-site and provide control capability from off-site.	N/A
20.	Irrigation System	(a) Sprinklers are to be operated to ensure wastewater is evenly distributed to the designated irrigation areas; (b) Each sprinkler to have an electric valve-in-head and be able to be operated on an individual basis or simultaneously activated; and (c) Scour valves must be provided to allow draining of the system for maintenance.	Labelled 'Irrigation areas' in Figure 5

Infrastructure and equipment		Operational requirement	Infrastructure location
21.	WWTP groundwater monitoring bores (MB001, MB002, MB003, MB006, MB007, MB008, MB009 and MB010)	(a) Must be maintained in good working order to allow representative water samples to be taken.	As depicted in Figure 6
22.	Golf course and oval irrigation monitoring sites (OV1, GC1, GC2, GC3, GC4, REF28-90, GC5s, GC5i, GC5d, GC6s, GC6i, GC6d, GC7s, GC7i, GC7d, GC8s, GC8i and GC8d)	(a) Must be maintained in good working order to allow representative water samples to be taken.	As depicted in Figure 7 and Figure 8

Emissions and discharges

Final effluent quality

5. The licence holder must ensure that treated wastewater is only discharged to the discharge locations specified in Table 4 and that the parameters listed in Table 4 do not exceed the corresponding discharge limit.

Table 4: Treated wastewater quality criteria

Discharge location	Parameter	Limit
Infiltration Basin as depicted in Figure 2 Golf course and sports oval – labelled 'Irrigation/ infiltration basin areas in Figure 5	Total Suspended Solids	10 mg/L
	Biochemical Oxygen Demand	10 mg/L
	Total Nitrogen	10 mg/L
	Total Phosphorus	1 mg/L

Treated wastewater irrigation

6. The licence holder must ensure that treated wastewater that is irrigated at the golf course and sports oval does not exceed the nutrient loading limits specified in Table 5.

Table 5: Irrigation loading limits

Discharge point	Parameter	Loading limit
Golf course and sports oval – labelled 'Irrigation/ infiltration basin areas in Figure 5	Total nitrogen	99 kg/ha/yr
	Total phosphorus	11.6 kg/ha/yr

7. The licence holder must establish baseline field capacity measurements for the soil sampling locations detailed in Table 14 before irrigation of treated wastewater commences.

8. The licence holder must ensure that irrigation of treated wastewater does not take place when the soil moisture content (v%) is equal to or greater than the baseline field capacity as determined by condition 7.

Monitoring

Waste inputs

9. The licence holder must record the total amount of waste accepted onto the premises, for each waste type listed in Table 6, in the corresponding unit, and for each corresponding time period, as set out in Table 6.

Table 6: Monitoring of inputs

Waste type	Unit	Averaging period	Frequency	Method
Sewage waste	m^3/day	Monthly	Continuous measurement	Flow metering device
Septage waste	m^3 or kL		Each load arriving at the premises	Controlled Waste Tracking System

Effluent discharge quality

10. The licence holder must monitor emissions in accordance with the requirements specified in Table 7 and record the results of all such monitoring.

Table 7: Monitoring of treated wastewater

Monitoring location	Parameter	Unit	Averaging period	Frequency	Method
Recycled Water Tank as depicted in Figure 2	pH[1]	-	Spot Sample	Continuous	AS/NZS 5667.1 and AS/NZS 5667.10
	TDS	mg/L		Monthly	
	TSS				
	BOD_5				
	NH_4-N				
	NO_3-N				
	NO_2-N				
	TN				

Monitoring location	Parameter	Unit	Averaging period	Frequency	Method
Recycled Water Tank as depicted in Figure 2	TP	mg/L	Spot Sample	Monthly	AS/NZS 5667.1 and AS/NZS 5667.10
	E. coli	cfu/100mL			
	Cumulative volume irrigated to the oval	m^3/day	Monthly	Continuous	Flow metering device
	Cumulative volume irrigated to the golf course				
Recycled Water Tank overflow line	Cumulative volume disposed of to the infiltration basin				Water balance calculation

Note 1: In-field non-NATA accredited analysis permitted.

11. The licence holder must ensure that all non-continuous sampling and analysis undertaken pursuant to condition 10 is undertaken by a holder of a current accreditation from NATA for the methods of sampling and analysis relevant to the corresponding relevant parameter.

Ambient monitoring program

12. The licence holder must conduct an ambient monitoring program in accordance with the requirements specified in Schedule 3: Monitoring program and record the results of all monitoring activity conducted under that program.

13. The licence holder must adhere to the field quality assurance and quality control procedures specified in Schedule 3: Monitoring program for the monitoring required by condition 12.

14. All sample analysis must be undertaken by laboratories with current accreditation from NATA for the relevant parameters, unless otherwise specified in Schedule 3: Monitoring program.

Records and reporting

15. The licence holder must maintain accurate and auditable books including the following records, information, reports, and data required by this licence:

(a) the calculation of fees payable in respect of this licence;

(b) the Controlled Waste Carrier, registration number of the transport vehicle and details of the waste facility used for the disposal of sludge in the course of complying with condition 3 of this licence;

(c) any maintenance of infrastructure that is performed in the course of complying with condition 4 of this licence;

(d) monitoring programs undertaken in accordance with conditions 9, 10 and 12 of this licence; and

(e) complaints received under condition 17 of this licence.

