Decision Report

Application for Works Approval

Division 3, Part V *Environmental Protection Act 1986*

Works Approval Number	W6317/2019/1
Applicant	Water Corporation
File Number	2010/006288-1
Premises	Waroona Wastewater Treatment Plant 22 Drake Road Waroona WA 6215 Legal description - Lot 22 on Deposited Plan 223194 Certificate of Title Volume 1536 Folio 692; and Lot 305 on Deposited Plan 223194 Certificate of Title Volume 410 Folio 90A
Date of Report	19 November 2020
Status of Report	Final

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1. Definitions of terms and acronyms

In this Decision Report, the terms in Table 1 have the meanings defined.

Table 1: Definitions

Term	Definition
AACR	Annual Audit Compliance Report
ACN	Australian Company Number
AER	Annual Environment Report
Category/ Categories/ Cat.	Categories of Prescribed Premises as set out in Schedule 1 of the EP Regulations
CS Act	*Contaminated Sites Act 2003* (WA)
Decision Report	refers to this document.
Delegated Officer	an officer under section 20 of the EP Act.
Department	means the department established under section 35 of the *Public Sector Management Act 1994* and designated as responsible for the administration of Part V, Division 3 of the EP Act.
DWER	Department of Water and Environmental Regulation As of 1 July 2017, the Department of Environment Regulation (DER), the Office of the Environmental Protection Authority (OEPA) and the Department of Water (DoW) amalgamated to form the Department of Water and Environmental Regulation (DWER). DWER was established under section 35 of the *Public Sector Management Act 1994* and is responsible for the administration of the *Environmental Protection Act 1986* along with other legislation.
EPA	Environmental Protection Authority
EP Act	*Environmental Protection Act 1986* (WA)
EP Regulations	*Environmental Protection Regulations 1987* (WA)
Existing Licence	The Licence issued under Part V, Division 3 of the EP Act and in force prior to the commencement of, and during this Review
Licence Holder	insert Licence Holder name
m^3	cubic metres
Minister	the Minister responsible for the EP Act and associated regulations
NEPM	National Environmental Protection Measure

Term	Definition
Noise Regulations	*Environmental Protection (Noise) Regulations 1997* (WA)
Occupier	has the same meaning given to that term under the EP Act.
Prescribed Premises	has the same meaning given to that term under the EP Act.
Premises	refers to the premises to which this Decision Report applies, as specified at the front of this Decision Report
Primary Activities	as defined in Schedule 2 of the Revised Licence
Risk Event	As described in *Guidance Statement: Risk Assessment*
UDR	*Environmental Protection (Unauthorised Discharges) Regulations 2004* (WA)

2. Purpose and scope of assessment

The Water Corporation (the Applicant) lodged an application for a Works Approval on 24 September 2019 to upgrade the Waroona wastewater treatment plant (WWTP) to an advanced secondary treatment system (Oxidation Ditch) to meet the long term inflows while significantly reducing nutrient loads discharging into Drakesbrook Drain.

On 21 July, the Applicant submitted an addendum to the application, documenting proposed changes to the original works.

The activities associated with this application include:

- Earthworks and site preparation;
- Creation of hardstand areas and access tracks;
- Construction of the advanced secondary treatment system, operations building and sludge management area;
- Draining of existing ponds and disconnection from the upgraded treatment process.
- Installation of a new underground pipework and new discharge flow meter point from the phase separation system to the existing clay-lined channel;
- Erection of new fencing along the northern and eastern boundary of Lot 22;
- Implementation of associated electrical and other works;
- Provision of supervisory control and data acquisition (SCADA) remote control and monitoring at both the Waroona WWTP and the Water Corporation Operations Centre; and;
- Commissioning of the works.

2.2 Application details

The Waroona Wastewater Treatment Plant (Waroona WWTP) is a simple Waste Stabilisation Pond system that currently operates as prescribed premise Category 54: sewerage facility that holds existing licence L5400/1992/12 (licence).

The Waroona WWTP is located on Lot 22 and Lot 305 on Plan 223194, Drake Road, Waroona, WA (Premises) and is situated approximately 2 km west of the township of Waroona.

The Applicant lodged an application for a Works Approval on 24 September 2019 to upgrade the Waroona WWTP to an advanced secondary treatment system (Oxidation Ditch) with capacity to manage the long term inflows while significantly reducing nutrient loads discharging into Drakesbrook Drain.

The Oxidation Ditch system was selected as it is considered the most reliable treatment upgrade option to be able to meet the nutrient reduction targets outlined in the *Water Quality Improvement Plan for Rivers and Estuary of the Peel-Harvey System – Phosphorous Management 2008, EPA 2008* (WQIP).

The Waroona WWTP currently has a treatment capacity of 240 m^3/day under the existing licence, with the proposed Oxidation Ditch system designed to work within the site constraints of the premise to increase capacity to allow for average daily inflows of 440 m^3/day. It is noted that while the plant is only expected to receive and treat an annual average daily inflow of up to 440 m^3/day for the foreseeable future, the inlet works has a maximum capacity of 30 L/second, which is equivalent to 2,592 m^3/day, to account for seasonal fluctuations. The oxidation can receive and treat an annual average daily inflow of 440 m^3/day, with occasional fluctuations above 440 m^3/day during times of higher seasonal demand. The maximum peak

flow that the plant has been designed to be able to treat is 880 m^3/day

The treatment technology is also expected to achieve a significant reduction in treated wastewater nutrient loads, with the proposed upgrade projected to reduce loading of Total Phosphorous by approximately 61% and Total Nitrogen by approximately 85% based on 2018/19 outflows.

The application addendum received on 21 July 2020 proposed the removal the existing pond system from the treatment process, with the wastewater treated via the phase separation system to discharge to the existing clay-lined channel. This will be achieved by the construction of an underground pipe and flow meter between the treatment infrastructure and the discharge channel. The existing ponds and associated flow meter are proposed to be disconnected from the treatment process and decommissioned.

Table 2 lists the documents submitted during the assessment process.

Table 2: Documents and information submitted during the assessment process

Document/information description	Date received
Water Corporation (2019) CS01367 Waroona Wastewater Treatment Plant Upgrade Works Approval Application and Supporting Information - September 2019	24 September 2019
Water Corporation (2019) CS01367 Waroona Wastewater Treatment Plant Upgrade, Version 3 Addendum to Supporting Information - July 2020	21 July 2020

3. Background

The Waroona WWTP was established in 1992 and provides secondary treatment wastewater (i.e. the removal of nutrients and organic compounds via a biological process). The Waroona WWTP currently consists of three treatment ponds in series with two aluminium sulphate (Alum) dosing points. Alum is dosed as the treated water passes from the primary pond to the secondary pond and again as treated water flows from the secondary pond to the tertiary treatment pond.

After flowing through the tertiary treatment pond, the treated wastewater discharges to a clay-lined channel which eventually leads into Drakesbrook Drain, a pre-established agricultural drain, offsite. Drakesbrook Drain connects with the Waroona Main Drain approximately 5 km to the west of the Premises, which diverts flows from both drains into the Harvey River. Flows from the Harvey River are eventually discharged into the Peel-Harvey Estuary located more than 25 km from the Premises

The Premises is located within the Peel-Harvey Catchment area and is subject to the *Environmental Protection (Peel Inlet – Harvey Estuary) Policy 1992* and the Water Quality Improvement Plan for the Rivers and Estuary of the Peel-Harvey System – Phosphorus Management.

Table 3 lists the prescribed premises categories that have been applied for.

Table 3: Prescribed Premises Categories in the Existing Licence

Classification of Premises	Description	*Current Premises design capacity*	*Proposed Premises design capacity*
Category 54	Sewage facility: premises – (a) on which sewage is treated (excluding septic tanks); or (b) from which treated sewage is discharged onto land or into waters.	240 m^3/day	880 m^3/day

4. Overview of Premises

4.1 Operational aspects

The Waroona WWTP currently treats wastewater to a secondary standard and consists of three treatment ponds in series with aluminium sulfate (Alum) dosing applied as the effluent passes from the secondary pond to the final treatment pond. The treated wastewater (TWW) then flows to a clay-lined channel (previously known as the clay-lined swale), which discharges into a pre-established agricultural drain (Drakesbrook Drain) off-site.

Drakesbrook Drain connects with the Waroona Main Drain, which flows into the Harvey River which flows into the Peel-Harvey Estuary approximately 24 km from the WWTP.

The current Premises has a maximum licensed approved premises production capacity of 240 kL/day.

Alum dosing has been applied at two dosing points as the wastewater passes from pond 1 to pond 2 and from pond 2 to pond 3 since the 2009/10 reporting period. TWW discharged to Drakesbrook Drain from 20 April 2009 to 6 March 2014 occurred via a tree lot disposal area. From 7 March 2014 the TWW discharged to Drakesbrook Drain has occurred via a clay-lined channel which contains aluminium and promotes phosphorus reduction in the wastewater via fixation to clay soils within the channel.

The application is to allow for the construction and commissioning of advanced secondary treatment infrastructure to replace the existing pond system of the Waroona WWTP.

The proposed advanced secondary treatment system will be a compact layout located immediately east of the existing pond system within the existing Waroona WWTP premise boundary (Figure 1). It comprises a new preliminary treatment facility, an advanced secondary treatment facility (Oxidation Ditch), to treat an annual average daily inflow of up to 440 m^3/day, with a capacity to treat up to 880 m^3/day, and sludge management. A new track will be constructed around the new treatment system and a hardstand area will be constructed to the west and south of the proposed sludge management area.

The existing clay-lined ponds will be retained on site but disconnected from the upgraded treatment process.

The existing treated wastewater discharge point and clay-lined channel to Drakesbrook Drain will be retained, with treated water to be directed from the phase separation system to the existing clay-lined channel via a new underground pipe and flow meter.

The proposed Oxidation Ditch will have a multi-channel configuration within an oval shaped basin with vertically mounted aerators to provide circulation, oxygen transfer and aeration in the ditch. The Ditch is designed to function as a modified activated sludge biological treatment process that utilises long solids retention times to remove biodegradable organics.

The hydraulic profile of the Waroona WWTP is configured to facilitate gravity flow from the

inlet to outlet. The system includes fully enclosed fine screening and aerated grit removal in the preliminary treatment stage to protect all downstream rotating mechanical equipment from fouling and accelerated wear.

In the activated sludge secondary treatment stage, a dedicated unaerated zone is provided for the conditioning of the process biomass to ensure settling and phase separation. The selector discharges directly to a single pass channel reactor equipped with variable speed surface aeration. The automated control of unaerated and aerated zones within the secondary treatment process creates the ideal environmental conditions to maximise biological removal of carbon, nitrogen and phosphorous.

Figure 1. Proposed site layout

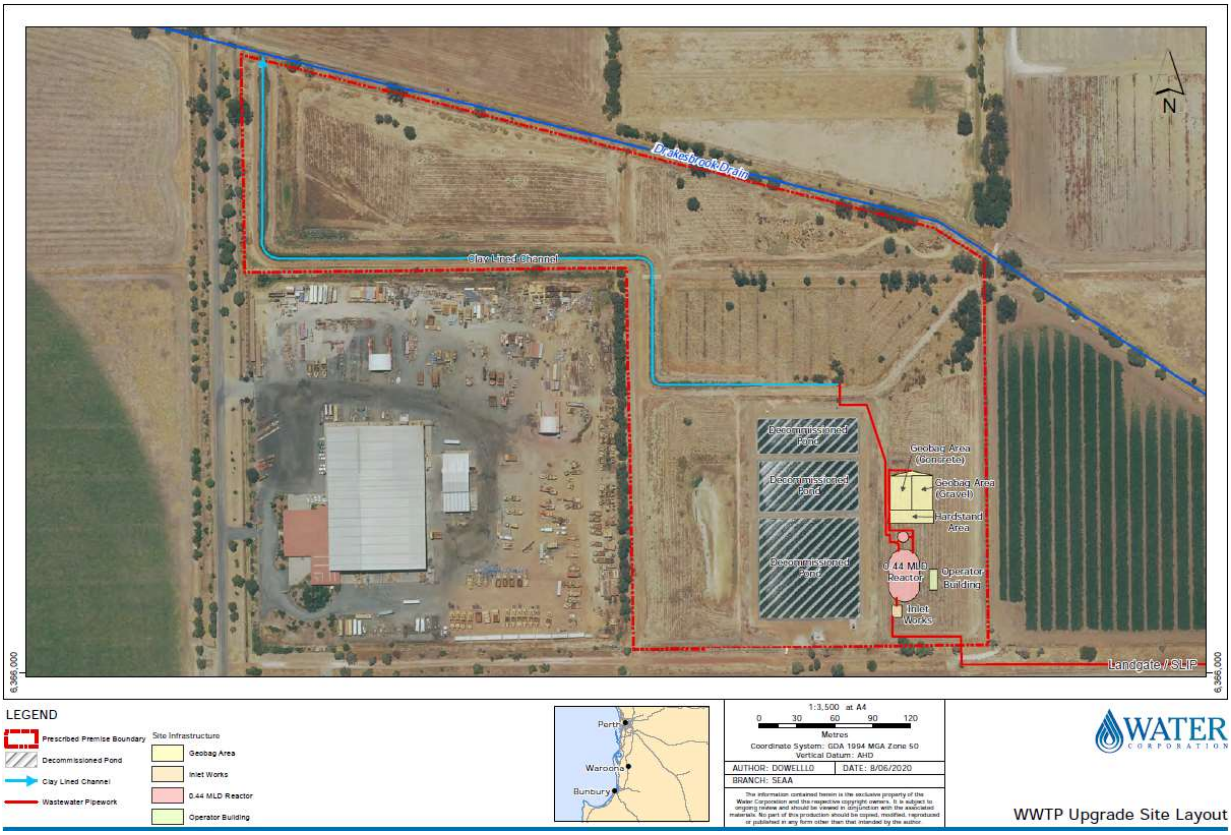


Figure supplied as part of the application

The phase separation system is provided to retain the process biomass within the secondary treatment stage and facilitate discharge of high quality clarified treated water.

