



Application for Works Approval Amendment

Division 3, Part V *Environmental Protection Act 1986*

Works Approval Number W6350/2020/1

Applicant City of Kalgoorlie Boulder

ACN N/A

File Number DER2019/000675

Premises South Boulder Wastewater Treatment Plant
Celebration Road, South Boulder
BOULDER WA 6432

Portion of Lot 221 on DP 217615 and Reserve 4200
Certificate of Title Volume LR3121 Folio 494
As defined by the coordinates in Schedule 1 of the Works
Approval

Date of Report 20/03/2020

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
ADWF	Average Dry Weather Flow
AER	Annual Environment Report
Applicant	City of Kalgoorlie Boulder
AS/NZS 5667.1	means the Australian Standard AS/NZS 5667.1 <i>Water Quality – Sampling – Guidance on the design of sampling programs, sampling techniques and the preservation and handling of samples.</i>
Category/ Categories/ Cat.	Categories of Prescribed Premises as set out in Schedule 1 of the EP Regulations
CKB	City of Kalgoorlie-Boulder
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 <i>Public Sector Management Act 1994</i> 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 <i>Public Sector Management Act 1994</i> and is responsible for the administration of the <i>Environmental Protection Act 1986</i> along with other legislation.
EP Act	<i>Environmental Protection Act 1986 (WA)</i>
EP Regulations	<i>Environmental Protection Regulations 1987 (WA)</i>
IAT	Intermittent Aeration Tanks
IDEA	Intermittently Decanted Extended Aeration
m ³	cubic metres

Minister	the Minister responsible for the EP Act and associated regulations
Noise Regulations	<i>Environmental Protection (Noise) Regulations 1997 (WA)</i>
Occupier	has the same meaning given to that term under the EP Act.
PWWF	Peak Wet Weather Flow
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 <i>Guidance Statement: Risk Assessment</i>
SBWWTP	South Boulder Wastewater Treatment Plant
TEBT	Treated Effluent Balance Tank
UDR	<i>Environmental Protection (Unauthorised Discharges) Regulations 2004 (WA)</i>
mg/L	milligrams per litre
WAS	Waste Activated Sludge
Works Approval	refers to this document, which evidences the grant of the works approval by the CEO under s.54 of the EP Act, subject to the conditions.
Works Approval Holder	City of Kalgoorlie Boulder
WWTP	Wastewater Treatment Plant

2. Purpose and scope of assessment

The City of Kalgoorlie Boulder (CKB) (Applicant) submitted an application on 18 December 2019 to the Department of Water and Environmental Regulation (DWER) for a works approval under the *Environmental Protection Act 1986* (EP Act) for the purpose of upgrading the South Boulder Wastewater Treatment Plant (SBWWTP) (L8560/2011/2) ponding lagoons 1, 2 and 3 (WWP1, WWP2 and WWP3).

The purpose of upgrading the South Boulder WWTP ponds (which operates in parallel with the Intermittently Decanted Extended Aeration (IDEA) plant) is to enable the diversion of the full sewer inflow to the ponds, and to enable an assessment of the IDEA plant. The IDEA plant flow metering indicates leakage and the earth embankments are in a deteriorated condition.

Assessment and refurbishment of the IDEA plant requires the unit to be offline as there is no standby capacity currently built into the plant.

2.1 Application details

The application details that the associated works will be carried out in two stages.

Stage A: Upgrades to the primary pond includes:

- Construction of an internal embankment to create dual train primary ponds, WWP1 Train A and WWP1 Train B (refer to figure 1 below); and
- Construction of new gravity flow pipework from WWP1 to WWP2 to support short term and final stages of operation.

During the construction phase the IDEA plant is to receive the full sewage inflow, as well as trade waste.