16. The books specified under condition 15 must:

(a) be legible;

(b) if amended, be amended in such a way that the original version(s) and any subsequent amendments remain legible and are capable of retrieval;

(c) be retained by the licence holder for the duration of the licence; and

(d) be available to be produced to an inspector or the CEO as required.

17. The licence holder must record the following information in relation to complaints received by the licence holder (whether received directly from a complainant or forwarded to them by the Department or another party) about any alleged emissions from the premises:

(a) the name and contact details of the complainant, (if provided);

(b) the time and date of the complaint;

(c) the complete details of the complaint and any other concerns or other issues raised; and

(d) the complete details and dates of any action taken by the licence holder to investigate or respond to any complaint.

18. The licence holder must:

(a) undertake an audit of their compliance with the conditions of this licence during the preceding annual period; and

(b) prepare and submit to the CEO an Annual Audit Compliance Report in the approved form by 30 September each year.

19. The licence holder must:

(a) prepare an environmental report that provides information in accordance with Table 8 for the preceding annual period; and

(b) submit the environmental report to the CEO by 30 September each year.

Table 8: Environmental Report requirements

Condition	Reporting Requirements
5, 6, 10, 11	Wastewater discharge volumes, quality criteria and monitoring: (a) Summary of wastewater discharge volumes to respective discharge areas; golf course, oval and infiltration basin. (b) volume (in m^3 or kL) of treated wastewater applied daily to each irrigation area, and monthly cumulative volumes presented in table format; (c) treated wastewater monitoring data in tabulated and graphical form including the sampling date; (d) tabulated monthly and annual loadings of nitrogen and phosphorus applied to each irrigation area, including an explanation of the basis for determining loading rates; (e) summary of moisture content (v%) with respect to operational irrigation requirements specified in conditions 7 and 8 (field capacity). (f) an assessment and interpretation of the data, including comparison to historical trends and loading limits; and (g) copies of laboratory sample analysis reports.

Condition	Reporting Requirements
9	Wastewater Intake Volumes: (a) Summary of daily intake volumes (m^3/day) of Waste entering the Premises. (b) Data should be presented in tabulated form within the report.
12, 13, 14 and Schedule 3: Monitoring program	Monitoring program: (a) a clear statement of the scope of work carried out; (b) a description of the field methodologies employed; (c) a summary of the field and laboratory quality assurance / quality control (QA/QC) program; (d) copies of the field monitoring records and field QA/QC documentation; (e) an assessment of reliability of field procedures and laboratory results; (f) a tabulated summary of results, as well as all raw data provided in an accompanying Microsoft Excel spreadsheet digital document/file (or a compatible equivalent digital document/file), with all results being clearly referenced to laboratory certificates of analysis; (g) a diagram with aerial image overlay showing all monitoring locations and depicting groundwater level contours, flow direction and hydraulic gradient (relevant site features including discharge points and other potential sources of contamination must also be shown); (h) an interpretive summary and assessment of results against previous monitoring results; (i) an interpretive summary and assessment of the results against relevant assessment levels for water, as published in the AMCS Guideline; and (j) trend graphs to provide a graphical representation of historical results and to support the interpretive summary.
15 and 17	Complaints – summary of records and actions

20. The Licence Holder must comply with a CEO Request, within 7 days from the date of the CEO Request or such other period specified in the CEO Request.

Definitions

In this licence, the terms in Table 9 have the meanings defined.

Table 9: Definitions

Term	Definition
ACN	Australian Company Number
AMCS Guideline	means the document titled *Assessment and management of contaminated sites* published by the Chief Executive Officer of the Department of Environment Regulation, as amended from time to time.
Annual Audit Compliance Report (AACR)	means a report submitted in a format approved by the CEO (relevant guidelines and templates may be available on the Department's website).
annual period	a 12 month period commencing from 1 July until 30 June of the immediately following year.
AS 4482.1	means the Australian Standard AS 4482.1 *Guide to the investigation and sampling of sites with potentially contaminated soil – Non-volatile and semi-volatile compounds*.
AS/NZS 5667.1	means the Australian Standard AS/NZS 5667.1 *Water quality – Sampling – Guidance of the Design of sampling programs, sampling techniques and the preservation and handling of samples*.
AS/NZS 5667.4	means the Australian Standard AS/NZS 5667.4 *Water quality – Sampling – Guidance on sampling from lakes, natural and man-made.*
AS/NZS 5667.10	means the Australian Standard AS/NZS 5667.10 Water Quality – Sampling – Guidance on sampling of waste waters.
AS/NZS 5667.11	means the Australian Standard AS/NZS 5667.11 *Water quality – Sampling – Guidance on sampling of groundwaters.*
ASC NEPM	National Environment Protection (Assessment of Site Contamination) Measure
Assessment levels	means the Tier 1 assessment levels as defined in the AMCS Guideline.
BOD_5	5 day biochemical oxygen demand
books	has the same meaning given to that term under the EP Act.
CEO	means Chief Executive Officer of the Department. "submit to / notify the CEO" (or similar), means either: Director General Department administering the *Environmental Protection Act 1986* Locked Bag 10 Joondalup DC WA 6919 or: info@dwer.wa.gov.au
Composite soil sample	has the same meaning given to that term in AS 4482.1.