Excess activated sludge created by the secondary treatment stage is to be removed on a regular basis to maintain process stability. Once removed, it will be dewatered and stabilised in ‘geobags’ before disposal to an appropriately licensed waste facility.

The existing clay-lined ponds will be retained on site but disconnected from the upgraded treatment process.

The existing treated wastewater discharge point and clay-lined channel to Drakesbrook Drain will be retained, with treated water to be directed from the phase separation system to the existing clay-lined channel via a new underground pipe and flow meter.

Remote monitoring and control of the treatment system will occur via a control system known as SCADA.

Preliminary Treatment

A pre-fabricated preliminary treatment package will be used for screening and grit removal. Inflows will be diverted to the new plant via a siphone shaped pipe in front of the new inlet works. During normal operations, inflow will pass through the single duty screen and downstream grit removal tank prior to gravity discharge to the secondary treatment process. System operation is automatically controlled by the site programmable logic controller (PLC).

In the event of equipment or power failure, inflow will bypass the duty screen, and pass through a standby static screen prior to discharge directly into the grit removal tank.

Secondary Treatment

The pre-treated inflow is discharged by gravity from the grit removal tank into a six zone unaerated selector tank. The process involves hydraulic mixing via sequential underflow ports and overflow weirs with automatic tank operation.

A recycle stream of mixed liquor from the reactor is used to condition process biomass in the selector to form dense, well-settling sludge.

The selector discharges by gravity to the process reactor. Process aeration is provided by duty/standby vertical shaft low-speed platform mounted surface aerators. Aeration control is managed via the site Master PLC via Dissolved Oxygen probes strategically placed in the reactor channels. During reactor operation, treated wastewater is physically separated from the process mixed liquor via a hydraulically controlled phase-separation system. Concentrated mixed liquor is returned to the process reactor, whilst clarified treated wastewater is discharged by gravity to the next stage of treatment. Phase-separation is fully-automated and managed by the site PLC.

Tertiary Treatment

The existing clay-lined ponds will be decommissioned, disconnected from the treatment process and will be retained on site.

No tertiary pathogen treatment post Oxidation Ditch treatment is proposed by the applicant on the assumption that the Drakesbrook Drain is not used for drinking water or primary recreation purposes.

Clay-lined Channel

The existing discharge points (as per the existing Licence), will remain and treated wastewater will be discharged into the existing clay-lined channel for eventual discharge into the Drakesbrook Drain. A new underground pipe and discharge flow meter from the phase-separation system to the clay-lined channel will be constructed.

Chemical Storage and Dosing

The existing chemical dosing system at the site is aluminium sulphate which will be utilised for alum dosing. A standby sucrose dosing system will be implemented at the site for the upgrade to provide an additional carbon source to aid the denitrification process during treatment.

The sucrose dosing system will be used as required and is not intended for daily or regular use. Sucrose may be dosed where inflows have been identified as carbon deficient. Sucrose will be dosed directly into the secondary treatment system. The Sucrose Dosing system consists of a double skinned self-bunded tank. The sucrose dosing system has a maximum storage capacity of up to 10,000 L.

Sludge Management

Sludge management will be in the form of geotextile bags (‘geobag’) for sludge dewatering and will be located to the north of the secondary treatment area. A liquid polymer dosing

system will be used for the Waste Activated Sludge (WAS) conditioning. The geobags will stand on a specifically lined area for up to six months before emptying. Once dried, the sludge cake (WAS) will be transferred to an appropriate waste facility. All leachate from the sludge drying process will be returned to the start of treatment plant.

Power

A feasibility study has been completed to identify site power requirements. The new operation building includes an electric switchroom and office. A 100kVA 22kV/415V ground mounted transformer will replace the existing pole mounted transformer. Two new switchboards will be required to supply the upgraded loads and will include the Main Switchboard and the Operations Building Distribution Switchboard.

SCADA Remote Control

The plant has been designed and configured to operate automatically and unattended, with remote control access via the site PLC and Water Corporation's Operations Centre.

Commissioning

The Commissioning Plan for this project details the commissioning process, including:

1. Testing to ensure all pipework and vessels within the project works are free from leaks;
2. Verification of required flows, pressures and temperatures throughout the system;
3. Testing each component of the system to ensure manufacturer specifications are met
4. Testing to ensure all electrical and instrumentation circuitry is fully functional
5. Testing to ensure the remote control program of the system is fully functional
6. Carrying out performance testing under all load conditions
7. Monitoring the automatic operation of the system for 30 continuous days under normal operating conditions to prove reliability.

4.2 Infrastructure

The proposed WWTP facility infrastructure, as it relates to Category 54 activities, is detailed in Table 4 and with reference to the Site Plan (attached in the Issued Works Approval).

Table 4 lists infrastructure associated with each prescribed premises category.

Table 4: Proposed Waroona WWTP facility Category 54 infrastructure

	Infrastructure	Site Plan Reference
	Prescribed Activity Category 54	
1	Preliminary treatment system including fine screening and grit removal.	Figure 1. Proposed site layout
2	Unaerated selector zone.	
3	In-ground Oxidation Ditch reactor with vertical shaft slow speed surface aeration The in-ground reactor will be lined with a 40 mm thick impervious, bituminous geotextile membrane (BGM).	
4	Sludge dewatering/drying facility comprising geotextile bags ('geobags') contained within a bunded concrete hardstand area.	
5	The existing clay-lined ponds will be decommissioned, disconnected from the treatment process and will be retained on site. A new underground pipe and discharge flow meter from the phase-separation system to the clay-lined channel will be constructed.	
6	The existing inlet (discharge) tower will be decommissioned. Inflows will be diverted to the new plant via a siphone shaped pipe in front of the new inlet works.	
	Other activities	
1	Pre-fabricated Operations building including switch and control rooms, laboratory and amenities.	Figure 1. Proposed site layout
2	New electrical, instrumentation, control and SCADA infrastructure to facilitate fully automated, unattended plant operation with remote operational control accessibility.	

5. Legislative context

Table 5 summarises approvals relevant to the assessment.

Table 5: Relevant approvals and tenure

Legislation	Number	Subsidiary	Approval
Part V of the EP Act (WA)	L5400/1992/12	Water Corporation	The existing Waroona WWTP has been constructed and operates under Licence L5400/1992/12.

5.1 Part V of the EP Act

5.1.1 Applicable regulations, standards and guidelines

The overarching legislative framework of this assessment is the EP Act and EP Regulations.

The guidance statements which inform this assessment are:

- *Guidance Statement: Regulatory Principles (July 2015)*
- *Guidance Statement: Setting Conditions (October 2015)*
- *Guidance Statement: Land Use Planning (February 2017)*
- *Guidance Statement: Decision Making (February 2017)*
- *Guidance Statement: Risk Assessments (February 2017)*
- *Guidance Statement: Environmental Siting (November 2016)*

5.1.2 Environmental Protection (Peel Inlet – Harvey Estuary) Policy 1992

The site is within the Peel-Harvey Environmental Protection Policy (EPP) area. The purpose of the EPP is:

- to set out environmental quality objectives for the Peel-Harvey Estuary which if achieved will rehabilitate the Estuary and protect the Estuary from further degradation; and
- to outline the means by which the environmental quality objectives for the Estuary are to be achieved and maintained.

The EPP states that the environmental quality objectives to be achieved and maintained in respect of the Estuary are a median load (mass) of total phosphorus flowing into the Estuary of less than 75 tonnes, with the median load (mass) of total phosphorus flowing into the Estuary from the Harvey River and associated drains being less than 38 tonnes.

Water Quality Improvement Plan for the Rivers and Estuary of the Peel-Harvey System – Phosphorus Management

The Environmental Protection Authority (EPA) and the Australian Government prepared the *Water Quality Improvement Plan for the Rivers and Estuary of the Peel Harvey System – Phosphorus Management* (WQIP) based on the findings of seven supporting projects and recommends a combination of management measures to reduce phosphorus loss from land uses within the coastal sections of the three catchments - the Serpentine, Murray and Harvey - draining to the Peel-Harvey Estuary. This improvement in water quality is to be achieved through changes to agricultural and urban practices and land-use planning.

The water quality objectives of the WQIP, relevant to the Premises, are:

- Median loadings of total phosphorus to estuarine waters should be less than 75 tonnes per annum in an average year, with the median load of total phosphorus flowing in the estuary from the Harvey River being less than 38 tonnes.
- Water qualities in streams in winter are to meet mean concentrations of 0.1 mg/L at current mean flows

The WQIP proposes management measures and control actions to reduce phosphorus inputs to the estuary by:

- management of agricultural and urban land practices;
- management of urban and rural effluent;

- management of licensed discharges;
- protection and revegetation of wetlands and waterways;
- modification to drainage management practices;
- research and investigation into best management practices;
- implementation of a monitoring and reporting programme;
- addressing barriers to uptake of best management practices; and
- fostering of community partnerships.

The Peel-Harvey Catchment Nutrient Report 2015: Drakes Brook-Waroona Drain 2017 update (Department of Water) noted that flows entering Harvey River have been below the 0.1 mg/L phosphorus objective since monitoring began in 2006 (Figure 2).

5.1.3 Works approval and licence history

Table 6 summarises the works approval and licence history for the premises.

Table 6: Works approval and licence history

Instrument	Issued	Nature and extent of works approval, licence or amendment
L5400/1992/4	25/09/2000	Licence re-issue
L5400/1992/5	3/09/2001	Licence re-issue
L5400/1992/6	23/10/2002	Licence re-issue
L5400/1992/7	6/10/2003	Licence re-issue
L5400/1992/8	27/05/2004	Licence re-issue
L5400/1992/9	1/11/2004	Licence re-issue
L5400/1992/10	17/10/2005	Licence re-issue
L5400/1992/11	28/10/2010	Licence re-issue
W5433/2013/1	5/06/2013	Works approval for construction of discharge swale
L5400/1992/12	15/10/2015	Licence re-issue and update to new licence format
W6317/2019/1	19/11/2020	This works approval for upgrade of infrastructure

6. Modelling and monitoring data

6.1 Monitoring of discharges to land

Water Corporation conducts water quality monitoring of treated wastewater from the discharge of the tertiary treatment pond before it is discharged into the clay-lined channel and at the final boundary discharge point prior to discharge to the Drakesbrook Drain.

The rural drainage network in the Waroona area was developed to alleviate water inundation to properties, supporting agricultural production, including low lying areas and areas which would normally become waterlogged. The natural flow of Drakesbrook Drain has been modified by engineering works to form part of the drainage network and support agricultural production in the area.

Drakesbrook Drain is located immediately north of the WWTP and flows in a westerly direction. The drain is classified as intermittent (non-perennial), with discontinuous to no flow observed during dryer months of the year. The confluence of Drakesbrook Drain and Waroona Main Drain is 5.8 km west of the WWTP. The Waroona Main Drain / Drakesbrook Drain flow into the Harvey River (15 km from discharge) and eventually the Peel-Harvey Estuary (25 km from the boundary discharge point. The drainage network is presented in Figure 2.

Figure 2. Drainage network

Figure supplied as part of the application

As addressed in the WQIP, a system of drains (including the Drakesbrook and Waroona drains) were constructed to address the problem of flooding in the Peel-Harvey catchment, brought on by increased clearing of the land and rising groundwater levels. The water within these drains is generally surface water discharge from neighbouring agricultural paddocks, with agriculture observed as the main land use surrounding the drains.