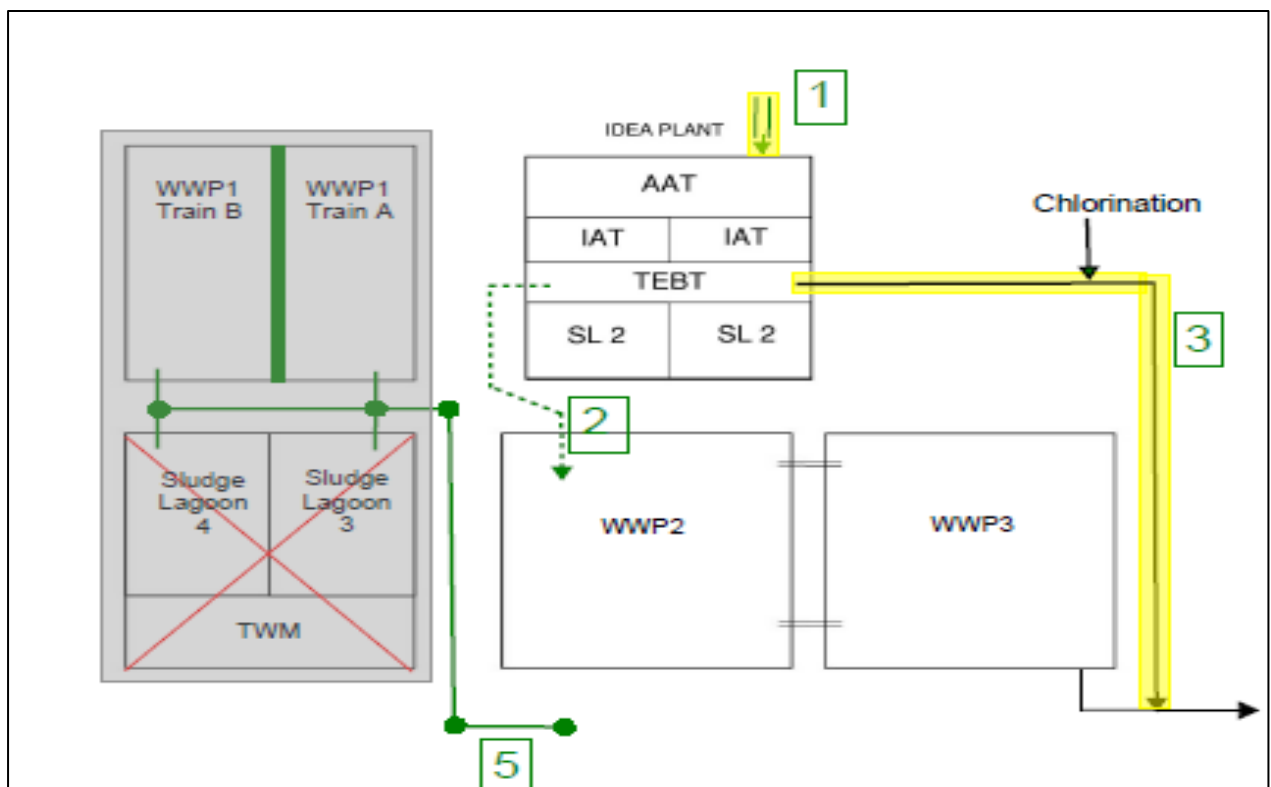


Figure 1: Primary pond upgrade

Stage B: Stage B works include refurbishment of embankments on the Secondary pond (WWP2) and maturation pond (WWP3), upgrades to baffles, and the installation of a final rock filter at WWP3 outlet. The works also include the relocation of the chlorination unit to the WWP3 outlet (refer to figure 2 below).

This decision report assesses emissions and discharges associated with:

- Stage A and Stage B refurbishment works and the associated activities when the plant is in operation.

The Delegated Officer notes that any future works (stage C) are outside the scope of this assessment and will require the submission of a further works approval application to DWER.