Term	Definition
Controlled Waste Carrier	has the same meaning given to that term under the Controlled Waste Regulations
Controlled Waste Regulations	*Environmental Protection (Controlled Waste) Regulations 2004* (WA)
Department	means the department established under section 35 of the *Public Sector Management Act 1994* (WA) and designated as responsible for the administration of the EP Act, which includes Part V Division 3.
discharge	has the same meaning given to that term under the EP Act.
EC	Electrical conductivity
E. coli	*Escherichia coli*
emission	has the same meaning given to that term under the EP Act.
EP Act	*Environmental Protection Act 1986* (WA)
EP Regulations	*Environmental Protection Regulations 1987* (WA)
field capacity	means the amount of moisture or water content held in soil without loss to infiltration and the capacity of vegetation and soil to assimilate nutrients and absorb metals.
FRP	Filterable reactive phosphorus
licence	refers to this document, which evidences the grant of a licence by the CEO under section 57 of the EP Act, subject to the specified conditions contained within.
licence holder	refers to the occupier of the premises, being the person specified on the front of the licence as the person to whom this licence has been granted.
mAGL	metres above ground level
mAHD	metres Australian height datum
mBGL	metres below ground level
NATA	National Association of Testing Authorities
NH_4-N	Ammonium as nitrogen
NO_2-N	Nitrite as nitrogen
NO_3-N	Nitrate as nitrogen
PBI	Phosphorus buffering index
premises	refers to the premises to which this licence applies, as specified at the front of this licence, and as shown on the premises map (Figure 1) in Schedule 1 and coordinates table (Table 10) in Schedule 2 to this licence.
prescribed premises	has the same meaning given to that term under the EP Act.

Term	Definition
SCADA	Supervisory control and data acquisition
TDS	Total dissolved solids
TKN	Total kjeldahl nitrogen
TN	Total nitrogen
TP	Total phosphorus
TSS	Total suspended solids
Waste	has the same meaning given to that term under the EP Act.
WWTP	wastewater treatment plant