The Premises is located within the Waroona Irrigation District surface water area which is proclaimed under Section 29 of the *Rights in Water and Irrigation Act 1914*.

The Existing Licence sets a discharge target to Drakesbrook Drain for TP at 5 mg/L; no other discharge limit was set. Figure 3 below displays the median concentrations over the previous nine AER reporting periods for the final WWTP effluent and the discharge to Drakesbrook Drain.

Figure 3. Discharge concentrations

AER Reporting Period	Final WWTP Effluent						Discharge to Drakesbrook Drain					
	TP (mg/L)	TN (mg/L)	BOD (mg/L)	TSS (mg/L)	*E. coli* (CFU/100mL)	AI (mg/L)	TP (mg/L)	TN (mg/L)	BOD (mg/L)	TSS (mg/L)	*E. coli* (CFU/100mL)	AI (mg/L)
DWER Licence	-	-	-	-	-	-	5	-	-	-	-	-
2009/10	0.6	22	12.5	45	995	N/A	N/A	N/A	N/A	N/A	N/A	N/A
2010/11	2.1	32	22.5	85	2,485	N/A	N/A	N/A	N/A	N/A	N/A	N/A
2011/12	2.7	29	20	77.5	670	N/A	2.3	N/A	N/A	N/A	N/A	N/A
2012/13	2.4	25	12.5	55	520	N/A	2.3	N/A	N/A	N/A	N/A	N/A
2013/14	2.5	24	15	70	1,700	N/A	2.4	N/A	N/A	N/A	N/A	N/A
2014/15	2.6	29	20	75	4,150	N/A	2.0	20	N/A	N/A	N/A	N/A
2015/16	1.9	30	20	70	3,350	2.1	1.2	26	18	167	4,061	4.5
2016/17	2.8	32	30	62.5	4,400	0.67	1.9	29	17.5	90	1,100	1.5
2017/18	2.9	31	25	105	2,950	0.61	2.4	25	20	102.5	2,300	1.4
2018/19	2.7	33	30	102.5	4,400	0.82	2.2	26	20	150	1,300	4.2

N/A – not available

Figure supplied as part of the application

6.2 Modelling of Drakesbrook drain capacity

With an increase in the capacity of the treatment system from 258 kL/day to an average of 440 kL/day, a similar increase in discharge volume of treated wastewater is predicted to enter Drakesbrook Drain.

Drakesbrook Drain averages approximately 1 m in width at the base and 3 m in width at the potential maximum height at which water can be contained, being approximately 2 m in height (Figure 4). Using the Manning formula to determine the flow within the channel, with an assumed 1/1000 gradient, the capacity of the drain is estimated to be 26 ML/day.

With the treatment systems' capacity proposed to increase from 258 m^3/day to an annual average daily inflow of up to 440 $m^{3/}$day, equating to an increased in outflow by 0.18 ML/day, it is evident that that increase is minor in comparison to the capacity of the drain. While it is noted that the model does not take into account flow rates in the drain due to rainfall and flood management drainage, the Drakesbrook drain is likely to provide capacity for managing the additional discharge volume.

Figure 4. Drakesbrook drain adjacent to Premises

6.3 Modelling of odour emissions

Environmental & Air Quality Consulting Pty Ltd (EAQ) was engaged by the Applicant to undertake a Desktop Odour Impact Assessment of the proposed WWTP upgrade, with *The Waroona Waste Water Treatment Plant, September 2019, Project Ref: EAQ-19020*, submitted as part of the Application.

While there is no current or historic odour emissions data for the Waroona WWTP, compiled odour data from other WWTP's operating pond technologies was used in the modelling.

The report stated that the proposed upgrade of the WWTP to an oxidation ditch configuration will in general resemble the current infrastructure operations of the Applicant's East Rockingham and Halls Head WWTP's. Previous assessments of these and other WWTP's has been undertaken to determine mass odour emission rates of the oxidation ditches and other infrastructure.

The table below presents a comparison between complied odour emission rates (OER) of pond configurations and those emissions from the other WA Oxidation Ditch configuration WWTP's. The data is then used to determine the existing and proposed odour footprint of the Waroona WWTP based on data used for other regulatory approvals in expansion and upgrades of WWTP's.

Figure 5. Predicted Odour Footprint of Upgraded WWTP

WWTP	Capacity (ML/day)	Inlet	Primary Pond	Secondary Pond	Tertiary Pond	Inlet Works	Bioselector Tank	Oxidation Ditch	Secondary Clarifier	Sludge Drying	Mass Odour Emission Footprint of Approved Premises (Ox. Ditch Configuration)
		SOER (ou/m^2/s)				SOER (ou/m^2/s)					ou/s
[1]Busselton	6.75	80	-	-	-	4	2.5	0.9 – 1.5	0.5	-	n/a
[2, A]Gordon Road	12.0	-	-	-	-	-	-	0.19 – 0.75	-	-	n/a
[3, A]Geraldton North	0.69	-	0.27 – 0.39	0.23 – 0.27	-	-	-	-	-	-	n/a
[4, B]Halls Head	5.8	60	-	-	0.2	5	8	1.8 – 4.0	0.4	20	12,870
[5]Harvey	1..1	25	1.3 (aerated)	0.5	0.2	0.2	-	-	-	-	13,300
Waroona WWTP	0.24 (0.44 new)	2m^2	6,500m^2	3,360m^2	3,360m^2	30m^2	50m^2	1,000m^2	50m^2	40m^2	
Maximum Odour Emission Rate (ou/s)		160	2,535	1,680	672	150	400	4,000	25	800	
		Total Estimated Odour Footprint (current)				Total Estimated Odour Footprint (proposed)					
		5,047				5,375					

[A] The Specific Odour Emission Rates (SOER) were collected using a Wind Tunnel Sampling Apparatus
[B] The SOER was collected using an Isolation Flux Hood (IFH)
[1] Consulting Environmental Engineers: Odour Predictions for Busselton WWTP (August 2009)
[2] The Odour Unit (WA) P/L: Odour Sampling & Testing at Gordon Road and Alkimos WWTP's (July 2014)
[3] The Odour Unit (WA) P/L: Odour Sampling & Testing at Geraldton North WWTP (January 2015)
[4] Consulting Environmental Engineers: Report on Odour Modelling for Halls Head WWTP (August 2006)
[5] Consulting Environmental Engineers: Report on Odour Modelling for Harvey WWTP (September 2008)

Figure supplied as part of the application

The predicted odour footprint of the upgraded Waroona WWTP shows that in considering the areas of the newly proposed infrastructure, the expected odour footprint from the proposed infrastructure is not likely to result in a significant change from what the odour emissions currently experienced at the WWTP.

The land use encompassing the WWTP is solely Agricultural and encompasses the nearest rural residential receivers, as per Figure 6.

Figure 6. Land Use surrounding the Premises

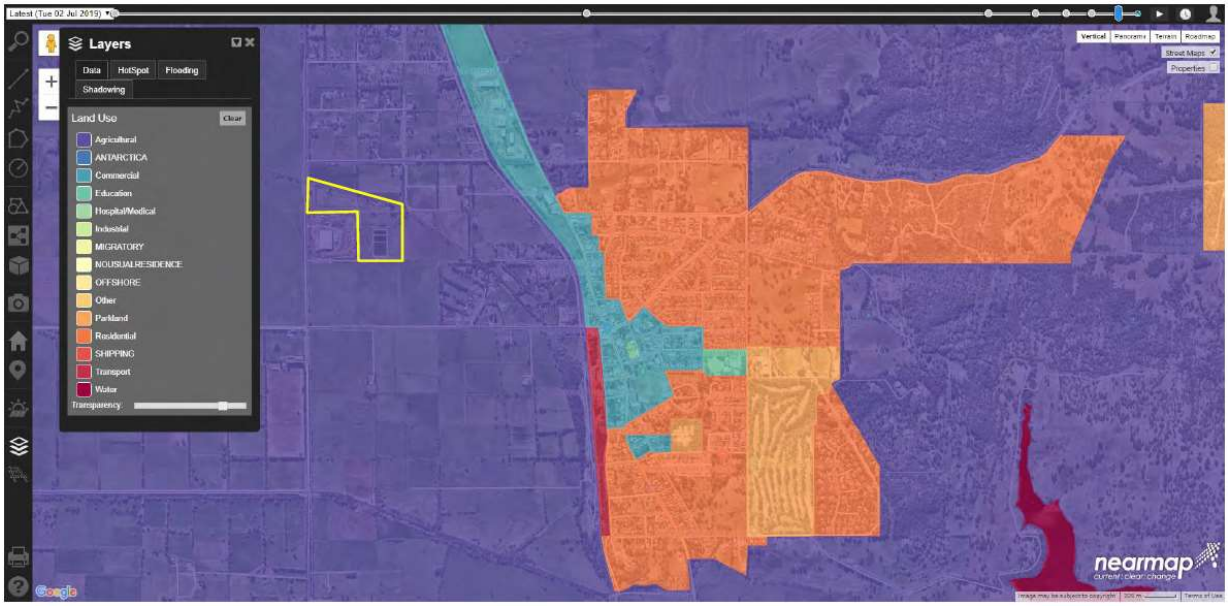


Figure supplied as part of the application

7. Consultation

The application was advertised in the West Australian on 14 November 2019 for public comment. No submissions were received.

The Department of Health was informed of the proposal on 12 August 2020 following the

application addendum to removal the existing pond system from the treatment process. Correspondence provided by the Department of Health on 3 September 2020 indicated that they had no objections to the proposal subject to the following:

- implementation of a process control table for the treatment plant;
- adequate maintenance of the clay-lined swale and Drakesbrook drain to minimise mosquito breeding;
- monthly monitoring of E. coli concentrations at the point of discharge;
- a communication plan being implemented, in the event odour complaints are received during the commissioning of the works;
- demonstration that the existing drain is capable to manage the additional 200 kL/day on the long term to minimise risk of wastewater overflow/ponding; and
- maintenance of training records for the oxidation ditch technology operators after commissioning of the upgrades.

8. Location and siting

8.1 Siting context

The Premises is situated approximately 2 km west of the township of Waroona and is within a rural setting with limited nearby sensitive receptors. The site is reserved for Public Purpose (public utilities) under the Shire of Waroona's Local Planning Scheme No. 4, and surrounded by areas zoned as 'Rural 2 - irrigated agriculture'.

The surrounding land uses are predominantly rural and agricultural uses (cattle/mixed grazing), some crops and rural residential developments.

The site is within the Peel-Harvey Environmental Protection Policy (EPP) area. The EPP legally defined the Peel Inlet and the Harvey Estuary as the Catchment Area for statutory and policy application, with approved Ministerial Conditions (refer to section 5.2.2 for details of the EPP and associated WQIP).

8.2 Residential and sensitive Premises

The distances to residential and sensitive receptors are detailed in Table 7.

Table 7: Receptors and distance from activity boundary

Sensitive Land Uses	Distance from Prescribed Activity
Residential Premises	The nearest residential dwelling is located approximately 400 m to the north of the Premises, with a number of rural residential dwellings located approximately 450 m to the southeast of the Premises

8.3 Specified ecosystems

Specified ecosystems are areas of high conservation value and special significance that may be impacted as a result of activities at or Emissions and Discharges from the Premises. The distances to specified ecosystems are shown in Table 8. Table 8 also identifies the distances to other relevant ecosystem values which do not fit the definition of a specified ecosystem.

The table has also been modified to align with the *Guidance Statement: Environmental Siting.*

Table 8: Environmental values

Specified ecosystems	**Distance from the Premises**
Ramsar Sites in Western Australia	The Premises is connected to the RAMSAR listed Peel-Yalgorup wetland system 20 km to the west. The Peel-Yalgorup wetland system includes the Peel-Harvey estuary and Yalgorup Lakes system, connected via the Harvey River.
Geomorphic Wetlands	The Premises is located within a Multiple use Palusplain (UFI: 15231).
Peel Harvey Environmental Protection Policy	The Premises is located within the Peel-Harvey Environmental Protection Policy area.
Threatened Ecological Communities and Priority Ecological Communities	The nearest ecological communities are two locations of the *Shrublands on dry clay flats* and *Kingia australis woodlands on heavy soils* threatened ecological communities, located approximately 1.8 km to the north of the Premises.
Biological component	**Distance from the Premises**
Threatened/Priority Fauna	Eight sites classified as '*Carnabys Cockatoo Feed Areas Investigation Required'* were identified within a 2 km radius around the Premises.
Other relevant ecosystem values	**Distance from the Premises**
Aboriginal Heritage site	The nearest Aboriginal Heritage site is located approximately 900 m east of the Premises: • Drake Road Dampland (ID: 23546); Lodged; camp, water source

8.4 Groundwater and water sources

The distances to groundwater and water sources are shown in Table 9.