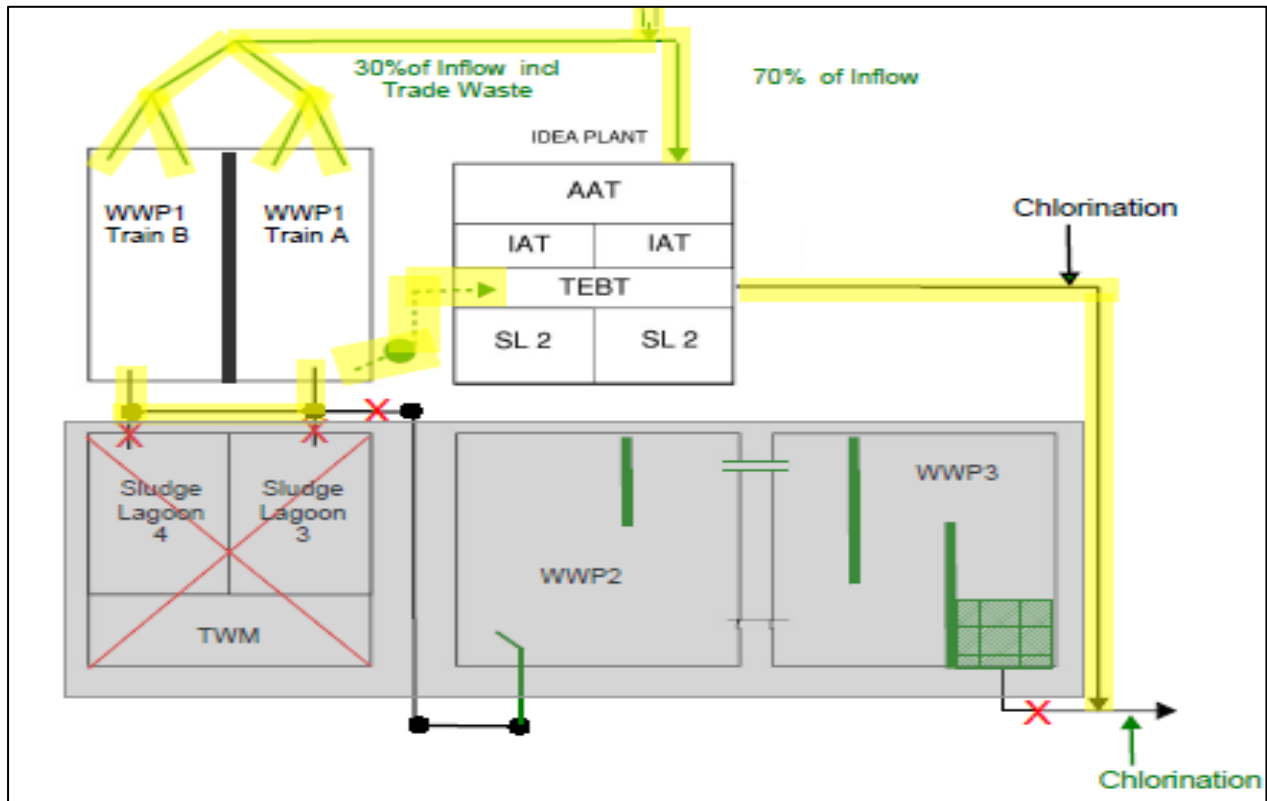


Figure 2: Secondary and Tertiary pond upgrade

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
DWER Application Form including following supporting information <ol style="list-style-type: none"> 1. Attachment 1A – Proof of occupier status 2. Attachment 2 – SBWWTP site plan 3. Attachment 3A – Overview of proposed activities 4. Attachment 4 – Additional information – Stage A and Stage b work including emissions and Discharges 5. Attachment 5 – Proposed Fee Calculation 	18 December 2019

3. Background

The City of Kalgoorlie-Boulder (CKB) owns and operates the South Boulder Wastewater Treatment Plant (SBWWTP).