END OF CONDITIONS

Schedule 1: Maps

Premises map

Figure 1: Map of the boundary of the prescribed premises

WWTP site plans and schematics

Figure 2: WWTP site plan

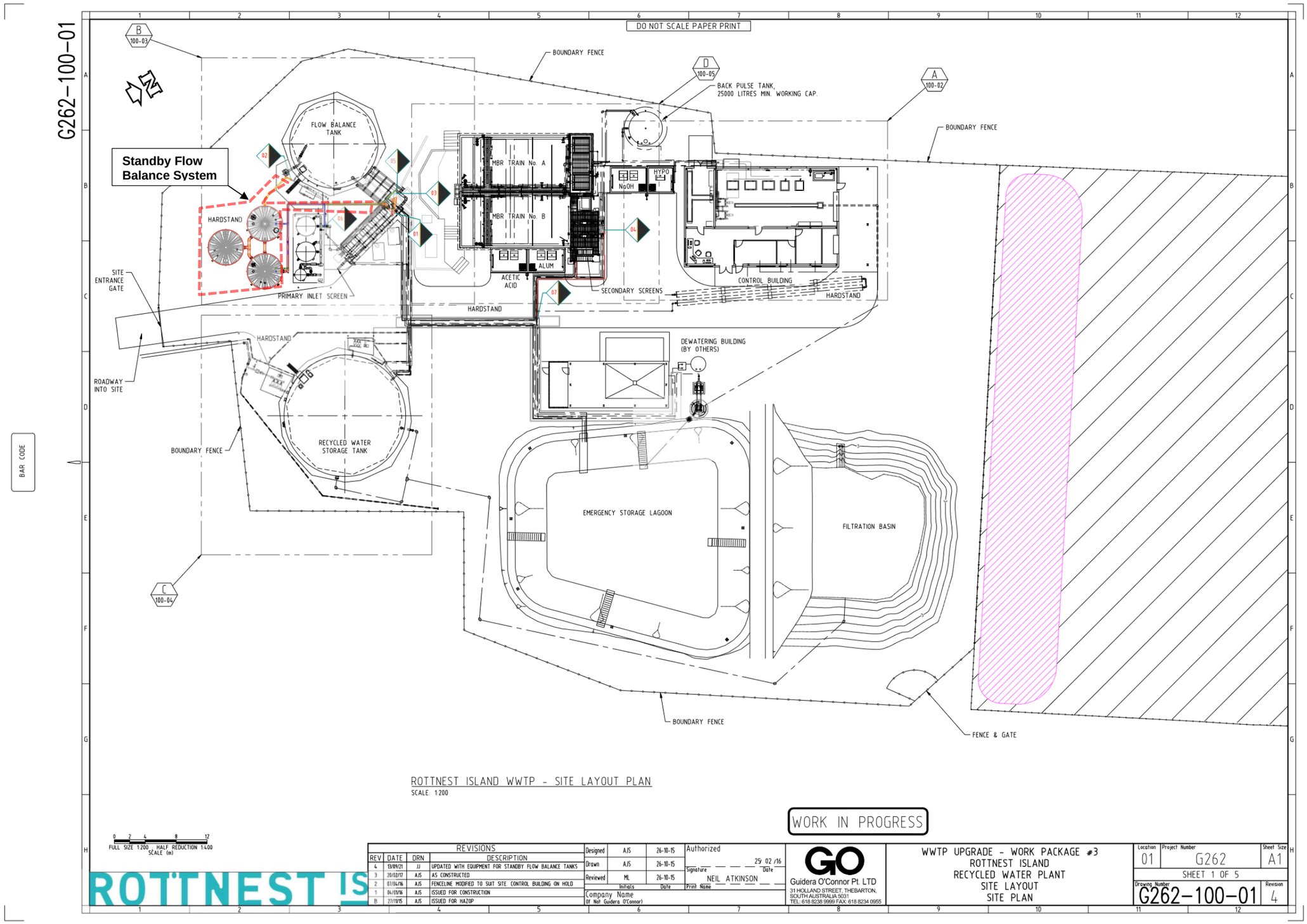