Table 9: Groundwater and water sources

Groundwater and water sources	Distance from Premises and description of environmental value
Public drinking water source areas	- There are no public drinking water source protection areas in the Murray groundwater area.
Major watercourses/waterbodies	- The Premises is situated within the Peel-Harvey catchment, capturing all the land that drains to the Peel Inlet and Harvey Estuary and the adjacent land that drains to the ocean, including catchments of the Serpentine, Murray and Harvey Rivers. - The Drakesbrook Drain (minor tributary), located adjacent to the north of the Premises, is within the Drakesbrook Drain subcatchment of the Harvey catchment area. Drakesbrook Drain flows in a westerly direction, with the drain classified as intermittent (non-perennial), with discontinuous to no flow observed during dryer months of the year - The rural drainage network in the Waroona area was developed to alleviate water inundation to properties, supporting agricultural production, including low lying areas and areas which would normally become waterlogged. The natural flow of Drakesbrook Drain has been modified by engineering works to form part of the drainage network and support agricultural production in the area. - The Waroona Main Drain is also located approximately 1.5 km south of the Premises and flows in a westerly direction. The confluence of Drakesbrook Drain and Waroona Main Drain is approximately 5.8 km west of the Premises. The Waroona Main Drain / Drakesbrook Drain flow into the Harvey River and eventually the Peel-Harvey
Groundwater	- The nearest licensed groundwater abstraction bore is 1.75 km to the east of the premises (GWL170892(1)), based on available GIS dataset –WIN Groundwater Sites. Only one other licensed groundwater abstraction bore is located within a 3 km radius of the Premises. - The nearest groundwater bore for use by irrigation, domestic/household or livestock is approximately 900m west/south-west of the premises. Numerous bores are located within a 2 km radius of the Premises, predominantly to the north. - The major groundwater resource of the region is held within the Yoganup Formation (Qpr). Groundwater table contours indicate that regional groundwater flows to the west towards the coast. - Waterlogging within the vicinity of the Waroona WWTP is observed to occur in the wet season. This indicates that a perched, seasonal water table may be present above the surface Guilford Cay (Qpa) formation during the winter months. Depth to groundwater, therefore, in the surficial aquifer is likely to be shallow (<1 m) - Groundwater across the Premises is estimated to be between 1 and 7 mbgl. A Geotechnical Investigation conducted in July 1986 identified the current Wastewater Treatment area intercepted groundwater at depths between 2.5 and 3.2 mbgl.

8.5 Soil type

Table 10 details soil types and characteristics relevant to the assessment.

Table 10: Soil and sub-soil characteristics

Classification	Characteristics
Soil type classification - Pinjarra P3 Phase	Perth Metropolitan Region 1:50 000 environmental geology series (1: 50,000 Sheet 2032 II) indicates that the areas surrounding the Premises site are underlain by Pleistocene age, unconsolidated material of the Guilford and Yoganup Formations. The sandy silt of the Guilford Formation (Qpa) is described as strong brown, variable clay content, mottled, blocky, silt with disseminated fine sub-angular quartz sand, and may extend to a depth of 10 m thick. The Yoganup Formation (Qpr) underlies the Guilford Formation (Qpa), and is described as sand, dark yellow to orange, medium to coarse, sub-angular to sub-rounded quartz with heavy minerals. The Yoganup Formation appears in outcrop to the east of the Site, close to the boundary with the Darling Fault. The Premises is mapped within the Pinjarra P3 Phase within the Pinjarra Zone, described as flat to very gently undulating plain with deep, imperfect to poorly drained acidic gradational yellow or grey-brown earths and mottled yellow duplex soils, with loam to clay loam surface horizons
Acid sulfate soil risk - Low to Moderate risk	The CSIRO acid sulphate soils (ASS) Atlas indicates the Premises as having 'Low to Moderate' risk of ASS within the first 3 m of natural ground level within the site and surrounding area.

8.6 Meteorology

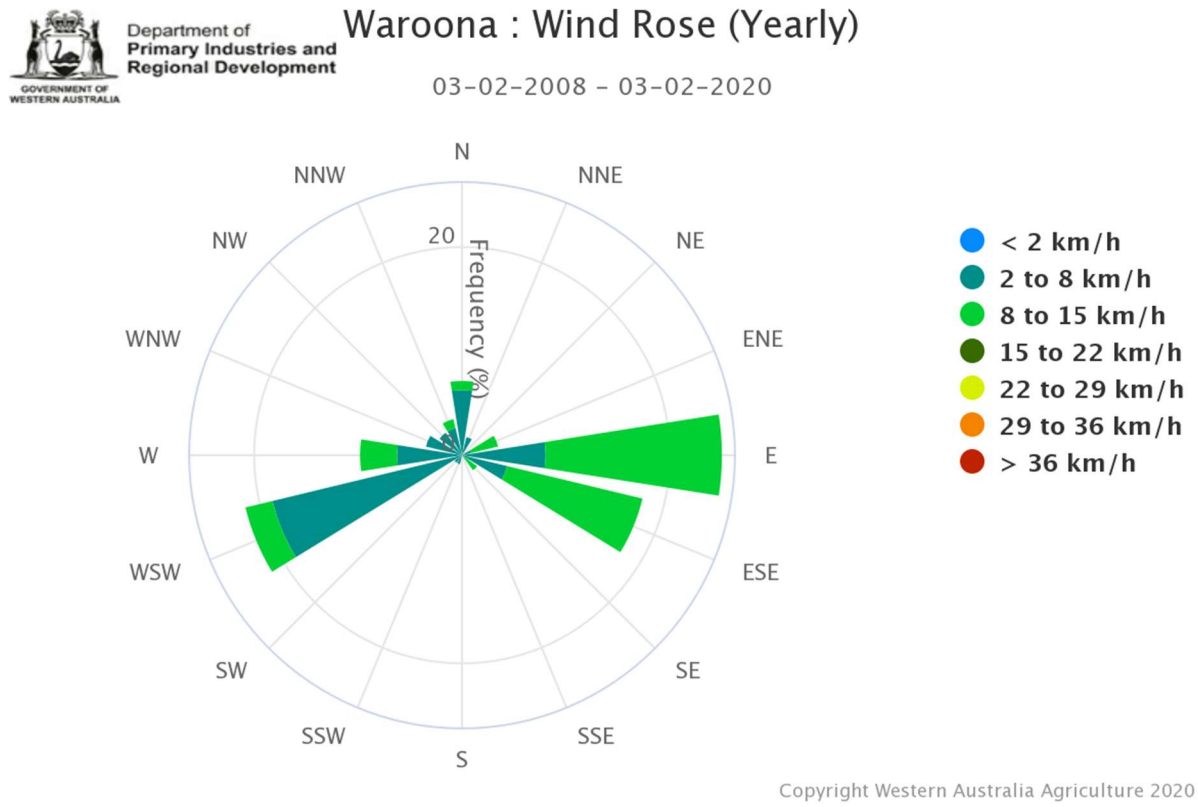
The Department of Primary Industries and Regional Development (DPIRD) operates a network of automatic weather stations and radars throughout the state. The nearest DPIRD weather station to the Premises is Waroona (code: WR), which is operated by Harvey Water.

8.6.1 Wind direction and strength

The annual wind rose for the Waroona weather station is presented in Figure 7. This data indicates that winds are predominantly from the west to south-west and from the east to south-east. Based on the wind direction data, identified sensitive receptors may, at time, be located downwind of the Premises, particularly to the south east, and have the potential to be impacted by odour emissions transmitted by air.

It is important to note that this wind roses show historical wind speed and wind direction data for should not be used to predict future data.

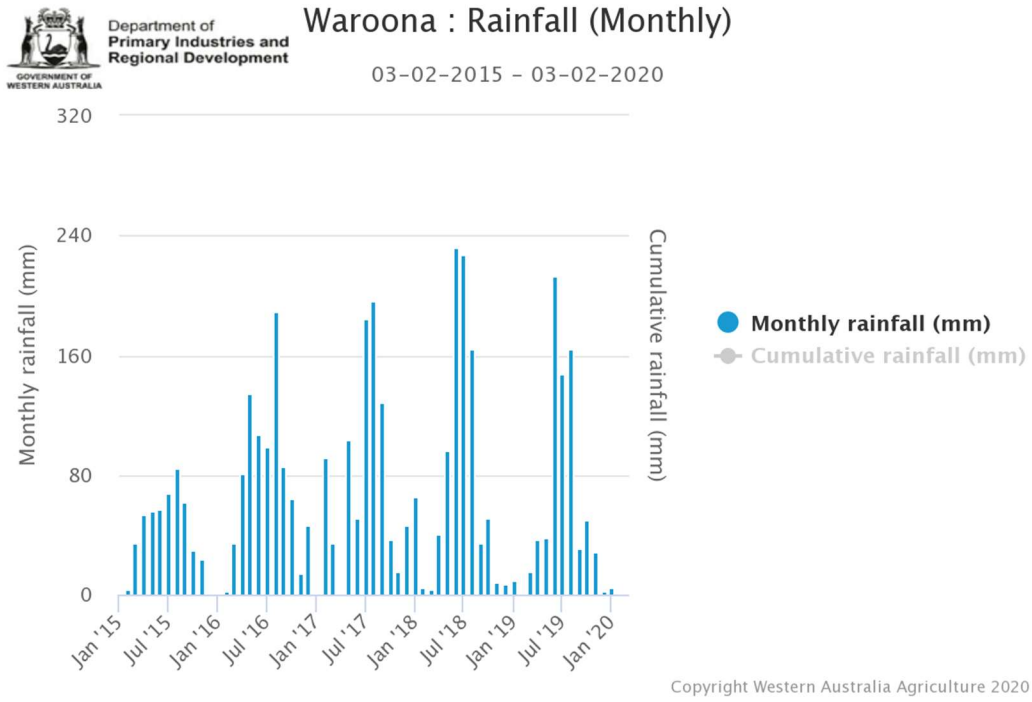
Figure 7. Annual wind rose for Waroona weather station



8.6.2 Rainfall

The annual average rainfall at the Waroona weather station is presented in Figure 8. Rainfall predominantly occurs in the winter months, when it can be expected that the potential for surface run-off to discharge from the Premises is most likely.

Figure 8. Annual rainfall at Waroona weather station



9. Risk assessment

9.1 Determination of emission, pathway and receptor

In undertaking its risk assessment, DWER will identify all potential emissions pathways and potential receptors to establish whether there is a Risk Event which requires detailed risk assessment.

To establish a Risk Event there must be an emission, a receptor which may be exposed to that emission through an identified actual or likely pathway, and a potential adverse effect to the receptor from exposure to that emission. Where there is no actual or likely pathway and/or no receptor, the emission will be screened out and will not be considered as a Risk Event. In addition, where an emission has an actual or likely pathway and a receptor which may be adversely impacted, but that emission is regulated through other mechanisms such as Part IV of the EP Act, that emission will not be risk assessed further and will be screened out through Table 12.

The identification of the sources, pathways and receptors to determine Risk Events are set out in Tables 11 and 12 below. Table 11 depicts the Risk Events associated with the construction of the proposed infrastructure, while Table 12 depicts the Risk Events associated with the commissioning and time-limited operations of the proposed infrastructure.

Table 111. Identification of emissions, pathway and receptors during construction

Risk Events						Continue to detailed risk assessment	Reasoning
Sources/Activities		Potential emissions	Potential receptors	Potential pathway	Potential adverse impacts		
Construction, mobilisation and positioning of infrastructure	Vehicle movements on unsealed access roads Construction of new infrastructure Decommissioning of existing infrastructure (inlet tower) Decommissioning of ponds and associated infrastructure (pipework and flow meter)	Dust	The nearest residential dwelling is located approximately 400 m to the north of the Premises	Air / wind dispersion	Amenity impacts	No	The following controls will be implemented by the Applicant: • The project will utilise pre-cast concrete structures that will limit the nature of construction works conducted onsite that may create dust; • Hardstand areas will be created around infrastructure areas; • Wetting/dust suppression of unsealed surfaces using benign dust suppressants will be used on disturbed areas as required; • Site preparation and excavations (cut and fill) will not be conducted if wind conditions are extreme, where practicable • Weather forecasts will be checked daily and high risk weather conditions will be monitored and additional wetting/dust suppressant used on unsealed surfaces during these conditions; • Trucks are to be washed down before leaving the premises to stop the spread or generation of dust offsite during construction activities; and • Speed limited on site will be adhered to on unsealed and sealed roads. The Delegated Officer considers the prevailing wind conditions are unlikely to provide a pathway for minor dust emissions to impact the nearest sensitive receptors. Due to the short term nature of decommissioning and construction activities, any emissions of dust may be subject to the provisions of section 49 of the EP Act. No further risk assessment is required.

Risk Events						Continue to detailed risk assessment	Reasoning
Sources/Activities		Potential emissions	Potential receptors	Potential pathway	Potential adverse impacts		
Construction, mobilisation and positioning of infrastructure	Vehicle movements on unsealed access roads Construction of new infrastructure Decommissioning of existing infrastructure (inlet tower) Decommissioning of ponds and associated infrastructure (pipework and flow meter)	Noise	The nearest residential dwelling is located approximately 400 m to the north of the Premises	Air / wind dispersion	Amenity impacts	No	The following controls are proposed to be implemented by the Applicant: • Night construction works is not expected; • Vehicles and equipment will be fitted with appropriate noise controls; • All plant, equipment and vehicles will be regularly inspected and maintained; • A complaints register will be kept on site and reported in the AER; The Delegated Officer considers the separation distance sufficient to ensure daytime noise emissions will not significantly impact upon amenity during construction. As night construction works is not expected, this assessment and subsequent conditions within the Works Approval is based on daytime construction only. In the event that the Applicant requires night construction works, the Applicant will be responsible to determine any deviations regarding noise emissions from the approved Works Approval. At this occurrence, an amendment to the Works Approval would be required to assess the risks associated with the revised works. Due to the short term nature of construction activities, any emissions of daytime noise may be subject to the provisions of the *Environmental Protection (Noise) Regulations 1997*. No further risk assessment is required.

Risk Events						Continue to detailed risk assessment	Reasoning
Sources/Activities		Potential emissions	Potential receptors	Potential pathway	Potential adverse impacts		
Construction, mobilisation and positioning of infrastructure	Construction of new infrastructure	Spills of hydrocarbons and other chemicals from vehicles and equipment	Surface water and riparian habitat Beneficial users of groundwater	Direct discharge to land and surface waters	Soil contamination inhibiting vegetation survival and growth and impacting fauna habitat Surface water and groundwater contamination	No	The following controls are proposed to be implemented by the Applicant: • All hazardous chemicals and hydrocarbons required on site are to be stored in appropriately bunded areas compliant with AS1940 and AS192 to contain any potential leaks or spills; • Appropriate spill response equipment for hazardous materials will be identified and readily accessible in areas where hazardous materials are stored; • All staff and contractors involved in the handling of hazardous chemicals and fuels will be suitably trained; • Scheduled maintenance and servicing of equipment and vehicles is to be conducted offsite as per manufacturer's specifications; and • Hardstand areas created will be sufficiently graded and bunded to contain spills or accidental. Discharges of hydrocarbons and other chemicals may also be subject to the provisions of the *Environmental Protection (Unauthorised Discharges) Regulations 2004* No further risk assessment is required.

Risk Events						Continue to detailed risk assessment	Reasoning
Sources/Activities		Potential emissions	Potential receptors	Potential pathway	Potential adverse impacts		
	Decommissioning of existing infrastructure (inlet tower) Decommissioning of ponds and associated infrastructure (pipework and flow meter)	Odour	The nearest residential dwelling is located approximately 400 m to the north of the Premises	Air / wind dispersion	Amenity impacts	No	The desludging of the existing treatment ponds may be undertaken in accordance with Licence L5400/1992/12. The Existing Licence requires a notification period of 14 days prior to The removal of sewage sludge from any on-site treatment pond, with details including the proposed date, duration and details of works, including fate of sludge necessary. Due to the short term nature of decommissioning and construction activities, any emissions of odour may be subject to the provisions of section 49 of the EP Act. The Delegated Officer considers current regulatory controls within the Existing Licence sufficient to prevent an emission occurring under most circumstances. Upon amendment of the licence post-construction, the licence conditions will be updated to reflect new infrastructure. No further risk assessment is required.

Risk Events						Continue to detailed risk assessment	Reasoning
Sources/Activities		Potential emissions	Potential receptors	Potential pathway	Potential adverse impacts		
		Rupture of pipes resulting in sewage discharge to land or groundwater	Overland flow Subsurface seepage	Surface water and riparian habitat Beneficial uses of groundwater	Potential impact to aquatic ecosystems Soil contamination inhibiting native vegetation	No	The Existing Licence requires a notification period prior to taking any treatment pond offline for maintenance works. The potential for ruptures of pipework during decommissioning is unlikely due to the pond treatment infrastructure being isolated once the oxidation ditch is operational. Due to the short term nature of decommissioning and construction activities, any emissions of wastewater and solids may be subject to the provisions of section 49 of the EP Act. The Delegated Officer considers current regulatory controls within the Existing Licence sufficient to prevent an emission occurring under most circumstances. Upon amendment of the licence post-construction, the licence conditions will be updated to reflect new infrastructure and available monitoring equipment. No further risk assessment is required.

Table 122: Identification of emissions, pathway and receptors during commissioning and time-limited operation

Risk Events						Continue to detailed risk assessment	Reasoning
Sources/Activities		Potential emissions	Potential receptors	Potential pathway	Potential adverse impacts		
Wastewater Treatment Plant	Treatment of sewage	Odour	The nearest residential dwelling is located approximately 400 m to the north of the Premises	Air / wind dispersion	Amenity impacts	Yes	See section 9.4

Risk Events						Continue to detailed risk assessment	Reasoning
Sources/Activities		Potential emissions	Potential receptors	Potential pathway	Potential adverse impacts		
	Treatment of sewage	Rupture of pipes / overtopping of holding tanks resulting in sewage discharge to land	Overland flow Subsurface seepage	Surface water and riparian habitat Beneficial uses of groundwater	Potential impact to aquatic ecosystems Soil contamination inhibiting native vegetation	No	The upgraded WWTP (oxidation ditch) is made out of prefabricated concrete and will have a permeability ranging between 1.7 x 10^{-11} m/s and 3.5 x 10^{-15} m/s. Earthworks will be bituminous Geomembrane lined with a permeability of 10^{-13} m/s. Wastewater inflow and outflow will be measured as a control for the possibility the structure will leak. Drakesbrook Drain provides adequate capacity for the increased outflow, with the increase minor in scale when compared to the capacity of the drain. The Delegated Officer considers that the effectiveness of the applicant controls for mitigation of these emissions depends on quality of construction of the infrastructure and therefore controls will be included in the works approval to require submission of a construction compliance report prior to the commencement of commissioning and operation of the infrastructure. The Delegated Officer considers current regulatory controls within the Existing Licence sufficient to prevent an emission occurring under most circumstances. Upon amendment of the licence post-construction, the licence conditions will be updated to reflect new infrastructure and available monitoring equipment. No further risk assessment is required.

Risk Events						Continue to detailed risk assessment	Reasoning
Sources/Activities		Potential emissions	Potential receptors	Potential pathway	Potential adverse impacts		
	Treatment of sewage	Contamination of stormwater	Overland flow Subsurface seepage	Surface water and riparian habitat Beneficial uses of groundwater	Soil contamination Inhibiting vegetation survival and growth and impacting fauna habitat Degradation of surface water and groundwater quality	No	Stormwater drainage is present along the southern site boundary along with drainage channels to assist with excess surface stormwater flow in the north-eastern portion of the Premises, diverting excess rainfall run off to the channel and/or the Drakesbrook Drain. Drakesbrook Drain provides adequate capacity for the increased outflow, with the increase minor in scale when compared to the capacity of the drain. The Delegated Officer considers that the controls proposed by the Applicant are sufficient to prevent an emission occurring under most circumstances. Any discharges may be subject to the provisions of the *Environmental Protection (Unauthorised Discharges) Regulations 2004*. Operational outcomes (reportable events and monitoring conditions) are reflected in the regulatory controls of the existing Licence will be reviewed and updated at Licence Amendment stage. No further risk assessment is required.

Risk Events						Continue to detailed risk assessment	Reasoning
Sources/Activities		Potential emissions	Potential receptors	Potential pathway	Potential adverse impacts		
Wastewater Treatment Plant	Treatment of sewage	Noise	The nearest residential dwelling is located approximately 400 m to the north of the Premises	Air / wind dispersion	Amenity impacts	No	The primary control for managing operational noise of the treatment facility is minimising the occurrence of falling or splashing water through careful hydraulic design of the plant. The Delegated Officer considers the separation distance sufficient to ensure noise emissions will not significantly impact upon amenity during operation. Noise emissions may be subject to the provisions of the *Environmental Protection (Noise) Regulations 1997*. No further risk assessment is required.

Risk Events						Continue to detailed risk assessment	Reasoning
Sources/Activities		Potential emissions	Potential receptors	Potential pathway	Potential adverse impacts		
Wastewater Treatment Plant	Desludging	Sludge containing highly concentrated contaminants	Surface water and riparian habitat Beneficial uses of groundwater	Overland flow and runoff Subsurface seepage	Contamination of soil Impact to vegetation health Degradation of groundwater quality	No	Excess activated sludge created by the secondary treatment stage is removed to maintain process stability and will be dewatered and stabilised in geotextile bags within a bunded, lined hardstand area. The geobags will stand within the hardstand area for up to six months whilst drying. Once dried, the sludge cake (WAS) will be transferred to an appropriate waste facility. All leachate from the sludge drying process will be returned to the start of treatment plant The Delegated Officer considers that the effectiveness of the applicant controls for mitigation of these emissions depends on quality of construction of the infrastructure and therefore controls will be included in the works approval to require submission of a construction compliance report prior to the commencement of commissioning and time-limited operation of the infrastructure. The Delegated Officer considers current regulatory controls within the Existing Licence sufficient to prevent an emission occurring under most circumstances. Upon amendment of the licence post-construction, the licence conditions will be updated to reflect new infrastructure. No further risk assessment is required.
Discharge to Drakesbrook Drain	Discharge of treated wastewater	Treated wastewater containing contaminants (e.g. nutrients, pathogens)	Surface water and riparian habitat Beneficial uses of groundwater	Overland flow and runoff Subsurface seepage	Contamination of soil Impact to vegetation health Degradation of groundwater quality	Yes	See section 9.5

Risk Events						Continue to detailed risk assessment	Reasoning
Sources/Activities		Potential emissions	Potential receptors	Potential pathway	Potential adverse impacts		
Emergency discharge to woodlot	Discharge of treated wastewater	Treated wastewater containing contaminants (e.g. nutrients, pathogens)	Surface water and riparian habitat Beneficial uses of groundwater	Overland flow and runoff Subsurface seepage	Contamination of soil Impact to vegetation health Degradation of groundwater quality	No	The discharge of treated wastewater to the woodlot to only occur as a contingency and/or if the clay-lined swale is offline for maintenance/repair was previously assessed in the Existing Licence. The Existing Licence requires a notification period of 14 days prior to treated wastewater being discharged to the woodlot. DWER notes that no such notifications have been received since 2016, with no evidence of this discharge occurring. Given that the quality of treated wastewater from the proposed oxidation ditch will reduce the loading of nutrients, the Delegated Officer considers that the controls proposed by the Applicant, along with the controls on the Existing Licence, are sufficient to prevent an emission causing impact occurring under most circumstances. It is noted that the Licence Holder requested the removal of reference to the woodlot as discharge will not occur in this location. However, as the Existing Licence allows treated wastewater to be discharged to the woodlot under certain conditions, the woodlot has remained within the risk assessment of this Application. No further risk assessment is required.

Risk Events						Continue to detailed risk assessment	Reasoning
Sources/Activities		Potential emissions	Potential receptors	Potential pathway	Potential adverse impacts		
Wastewater Treatment Plant	Onsite operational equipment	Spills of hydrocarbons and chemicals such as alum and chlorine	Surface water and riparian habitat Beneficial uses of groundwater	Direct discharge to land and surface waters	Soil contamination inhibiting vegetation growth and survival and health impacts to fauna Degradation of surface water and groundwater quality	No	During operations, all chemicals will be stored in purpose built areas that comply with AS3780: The storage and handling of corrosive substances. This includes hardstands and bunds capable of containing a major failure of storage tanks. The existing chemical dosing system at the site is aluminium sulphate which will be utilised for alum dosing. A standby sucrose dosing system will be implemented at the site for the upgrade to provide an additional carbon source to aid the denitrification process during treatment. The sucrose dosing system will be used as required and is not intended for daily or regular use. Sucrose may be dosed where inflows have been identified as carbon deficient. Sucrose will be dosed directly into the secondary treatment system. The Delegated Officer considers there is no foreseeable risk from spills of chemicals and hydrocarbons given the Applicant's proposal. No further risk assessment is required.

9.2 Consequence and likelihood of risk events

A risk rating will be determined for risk events in accordance with the risk rating matrix set out in Table 13 below.