Figure 3: WWTP schematic

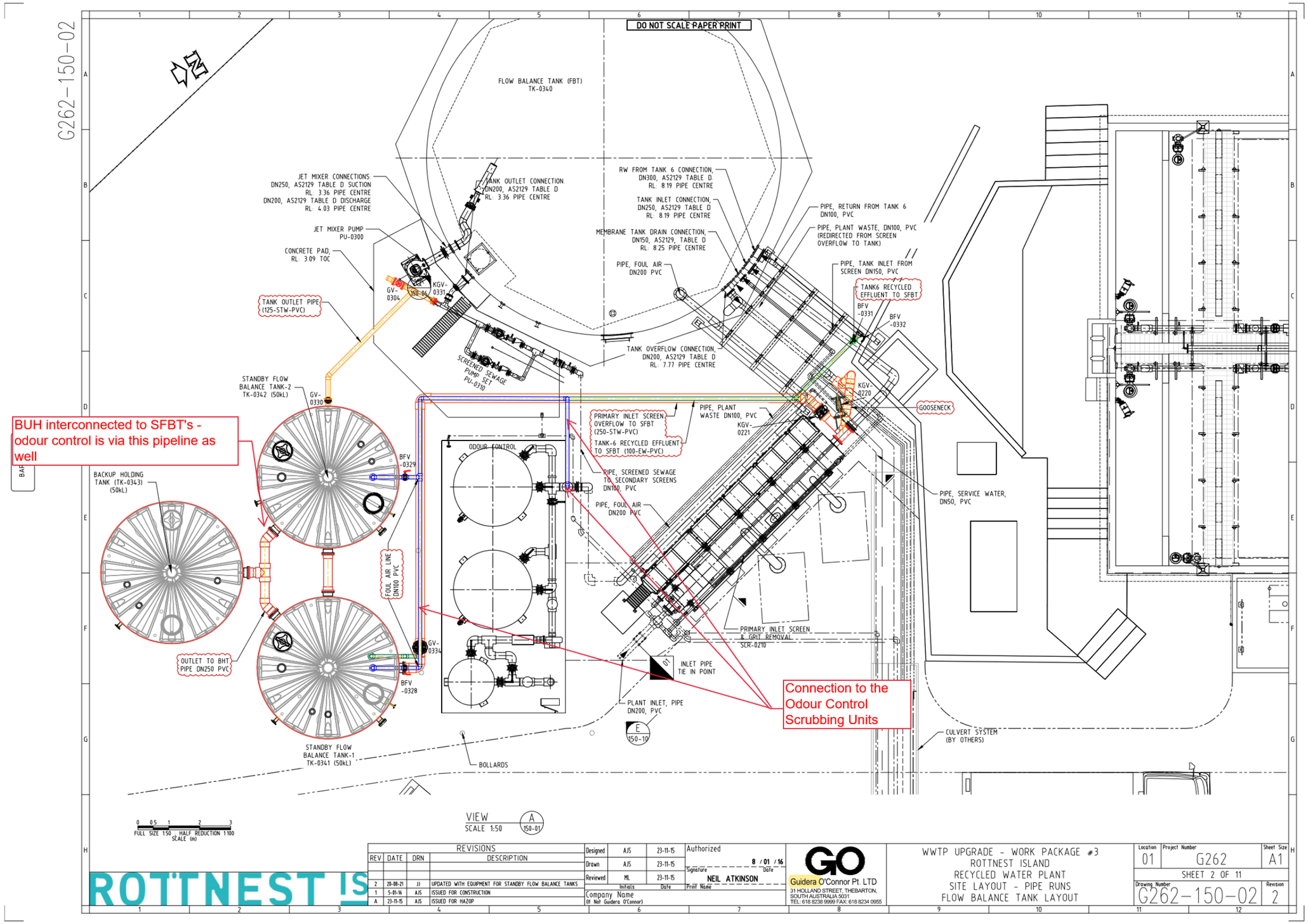

Figure 4: Standby flow balance system layout

Irrigation area

Figure 5: Golf course and oval irrigation areas

Monitoring bores