Table 13: Risk rating matrix

Likelihood	Consequence				
	Slight	Minor	Moderate	Major	Severe
Almost certain	Medium	High	High	Extreme	Extreme
Likely	Medium	Medium	High	High	Extreme
Possible	Low	Medium	Medium	High	Extreme
Unlikely	Low	Medium	Medium	Medium	High
Rare	Low	Low	Medium	Medium	High

DWER will undertake an assessment of the consequence and likelihood of the Risk Event in accordance with Table 14 below.

Table 14: Risk criteria table

Likelihood		Consequence		
The following criteria has been used to determine the likelihood of the Risk Event occurring.		The following criteria has been used to determine the consequences of a Risk Event occurring:		
			Environment	Public health* and amenity (such as air and water quality, noise, and odour)
Almost Certain	The risk event is expected to occur in most circumstances	Severe	• **onsite impacts**: catastrophic • **offsite impacts local scale**: high level or above • **offsite impacts wider scale:** mid-level or above • Mid to long-term or permanent impact to an area of high conservation value or special significance^ • Specific Consequence Criteria (for environment) are significantly exceeded	• Loss of life • **Adverse health effects:** high level or ongoing medical treatment • Specific Consequence Criteria (for public health) are significantly exceeded • **Local scale impacts:** permanent loss of amenity
Likely	The risk event will probably occur in most circumstances	Major	• **onsite impacts**: high level • **offsite impacts local scale**: mid-level • **offsite impacts wider scale**: low level • Short-term impact to an area of high conservation value or special significance^ • Specific Consequence Criteria (for environment) are exceeded	• **Adverse health effects:** mid-level or frequent medical treatment • Specific Consequence Criteria (for public health) are exceeded • **Local scale impacts**: high level impact to amenity
Possible	The risk event could occur at some time	Moderate	• **onsite impacts**: mid-level • **offsite impacts local scale**: low level • **offsite impacts wider scale**: minimal • Specific Consequence Criteria (for environment) are at risk of not being met	• **Adverse health effects:** low level or occasional medical treatment • Specific Consequence Criteria (for public health) are at risk of not being met • **Local scale impacts:** mid-level impact to amenity
Unlikely	The risk event will probably not occur in most circumstances	Minor	• **onsite impacts**: low level • **offsite impacts local scale**: minimal • **offsite impacts wider scale**: not detectable • Specific Consequence Criteria (for environment) likely to be met	• Specific Consequence Criteria (for public health) are likely to be met • **Local scale impacts:** low level impact to amenity
Rare	The risk event may only occur in exceptional circumstances	Slight	• **onsite impact**: minimal • Specific Consequence Criteria (for environment) met	• **Local scale**: minimal to amenity • Specific Consequence Criteria (for public health) met

^ Determination of areas of high conservation value or special significance should be informed by the *Guidance Statement: Environmental Siting.*

* In applying public health criteria, DWER may have regard to the Department of Health's *Health Risk Assessment (Scoping) Guidelines.*

"onsite" means within the Prescribed Premises boundary.

9.3 Acceptability and treatment of Risk Event

DWER will determine the acceptability and treatment of Risk Events in accordance with the Risk treatment table 15 below:

Table 15: Risk treatment table

Rating of Risk Event	Acceptability	Treatment
Extreme	Unacceptable.	Risk Event will not be tolerated. DWER may refuse application.
High	May be acceptable. Subject to multiple regulatory controls.	Risk Event may be tolerated and may be subject to multiple regulatory controls. This may include both outcome-based and management conditions.
Medium	Acceptable, generally subject to regulatory controls.	Risk Event is tolerable and is likely to be subject to some regulatory controls. A preference for outcome-based conditions where practical and appropriate will be applied.
Low	Acceptable, generally not controlled.	Risk Event is acceptable and will generally not be subject to regulatory controls.

9.4 Risk Assessment – Odour

9.4.1 Description of Odour - Operation

Emissions of odours associated with raw and treated sewage may be released from the secondary treatment system causing an adverse amenity impact on sensitive receptors.

9.4.2 Identification and general characterisation of emission

The proposed upgrade to an oxidation ditch, clarifiers and sludge handling and storage configuration allows an increase in throughput which in turn requires faster treatment times to compensate for the increased influent streams.

A desktop odour impact assessment of the proposed works (September 2019, Project Ref: EAQ-19020) by Environmental and Air Quality Consulting Pty Ltd was submitted within the application. The assessment identified that the primary odour emissions from the proposed upgrades will likely be from the inlet where odour is typically confined to the immediate vicinity around the inlet works. Other sources of odour include the oxidation ditches, clarifiers and sludge handling and storage area.

The assessment also states that the estimated increase in mass odour emission rates generated by the proposed works is <10% of the existing estimated baseline mass odour emission rates.

9.4.3 Description of potential adverse impact from the emission

The impacts from odours can vary from being just detectable to levels that can cause nuisance and become objectionable and offensive. The main effect of environmental odour is nuisance, but stronger or persistent odours can lead to feelings of nausea, headache, loss of sleep and other symptoms of stress.

Repeated exposure to nuisance levels of odour can lead to a high level of annoyance. The more often, strong and ongoing an odour is, the more it can impact the community

9.4.4 Criteria for assessment

The following criteria have been used to evaluate the risk associated with operational odour:

- Public Health and Amenity – Risk Criteria Table 1 (DER, 2017);
- *Guideline: Odour Emissions (DWER, 2019);*
- *Guidance Statement: Environmental Siting (DER 2016).*

9.4.5 Applicant controls

This assessment has reviewed the controls set out in Table 16 below.

Table 1613: Applicant's proposed controls for Operation - Odour

Site infrastructure	Description	Operation details	Reference to issued licence plan
Controls for odour emissions			
Wastewater Treatment Plant and new infrastructure	Pre-Treatment Inlet Works	- The preliminary grit removal system will be a closed unit - Flows measured by inline magnetic flow meter - System operation is automatically controlled by the site programmable logic controller (PLC) - Grit tank has continuous aeration	Application supporting documentation (See Table 2).
	Secondary treatment works	- Outflow weirs decant sludge - Waste Activated Sludge transferred daily to geobags as an ongoing operational activity. Geobags will be rotated periodically, as required, on up to six month rotations as required.	Application supporting documentation (See Table 2).

9.4.6 Key findings

The Delegated Officer has reviewed the information regarding operational odour emissions and has found:

1. Based on the information presented in the desktop odour assessment (EAQ, 2019), the anticipated rate of odour emissions from the proposed works are likely to be similar to the current rate odour emissions from the existing infrastructure.
2. The anticipated odour emissions from the proposed works are likely to less malodourous and persistent than current odour emissions, due to the inlet works being enclosed and the oxidation ditch having a smaller footprint than the pond system.
3. Uncontrolled odour emissions under current normal operations are not present at a concentration that causes noticeable impact to amenity at the nearest sensitive receiver. This is based on the current complaint record from the Premises and incidents submitted to DWER.

9.4.7 Consequence

If operational odour emissions occur, then the Delegated Officer has determined that the amenity impacts will not change significantly from current level, and are likely to be low level on-site impacts, minimal off-site impacts, not detectable off-site wider scale impacts with Specific Consequence Criteria likely to be met. Therefore, the Delegated Officer considers the consequence of operational odour emissions to be **Minor**.

9.4.8 Likelihood of Risk Event

The Delegated Officer has determined that the likelihood of operational odour emissions occurring will probably not occur in most circumstances. Therefore, the Delegated Officer considers the likelihood of operational odour emissions to be **Unlikely**.

9.4.9 Overall rating of Odour - Operation

The Delegated Officer has compared the consequence and likelihood ratings described above with the risk rating matrix (Table 13) and determined that the overall rating for the risk of operational odour emissions is **Medium**.

9.5 Risk Assessment – Discharge to land

9.5.1 Description of Discharge to land - Operation

Treated wastewater is to be directed through the clay-lined channel prior to reaching the Boundary Discharge Point 2, whereby it converges with Drakesbrook Drain. Treated wastewater can also be discharged to a woodlot within the Premises as a contingency measure /or if the clay-lined channel is temporarily offline for maintenance or repair work. Both of these discharge point locations do not vary from those currently licensed at the Premises.

9.5.2 Identification and general characterisation of emission

The risk assessment is based on the proposed oxidation ditch increasing wastewater treatment capacity to an annual average daily inflow of up to 440 m^3/day and the key chemical performance parameters of the treated wastewater identified in Figure 9.

Figure 9. Performance values comparison

Parameter	Oxidation Ditch Performance Value (Median)	Current WWTP Median Final Effluent Results July 2009 to July 2019
BOD	<5 mg/L	20 mg/L
TN	<5 mg/L	30 mg/L
TP	<1.0 mg/L	2.4 mg/L
TSS	<20 mg/L	75 mg/L

The proposed oxidation ditch will reduce the final effluent quality of TP, TN, BOD and TSS when compared to the current WWTP. Based on 2018/19 outflows (average 258 kL/day), the upgraded oxidation ditch will reduce loading of TP by ~61%, TN by ~85%, BOD by ~85% and TSS by ~80%. The WWTP upgrade capacity is expected to be reached in 2048. In 2048 with average outflows of 440 kL/day, the upgraded WWTP will still have reduced TP, TN, BOD and TSS loading compared to the current WWTP with 2018/19 outflows.

The upgraded WWTP will also continue to discharge effluent to Drakesbrook Drain via the clay-lined channel. It is expected the clay-lined channel will continue to reduce TP concentrations further through sorption and fixation to aluminium naturally found within the clay.

Tertiary pathogen treatment will no longer occur due to the decommissioning of the clay-lined pond system. Review of surface water sampling within Drakesbrook Drain shows that upstream results show high counts of total coliforms (41,000 CFU/100mL) as a background level (relative to the Premises) of microbial contamination existing within the drain system. The results also show elevated bacterial counts downstream (520,000 CFU/100mL) which are significantly higher than the treated water entering the system from the Premises (average of 6,000 CFU/100mL). The receiving environment near the inlet to the Harvey River shows attenuation of pathogen levels of total coliform of 380 CFU/100mL and E. coli of 110 CFU/100mL.

9.5.3 Description of potential adverse impact from the emission

Untreated or incorrectly treated wastewater may contain elevated concentrations of nitrogen and phosphorus as well as metals, metalloids, persistent organic pollutants and pathogens. During discharges of treated wastewater to land (source) the release of contaminants in elevated concentrations (emission) by overland flow and runoff and subsurface seepage (pathway) may cause adverse impact to aquatic and riparian ecosystem health, surface water, contamination of soil, impacts to riparian vegetation health and degradation of groundwater quality (adverse impact). Pathogens may cause impact to human health.

Wastewater, if treated sufficiently, should contain contaminants and pathogens at levels adequate for the receiving environment to appropriately buffer, thereby preventing or minimising adverse impacts to the environment.

9.5.4 Criteria for assessment

The following criteria have been used to evaluate the risk associated with discharge to land:

- *ANZECC & ARMCANZ (2000) – freshwater criteria;*
- *Department of Water and Environmental Regulation (2008) Water Quality*

Protection Note 22 Irrigation with nutrient-rich wastewater[1];

- *Department of Water (2010) Water Quality Protection Note 33 Nutrient and irrigation management plans[1]; and*
- *National Health and Medical Research Council (2019) – Guidelines for managing risks in recreational water.*

9.5.5 Applicant controls

This assessment has reviewed the controls set out in Table 17 below.

Table 14: Applicant's proposed controls for Discharge to Land

Site infrastructure	Description	Operation details	Reference to issued licence plan
Controls for odour emissions			
Wastewater Treatment Plant and new infrastructure	Secondary treatment works	- The process reactor will be fully lined with impervious bituminous geotextile membrane. - The bitumous geotextile membrane (BGM) to be used has a permeability of 10^{-13} m/s. This will be tested during construction and commissioning of the Factory Acceptance Testing in accordance with international standard ASTM D7748 Standard Test Method for Flexural Rigidity of Geogrids, Geotextiles and Related Products. - Anaerobic selector will be constructed of concrete. - Concrete used will have a permeability ranging between $1.7x10^{-11}$ m/s and $3.5x10^{-15}$ m/s. This will be tested during construction and commissioning in accordance with AS 3735-2001 Concrete Structures Retaining Liquids. - All other process tanks or conveyance systems will be designed, constructed and tested to demonstrate complete containment of relevant process fluids. - Wastewater inflows and outflows will be measured by magflow meters to monitor the integrity of	Application supporting documentation (See Table 2).

[1] Criteria is only relevant for the discharge of treated wastewater to the woodlot

Site infrastructure	Description	Operation details	Reference to issued licence plan
		the upgraded WWTP. - Installation of groundwater bores on-site and four rounds (six months apart) of groundwater sampling over two (2) years will allow an assessment of groundwater condition at the WWTP. - Surface water monitoring in Drakesbrook Drain to confirm attenuation of contaminants upstream and downstream of the discharge point. - The Existing Licence requires water quality monitoring of discharge locations.	