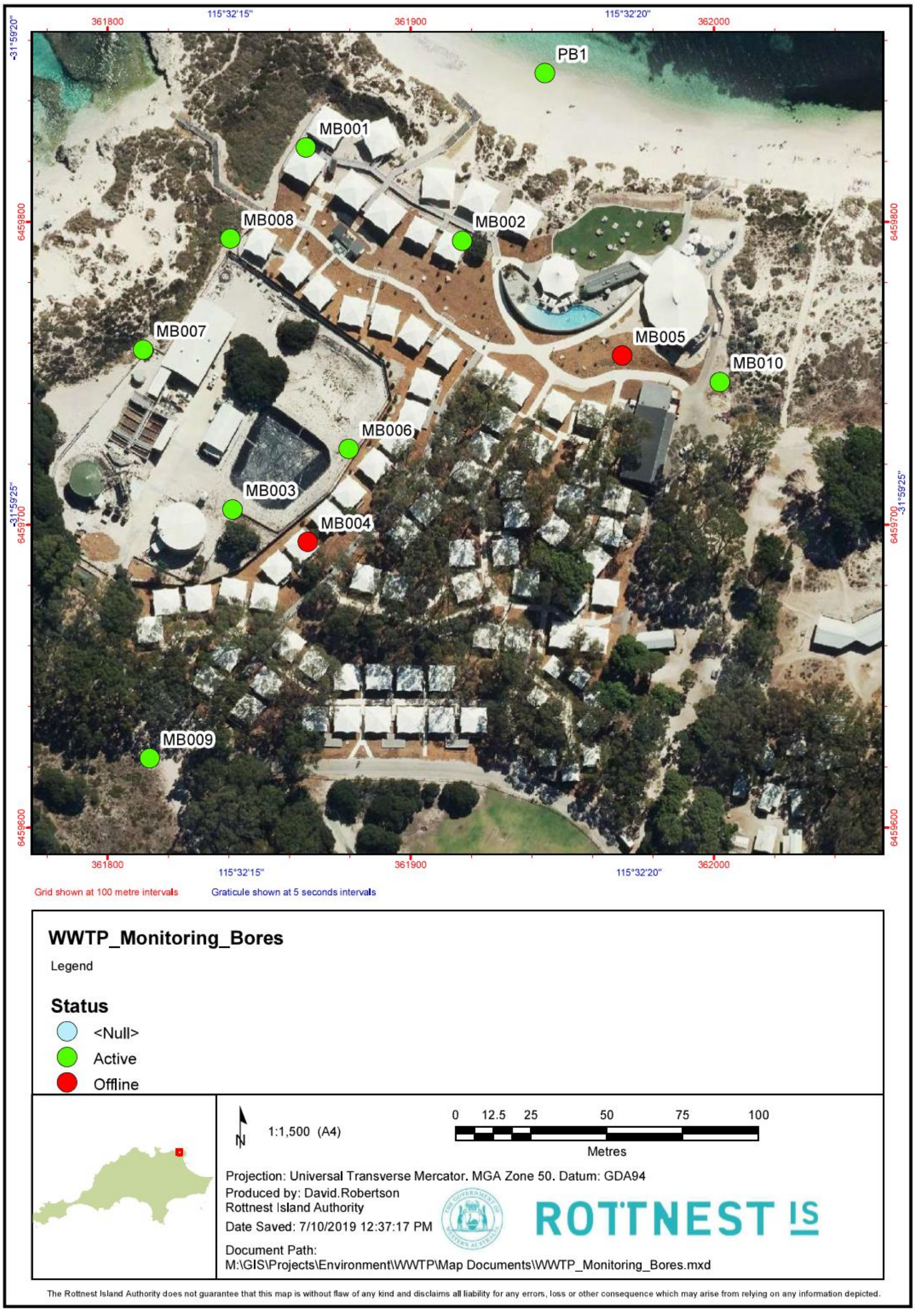

Figure 6: Groundwater monitoring locations for the WWTP

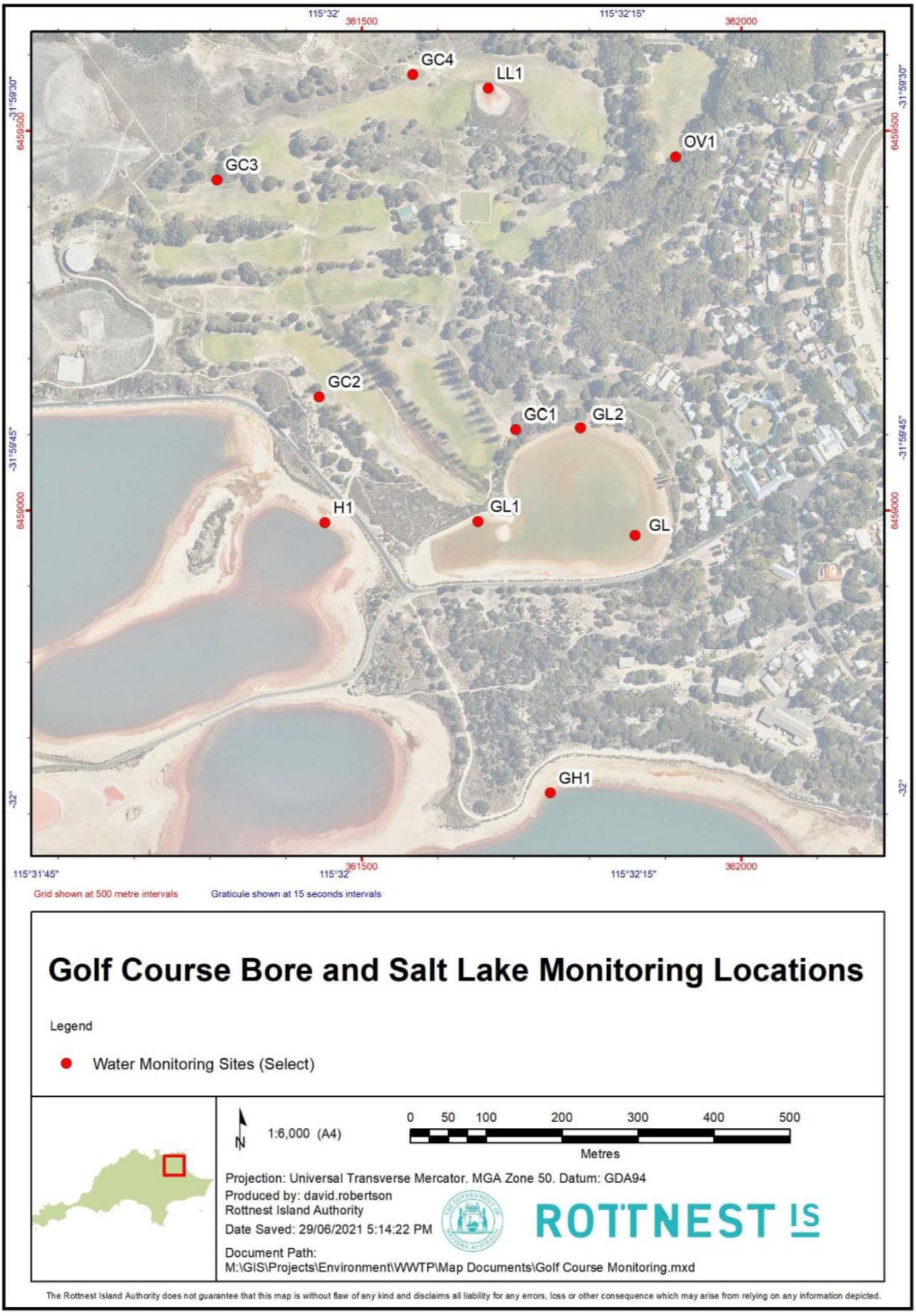

Figure 7: Groundwater and surface water monitoring locations for the irrigation areas