9.5.6 Key findings

The Delegated Officer has reviewed the information regarding discharges to land and has found:

1. DWER internal advice noted that the proposed upgrade to an Oxidation ditch system will likely reduce the average nutrient loading to Drakesbrook Drain when compared to the existing treatment system.
2. The risk assessment is based on the predominant discharge of treated wastewater to the clay-lined channel, with discharge to the woodlot to occur on rare occasions. As the Existing Licence requires notification to DWER prior to discharge to the woodlot, and DWER has not received such notifications since 2016, the risk for such discharge is low. However, should discharge to the woodlot increase in frequency, the factors associated with such discharge would pose a different risk than that assumed in this assessment.
3. It is noted that the Licence Holder requested the removal of reference to the woodlot as discharge will not occur in this location. However, as the Existing Licence allows treated wastewater to be discharged to the woodlot under certain conditions, the woodlot has been retained within the risk assessment of this Application.
4. The basis of the risk assessment for treated wastewater discharge is nutrient loading within Drakesbrook Drain, and the requirements to meet the WQIP. While the predicted treatment concentrations have been taken into account in relation to nutrient loading, they will not form a requirement of the Works Approval. Analysis of monitoring undertaken during commissioning and time-limited operations will provide confirmation of the performance of the treatment plant. Should monitoring results demonstrate performance is considerably different to that proposed, further controls may be imposed at the licensing stage.
5. In relation to pathogen loading within the receiving water, the Department of Health had no objections with the application, subject to monthly monitoring of E. coli concentrations at the point of discharge.

6. The application has assumed that the Drakesbrook and Waroona drains are for the purpose of managing flooding and groundwater water levels for the cleared agricultural land, and therefore are not likely to be accessed by land owners or have water taken for use. The woodlot is not publicly accessible.
7. The capacity of the Drakesbrook drain to receive the additional discharge volume associated with the expected average and peak flows, does not appear to consider flow volumes in response to rainfall etc. Additional information will be required to be submitted with the licence application to verify that the assumption made in this assessment is correct.

9.5.7 Consequence

If treated wastewater is released containing elevated concentrations of contaminants and pathogens, the Delegated Officer has determined that the impact of soil and surface water contamination has the potential to have mid-level on-site impacts, low level off-site impacts at a local scale and minimal off-site impacts at a wider scale.

Therefore, the Delegated Officer considers the consequence of treated wastewater containing elevated concentrations of contaminants to be **Moderate**.

9.5.8 Likelihood of Risk Event

The Delegated Officer has determined that the likelihood of impacts from contaminants in treated wastewater discharge could occur at some time.

It is noted that the likelihood rating is dependent on the drain being not accessed by public as part of normal use. It is also dependent on the assumptions made around the capacity of the drain to retain the volume of discharge water during wet periods. Additional information will be required to be submitted with the future licence amendment application following construction of the infrastructure.

Therefore, the Delegated Officer considers the likelihood of treated wastewater containing elevated concentrations of contaminants to be **Possible**.

9.5.9 Overall rating of Discharge to land - Operation

The Delegated Officer has compared the consequence and likelihood ratings described above with the risk rating matrix (Table 12) and determined that the overall rating for the risk of treated wastewater containing elevated concentrations of contaminants is **Medium**.

9.6 Summary of acceptability and treatment of Risk Events

A summary of the risk assessment and the acceptability or unacceptability of the risk events set out above, with the appropriate treatment and control, are set out in Table 18 below. Controls are described further in section 11.

Table 15: Risk assessment summary

	Description of Risk Event			Applicant controls	Risk rating	Acceptability with controls (conditions on instrument)
	Emission	**Source**	**Pathway/ Receptor (Impact)**			
1.	Odour	Wastewater treatment system	Air/wind to sensitive receptor causing amenity impacts.	- The preliminary grit removal system will be a closed unit - Flows measured by inline magnetic flow meter - System operation is automatically controlled by the site programmable logic controller (PLC) - Grit tank has continuous aeration - Outflow weirs decant sludge - Waste Activated Sludge is transferred daily to geobags as an ongoing operational activity. Geobags will be rotated periodically, as required, on up to six month rotations as required.	Minor consequence Unlikely likelihood **Medium risk**	Acceptable subject to proponent controls, conditioned / outcomes based controls
2.	Discharge of treated wastewater to Drakesbrook Drain	Treated wastewater containing contaminants (e.g. nutrients, pathogens)	Contamination of soil; impact to vegetation health; degradation of groundwater quality Via overland flow and runoff; subsurface seepage Causing contamination of soil; impact to vegetation health; Degradation of groundwater quality	- The process reactor will be fully lined with impervious bitumous geotextile membrane. - The bitumous geotextile membrane (BGM) to be used has a permeability of 10^{-13}m/s. This will be tested during construction and commissioning of the Factory Acceptance Testing in accordance with international standard ASTM D7748 Standard Test Method for Flexural Rigidity of Geogrids, Geotextiles and Related Products. - Concrete used will have a permeability ranging between $1.7x10^{-11}$ m/s and $3.5x10^{-15}$ m/s. This will be tested during construction and commissioning in accordance with AS 3735-2001 Concrete Structures Retaining Liquids.	Moderate consequence Unlikely likelihood **Medium risk**	Acceptable subject to the quality of construction of the infrastructure and outcome-based controls. The Works Approval will contain conditions requiring submission of a construction compliance report prior to the commencement of

	Description of Risk Event			Applicant controls	Risk rating	Acceptability with controls (conditions on instrument)
	Emission	Source	Pathway/ Receptor (Impact)			
				- All other process tanks or conveyance systems will be designed, constructed and tested to demonstrate complete containment of relevant process fluids. - Geobag laydown area to be a lined impermeable hardstand. - Wastewater inflows and outflows will be measured by magflow meters to monitor the integrity of the upgraded WWTP. - Installation of groundwater bores on-site and four rounds (six months apart) of groundwater sampling over two (2) years will allow an assessment of groundwater condition at the WWTP. - Surface water monitoring in Drakesbrook Drain to confirm attenuation of contaminants upstream and downstream of the discharge point. - The Existing Licence requires water quality monitoring of discharge locations.		commissioning and time-limited operation of the infrastructure, mitigating the Risk Event.

10. Regulatory controls

10.1 Works Approval controls

- Conditions 1 and 2 allow construction of the infrastructure as per Table 1 and Table 2 in the Works Approval.
- Conditions 3 to 6 requires an Environmental Compliance Report and Critical Containment Infrastructure Report to be submitted to the CEO, to confirm all infrastructure has been constructed as required by each stage of construction.
- Condition 7 requires baseline ambient groundwater monitoring.
- Conditions 8 to 11 allows environmental commissioning of the proposed works.
- Conditions 12 to 15 relate to monitoring programmes to be conducted during the environmental commissioning.
- Conditions 16 and 17 require the submission of an Environmental Commissioning Report.
- Conditions 18 to 22 allows time limited operations of the proposed works.
- Conditions 23 to 25 relate to monitoring programmes to be conducted during the time limited operations.
- Conditions 26 and 27 require the submission of a report the time limited operations.
- Condition 28 to 30 relate to monitoring specifications.
- Conditions 31 to 33 requires accurate and auditable books to be maintain by the works approval holder.

10.2 Aspects to be determined as part of Licence assessment

- Implementation of a groundwater monitoring program based on results submitted during environmental commissioning to provide greater confidence in identifying changes in groundwater quality due to discharges from site operations.
- Update of infrastructure within the Premises and associated maintenance conditions.
- Requirements to maintain the clay-lined channel to ensure that it is functioning as intended, based on results submitted during environmental commissioning to provide greater confidence in identifying changes in wastewater quality.
- Amendment of flow meter location for the monitoring of treated wastewater discharged.
- Confirmation of the capacity of the Drakesbrook drain to receive and contain additional wastewater volumes, with consideration to increase in peak discharge flows, and upstream flow.

11. Determination of Works Approval conditions

The conditions in the issued Works Approval in Attachment 1 have been determined in accordance with the *Guidance Statement: Setting Conditions*.

Table 19 provides a summary of the conditions to be applied to this Works Approval.

Table19: Summary of conditions to be applied

Condition Ref	Grounds
Infrastructure and Equipment Conditions 1 and 2	These conditions are valid, risk-based and contain appropriate controls.
Compliance reporting Conditions 3 to 7	Environmental compliance is a valid, risk-based condition to ensure appropriate linkage between the licence and the EP Act.
Environmental commissioning Conditions 8 to 11	These conditions are valid, risk-based and contain appropriate controls.
Monitoring during environmental commissioning Conditions 12 to 14	These conditions are valid, risk-based and consistent with the EP Act.
Environmental commissioning reporting Condition 15 and 16	These conditions are valid and are necessary administration and reporting requirements to ensure compliance.
Time limited operations Conditions 17 to 21	These conditions are valid, risk-based and contain appropriate controls.
Monitoring during time limited operations Conditions 22 to 24	These conditions are valid, risk-based and consistent with the EP Act.
Time limited operations reporting Condition 25 and 26	These conditions are valid and are necessary administration and reporting requirements to ensure compliance.
Monitoring specifications Conditions 27 to 29	These conditions are valid and are necessary to ensure monitoring is consistent with a required standard.
Records and reporting Conditions 30 to 32	These conditions are valid and are necessary administration and reporting requirements to ensure compliance.

DWER notes that it may review the appropriateness and adequacy of controls at any time and that, following a review, DWER may initiate amendments to the works approval under the EP Act.

12. Applicant's comments

The Applicant was provided with the draft Decision Report and draft issued Works Approval on 14 September 2020. The Applicant provided comments which are summarised, along with DWER's response, in Appendix 2.

13. Conclusion

This assessment of the risks of activities on the Premises has been undertaken with due consideration of a number of factors, including the documents and policies specified in this Decision Report (summarised in Appendix 1).

Based on this assessment, it has been determined that the Works Approval will be granted subject to conditions commensurate with the determined controls and necessary for administration and reporting requirements.

Tracey Hassell

Digitally signed by Tracey Hassell
Date: 2020.11.19 13:23:45 +08'00'

Tracey Hassell
A/MANAGER WASTE INDUSTRIES
REGULATORY SERVICES
Delegated Officer under section 20 of the *Environmental Protection Act 1986*

Appendix 1: Key documents

	Document title	In text ref	Availability
1.	Licence L5400/1992/12 – Waroona WWTP	L5400/1992/12	accessed at www.dwer.wa.gov.au
2.	Works Approval Application and Supporting Information, Water Corporation, September 2019 – submitted 24 September 2019	Application	DWER records (DWERDT205920)
3.	Works Approval Application - Addendum to Supporting Information, Water Corporation, July 2020	Addendum	DWER records (A1879616)
4.	DER, July 2015. *Guidance Statement: Regulatory principles.* Department of Environment Regulation, Perth.	DER 2015a	accessed at www.dwer.wa.gov.au
5.	DER, October 2015. *Guidance Statement: Setting conditions.* Department of Environment Regulation, Perth.	DER 2015b	
6.	DER, November 2016. *Guidance Statement: Risk Assessments*. Department of Environment Regulation, Perth.	DER 2016b	
7.	DER, November 2019. *Guidance Statement: Decision Making*. Department of Environment Regulation, Perth.	DER 2019	

Appendix 2: Summary of applicant's comments on risk assessment and draft conditions