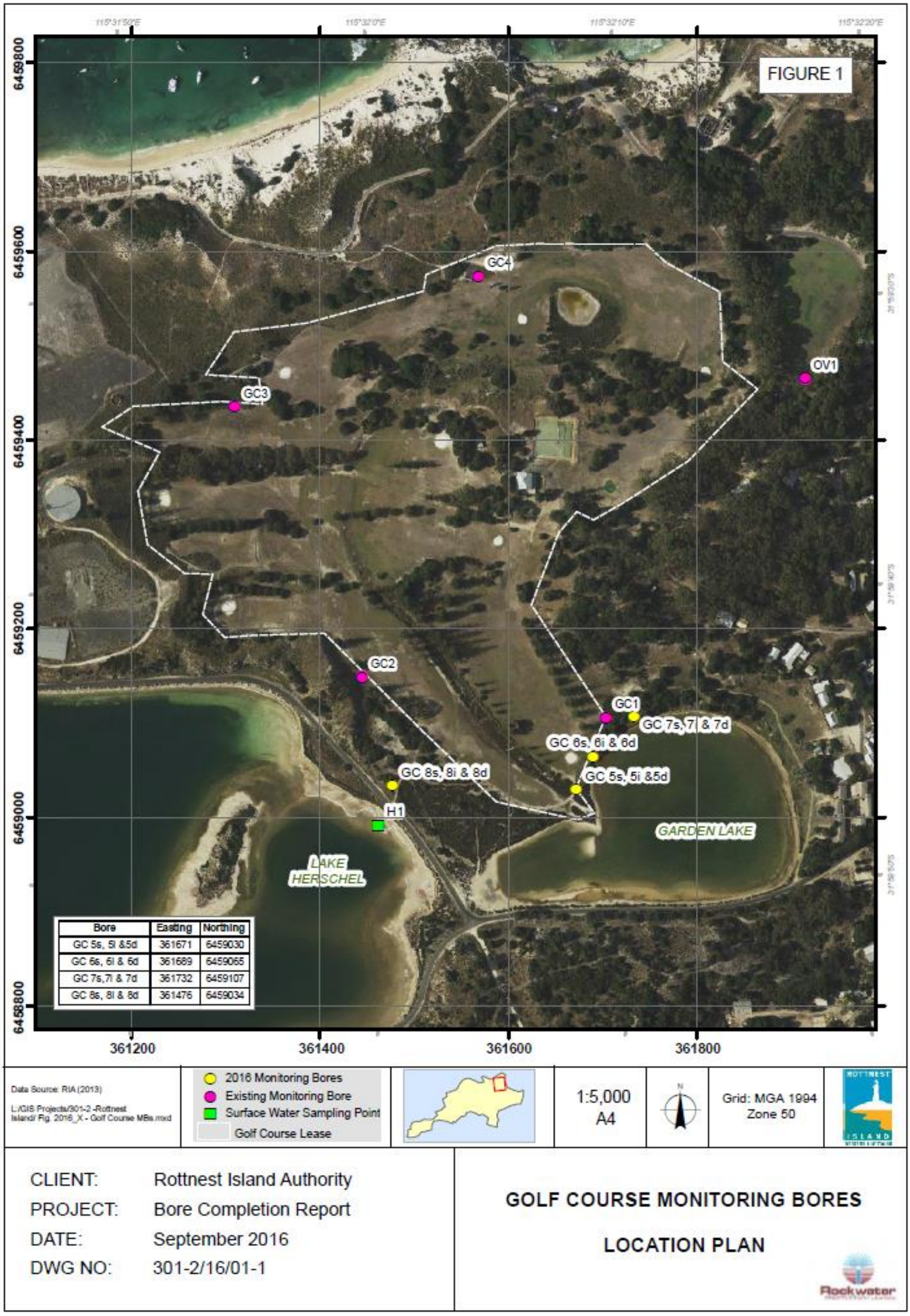

Figure 8: Fresh groundwater lens/hyporheic zone monitoring locations for the irrigation areas

Soil bores

Figure 9: Soil monitoring locations for the irrigation areas

Schedule 2: Premises boundary

The premises boundary is defined by the coordinates in Table 10.

Table 10: Premises boundary coordinates (GDA94 MGA Zone 50)

Point	Easting	Northing	Point	Easting	Northing
1.	361839.129	6459783.928	2.	361891.124	6459748.397
3.	361892.325	6459740.997	4.	361892.325	6459740.997
5.	361872.172	6459710.223	6.	361855.573	6459696.466
7.	361842.437	6459703.275	8.	361828.535	6459680.430
9.	361810.097	6459687.478	10.	361798.891	6459660.764
11.	361765.370	6459595.139	12.	361846.479	6459567.850
13.	361883.244	6459585.664	14.	361898.784	6459609.921
15.	361911.096	6459613.536	16.	361943.904	6459610.361
17.	361967.188	6459594.485	18.	361971.421	6459582.844
19.	361972.479	6459558.502	20.	361964.013	6459535.219
21.	361936.313	6459469.972	22.	361844.875	6459436.827
23.	361694.137	6459310.852	24.	361662.387	6459325.668
25.	361609.470	6459230.418	26.	361688.845	6459093.893
27.	361669.795	6459021.926	28.	361662.387	6459001.818
29.	361607.354	6459007.109	30.	361393.570	6459196.551
31.	361265.511	6459194.435	32.	361242.426	6459233.530
33.	361221.919	6459225.928	34.	361197.583	6459217.653
35.	361171.786	6459213.273	36.	361146.963	6459211.083
37.	361138.688	6459209.622	38.	361131.144	6459165.087
39.	361094.153	6459170.441	40.	361099.507	6459207.675
41.	361116.786	6459213.760	42.	361135.038	6459219.114
43.	361162.052	6459222.764	44.	361187.848	6459225.685
45.	361205.371	6459229.335	46.	361237.643	6459241.629
47.	361208.316	6459291.296	48.	361192.486	6459398.693

Point	Easting	Northing	Point	Easting	Northing
49.	360989.286	6459459.019	50.	360932.846	6459452.991
51.	360923.764	6459509.033	52.	360980.819	6459521.460
53.	360992.461	6459475.952	54.	361185.815	6459426.665
55.	361234.820	6459464.310	56.	361289.972	6459501.789
57.	361442.253	6459528.869	58.	361552.060	6459582.623
59.	361564.339	6459595.785	60.	361656.883	6459608.124
61.	361720.595	6459596.602	62.	361732.237	6459626.236
63.	361805.262	6459747.944	64.	361824.312	6459772.286

Schedule 3: Monitoring program

Groundwater monitoring

1. The licence holder must monitor groundwater for concentrations of the identified parameter(s) in accordance with Table 11.

Table 11: Groundwater monitoring of ambient concentrations

Monitoring location	Parameter	Unit	Frequency	Method
MB001, MB002, MB003, MB006, MB007, MB008, MB009 and MB010 as depicted in Schedule 1: Figure 6	Standing water level	mAHD and mBGL	Monthly	AS/NZS 5667.1 and AS/NZS 5667.11
	pH[1]	-		
	TN	mg/L		
	TP			
	TDS			
	Thermotolerant coliforms	cfu/100mL		
	Dissolved metals (aluminium, copper, lead, nickel, zinc)	mg/L	Six monthly	
OV1, GC1, GC2, GC3, GC4 and REF28-90 as depicted in Schedule 1: Figure 7	Standing water level	mAHD and mBGL	Monthly	
	EC[1]	µS/cm		
	pH[1]	-		
	Temperature[1]	[0] celsius		
	Dissolved oxygen[1]	mg/L		
	TDS			
	TN			
	TKN			
	NH_4-N			
	NO_3-N			
	TP			
	FRP			
	Chloride			
	BOD_5			

Monitoring location	Parameter	Unit	Frequency	Method
OV1, GC1, GC2, GC3, GC4 and REF28-90 as depicted in Schedule 1: Figure 7	Thermotolerant coliforms	cfu/100mL	Monthly	AS/NZS 5667.1 and AS/NZS 5667.11
	E. coli			
	Sodium	mg/L	Six monthly	
	Potassium			
	Calcium			
	Magnesium			
	Sulphate			
	Fluoride			
	Bicarbonate			
	Dissolved metals (aluminium, arsenic, cadmium, chromium, copper, lead, nickel, selenium, zinc, boron)			

Note 1: In-field non-NATA accredited analysis permitted.