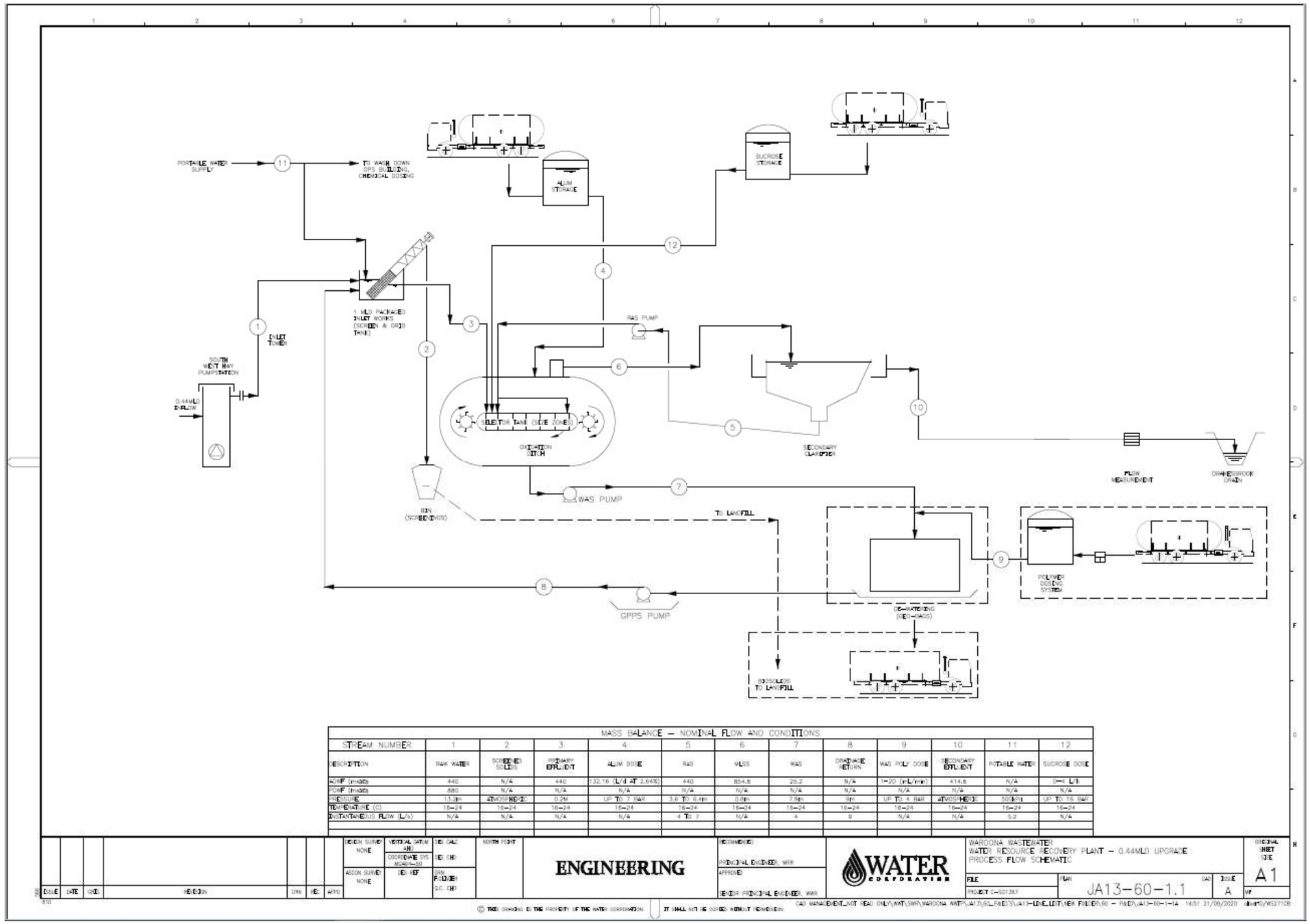
Condition	Summary of Licence Holder comment	DWER response
Assessed design capacity	Update to include "annual average daily inflow" as per Page 6 of Draft Works Approval Decision Report.	The assessment is based on the maximum design capacity of the infrastructure, which is 2,590 m^3/day for the preliminary treatment step, and 880 m3/day for the primary treatment system, as such, the Works Approval reflects this capacity. However, the risk assessment has had regard of the expected annual average daily inflow of up to 440 m^3/day for the foreseeable future. The Applicant provided information on the maximum treatment capacity of the infrastructure, which has been reflected in the Decision Report and the instrument. The licence contains conditions for monitoring and reporting of discharge volumes.
Table 3, Table 6, Table 7, Table 12	Remove requirement to sample for Total Aluminium in groundwater samples.	The groundwater requirements will be amended to dissolved aluminium, due to the dissolved phase representing the mobile component relevant to ambient monitoring.
Table 2 , Pre-treatment Inlet Works	The existing inlet (discharge) tower will be decommissioned. Inflows will be diverted to the new plant via a siphone shaped pipe in front of the new inlet works. The grit removal system is itself a closed unit.	Phrasing has been amended.

Condition	Summary of Licence Holder comment	DWER response
Table 2, Wastewater Treatment System	The inlet works are located above ground. The oxidation ditch itself isn't constructed out of concrete, only the bioselector. The oxidation ditch is constructed of 40mm thick bituminous geotextile membrane with a permeability less than concrete.	Phrasing has been amended.
Table 9, Time Limited Operations	Request inclusion of discharge requirements during Time Limited Operations and or comment around the assessment being based on a loading limit. There is concern that the oxidation ditch design parameters (median concentrations) will become a licence limit which does not align with the intended construction / design to meet the requirements of the WQIP.	The basis of the risk assessment for treated wastewater discharge is nutrient loading within Drakesbrook Drain, and the requirements to meet the WQIP. While the predicted treatment concentrations have been taken into account in relation to nutrient loading, they will not form a requirement of the Works Approval. Analysis of monitoring undertaken during commissioning and time-limited operations will provide confirmation of the performance of the treatment plant. Should monitoring results demonstrate performance is considerably different to that proposed, further controls may be imposed at the licensing stage.
Table 4, Environmental Commissioning Requirements.	Water Corporation notes the Environmental Commissioning Requirements in Table 4 are not critical to the commissioning of the constructed plant but are ongoing operational items. The commissioning requirements provided in Table 4 do not specify testing and commissioning of liners, containment infrastructure, pipes, pumps and performance of emission controls etc.	The commissioning requirements relate to demonstrating that the constructed infrastructure performs to the appropriate design standard, whilst also controlling potential emissions during the commissioning phase, as this phase may continue for 90 days. Commissioning aspects to meet the infrastructure requirements of Tables 1 and 2 of the Works Approval are addressed through condition 17 which require a compliance assessment against design standards of infrastructure as specified in Tables 1 and 2.
Surface and Groundwater monitoring	Given the rural context and several land uses impacting on the drain, it is requested that only E.coli is monitored and the removal of requirement to monitor Faecal coliforms as per standard practice in other Water Corporation licences.	The monitoring requitement has been amended to reflect this. In relation to pathogen loading within the receiving water, the Department of Health had no objections with the application, subject to monthly monitoring of E. coli concentrations at the point of discharge.

Condition	Summary of Licence Holder comment	DWER response
Page 9, Preliminary Treatment	The existing discharge tower will be decommissioned. Inflows will be diverted to the new plant via a siphone shaped pipe in front of the new inlet works.	Phrasing has been amended.
Page 10, Chemical Storage and Dosing	The existing chemical dosing system at the site is aluminium sulphate not Polyaluminium chloride.	Phrasing has been amended.
Page 10, Power	Power supply feasibility has been completed.	Phrasing has been amended.
Emergency Discharge to Woodlot	There is no longer a woodlot on site, the trees are all dead. The woodlot is to be excluded from this Works Approval as it provides no additional polishing or benefit.	As the current licence permits the discharge of treated wastewater to the woodlot to occur as a contingency and/or if the clay-lined swale is offline, the woodlot area has been included within the assessment to remain consistent with the licence. The removal of the woodlot area will be implemented at the licence application stage should the applicant request it.
Pre-Treatment Inlet Works	Updated infrastructure details provided.	Phrasing has been amended.
Clay lined ponds	The existing clay lined ponds will be retained on site but disconnected from the treatment train and will not be used in an emergency.	Phrasing has been amended.
Appendix 3: Proposed Design Drawings	Update Figure 10 Process Flow Schematic as per attached figure.	Figure has been updated

Appendix 3: Proposed design drawings

Figure 10. Process flow schematic



MASS BALANCE – NOMINAL FLOW AND CONDITIONS

STREAM NUMBER	1	2	3	4	5	6	7	8	9	10	11	12
DESCRIPTION	RAW WATER	SCREENED SOLIDS	PRIMARY EFFLUENT	ALUM DOSE	RAS	MLSS	WAS	DRAINAGE RETURN	WAS POLY DOSE	SECONDARY EFFLUENT	POTABLE WATER	SUCROSE DOSE
ADWF (m³/d)	440	N/A	440	132.16 (L/d AT 2.64%)	440	854.8	25.2	N/A	1–20 (mL/min)	414.8	N/A	0–1 L/h
PDWF (m³/d)	880	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
PRESSURE	13.2m	ATMOSPHERIC	0.2m	UP TO 7 BAR	3.6 TO 6.4m	0.8m	7.8m	9m	UP TO 4 BAR	ATMOSPHERIC	50MPa	UP TO 16 BAR
TEMPERATURE (C)	18–24	18–24	18–24	18–24	18–24	18–24	18–24	18–24	18–24	18–24	18–24	18–24
INSTANTANEOUS FLOW (L/s)	N/A	N/A	N/A	N/A	4 TO 7	N/A	4	9	N/A	N/A	5.2	N/A

ENGINEERING

WATER CORPORATION

WARDONA WASTEWATER WATER RESOURCE RECOVERY PLANT – 0.44MLD UPGRADE PROCESS FLOW SCHEMATIC

FILE | PLAN JA13-60-1.1 | SCALE A | ORIGINAL SHEET SIZE A1

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Figure 11. General arrangement

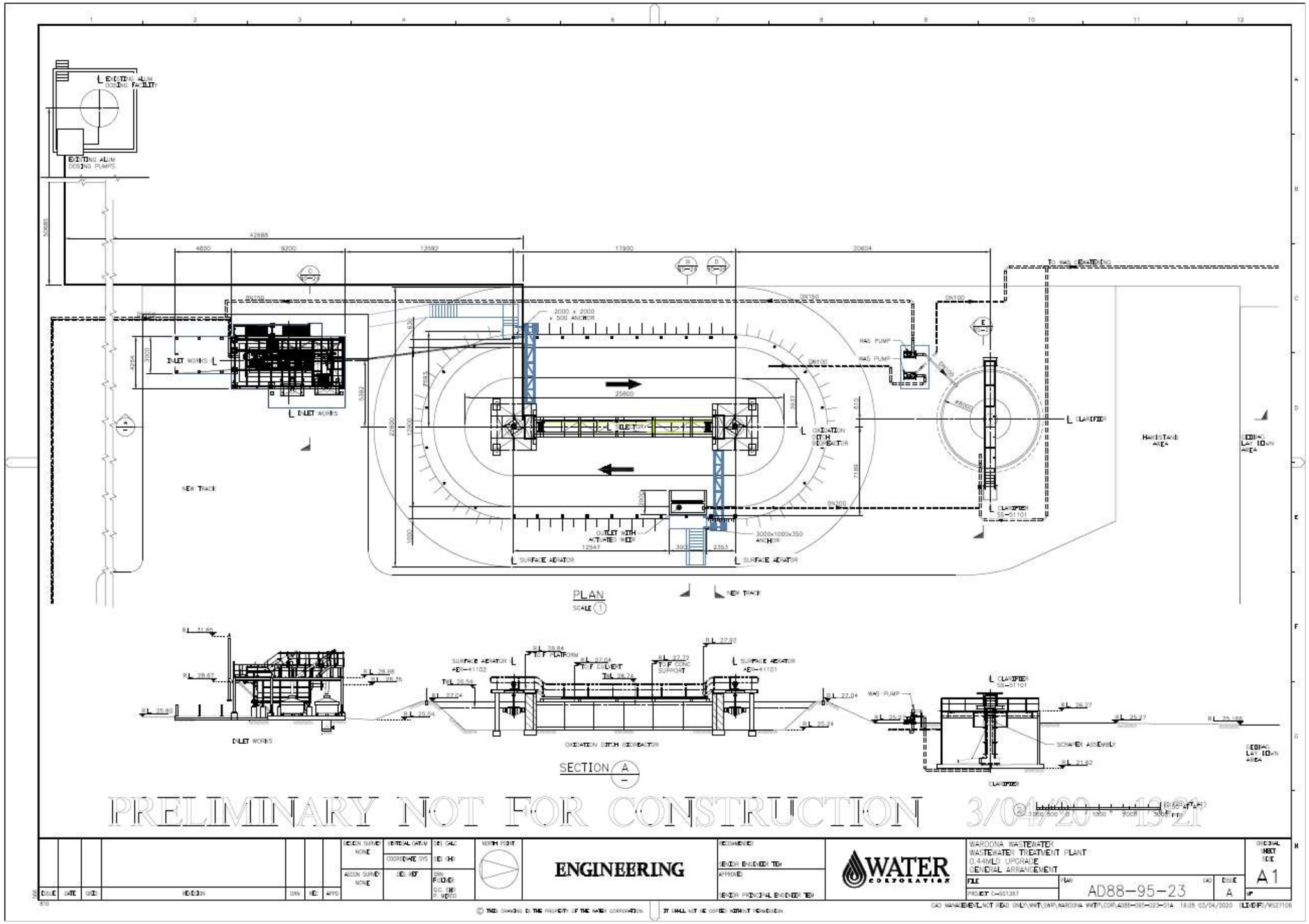

Figure 12. Infrastructure sections