Surface water monitoring

2. The licence holder must monitor surface water for concentrations of the identified parameter(s) in accordance with Table 12.

Table 12: Surface water monitoring of ambient concentrations

Monitoring location	Parameter	Unit	Frequency	Method
LL1, H1, GL and GH1 as depicted in Schedule 1: Figure 7	Standing water level	mAHD and mAGL	Monthly	AS/NZS 5667.1 and AS/NZS 5667.4
LL1, H1, GL1, GL2 and GH1 as depicted in Schedule 1: Figure 7	EC[1]	µS/cm		
	pH[1]	-		
	Temperature[1]	^{0}C		
	Dissolved oxygen[1]	mg/L		
	TDS			
	TN			
	TKN			
	NH_4-N			
	NO_3-N			
	TP			
	FRP			
	Chloride			
	BOD_5			
	Thermotolerant coliforms	cfu/100mL		
	E. coli			
	Sodium	mg/L	Six monthly	
	Potassium			
	Calcium			
	Magnesium			
	Sulphate			
	Fluoride			
	Bicarbonate			

Monitoring location	Parameter	Unit	Frequency	Method
LL1, H1, GL1, GL2 and GH1 as depicted in Schedule 1: Figure 7	Dissolved metals (aluminium, arsenic, cadmium, chromium, copper, lead, nickel, selenium, zinc, boron)	mg/L	Six monthly	AS/NZS 5667.1 and AS/NZS 5667.4

Note 1: In-field non-NATA accredited analysis permitted.

Fresh groundwater lens/hyporheic zone monitoring

3. The licence holder must monitor surface water for concentrations of the identified parameter(s) in accordance with Table 13.

Table 13: Hyporheic zone monitoring of ambient concentrations

Monitoring location	Parameter	Unit	Frequency	Method
GC5s, GC5i, GC5d, GC6s, GC6i, GC6d, GC7s, GC7i, GC7d, GC8s, GC8i and GC8d as depicted in Schedule 1: Figure 8	Standing water level	mAHD and mAGL	Monthly	AS/NZS 5667.1 and AS/NZS 5667.11
	EC[1]	µS/cm		
	pH[1]	-		
	Temperature[1]	^{0}C		
	Dissolved oxygen[1]	mg/L		
	TDS			
	TN			
	TKN			
	NH_4-N			
	NO_3-N			
	TP			
	FRP			
	Thermotolerant coliforms	cfu/100mL		
	E. coli			
	Chloride	mg/L		
	BOD_5			

Note 1: In-field non-NATA accredited analysis permitted.

Soil monitoring

4. The licence holder must monitor soil for concentrations of the identified parameter(s) in accordance with Table 14.

Table 14: Soil monitoring of ambient concentrations

Monitoring location	Parameter	Unit	Frequency	Method
GCS01, GCS02, GCS03, GCS04, GCS05, HA01, HA02,HA03,HA04, HA05, HA06, HA07, HA08, HA08, HA09, HA10 and HA11 as depicted in Schedule 1: Figure 9	PBI	-	Annually	AS 4482.1 A composite soil sample shall be collected from each monitoring location. Each composite sample shall be derived from five cores at four depth intervals to one metre, within a five metre diameter plot. The four depths should fall within 0–20, 20–40, 40–70 and 70–100 cm depth increments and positioned within major soil horizons or layers.
	EC[1]	µS/cm		
	pH[1]	-		
	TN	mg/L		
	TKN			
	NO_3-N			
	NO_2-N			
	TP			
GCS02, GCS03, HA01, HA02, HA03 and HA11 as depicted in Schedule 1: Figure 9	v% moisture content[1]	-	Daily between September and April	Water potential probe
GCS01, GCS04, GCS05, HA04, HA05, HA06, HA07, HA08, HA09 and HA10 as depicted in Schedule 1: Figure 9			2 times per week between September and April	

Note 1: In-field non-NATA accredited analysis permitted.

Quality assurance and quality control requirements

5. The licence holder must adhere to the following field quality assurance and quality control procedures, as specified in Schedule B2 of the ASC NEPM, and must include as a minimum;

(a) decontamination procedures for the cleaning of tools and sampling equipment before sampling and between samples;

(b) field instrument calibration for instruments used on site;

(c) blind replicate samples and rinsate blanks must be collected in the field and sent to the primary laboratory to determine the precision of the field sampling and laboratory analytical program;

(d) completed field monitoring sheets / sampling logs for each sample collected, showing:

(i) time of collection

(ii) location of collection

(iii) initials of sampler

(iv) sampling method

(v) field analysis results

(vi) duplicate type/location (if relevant)

(vii) site observations and weather conditions; and

(e) chain-of-custody documentation must be completed which details the following information:

(i) site identification

(ii) the sampler

(iii) nature of the sample

(iv) collection time and date

(v) analyses to be performed

(vi) sample preservation method

(vii) departure time from site

(viii) dispatch courier(s)

(ix) arrival time at the laboratory.