The WWTP operations consist of an Intermittently Decanted Extended Aeration (IDEA) plant with design capacity of 8 ML/day Average Dry Weather Flow (ADWF) and up to 20 ML/d Peak Wet Weather Flow (PWWF).

Treated effluent is then either pumped from the IDEA plant offsite to the Old Boulder holding ponds (located approximately 500 metres to the north of the premises) or treated further by Wastewater Ponding Lagoons 1, 2 and 3.

Effluent from the Old Boulder ponds (located off-site) is chlorinated and pumped to a number of holding ponds and tanks located within the City of Kalgoorlie-Boulder. Effluent stored within the city storage network is further chlorinated before use for the irrigation of lawns, parks and gardens. The treatment of effluent for the re-use for irrigation is regulated by the Department of Health under the *Health Act 1911* via a Recycled Water Scheme Approval (Approval Number: B28/0000).

The wastewater stabilisation ponds operate in parallel to the IDEA plant.

Table 3 lists the prescribed premises categories in the existing licence.

Table 3: Prescribed Premises Categories in the Existing Licence

Classification of Premises	Description	Approved Premises production or design capacity or throughput
54	Sewage facility: premises – (a) On which sewage is treated (excluding septic tanks); or (b) From which treated sewerage is discharged onto land or into waters.	20,000 cubic meters per day
61	Liquid waste facility: premises on which liquid waste produced on other premises (other than sewerage waste) is stored, re-processed, treated, or discharged onto land.	15,000 tonnes per year

4. Overview of Premises

4.1 Operational aspects

The following information in relation to premises operation has been summarised from the application:

The current wastewater treatment plant consists of the following components:

- Intermittently Decanted Extended Aeration (IDEA) activated sludge plant; incorporating:
 - 1x Aerobic Tank (AAT)
 - 2x Intermittent Aeration Tanks (IAT)
 - 1x Treated Effluent Balance Tank (TEBT)
- Four Waste Activated Sludge (WAS) drying lagoons (sludge lagoons);
- Treated wastewater pump stations;
- Chlorine disinfection system; and
- 3 x Wastewater treatment lagoons.

The IDEA plant was constructed in 2001 by Water Corporation and Simon Engineering on a Design, Build & Operate (DBO) contract.

Current operations at the CKB WWTP are shown in drawing below (Figure 4) and include:

- Reticulated domestic flows (Category 54) received via gravity sewer into the IDEA plant, excess flows from IDEA plant during storm events and treated effluent from the IDEA plant for storage when demand for recycled water is low is directed to wastewater lagoon 1;
- Tankered waste (Category 61) drop off pit- with leachate return to Wastewater Lagoon 1; and
- Leachate from Sludge Lagoons 1, 2, 3 and 4 is pumped to the TWM Storage Lagoon and disposed of via the process of evaporation.

Controlled Waste categories K130 and K210 drain from the waste receiveal pit via pipework to Wastewater Ponding Lagoon 1. Reticulated sewerage received at the premises during a power failure or in excess of the hydraulic capacity of the IDEA plant (i.e. surge flows during storm events) are also directed to Wastewater Ponding Lagoon 1. Overflow from Wastewater Ponding Lagoon 1 is directed to Wastewater Ponding Lagoon 2 followed by Wastewater Ponding Lagoon 3. Effluent from Wastewater Ponding Lagoon 3 is either pumped offsite to the 'Old Boulder' holding ponds or is discharged via controlled release to Hannan's Lake.

The adjacent facility operated by Total Waste Management (TWM) had a contract to discharge condensate to the designated TWM Lagoon in the South Boulder WWTP facility. This contract has expired and is no longer in operation. The condensate from TWM was pumped via a pipeline to an evaporation pond and was disposed of via evaporation. This pond is hydraulically isolated from all other on-premises wastewater treatment processes and treatment ponds.

Existing sewage flows

Figure 3 illustrates the historic WWTP inflows between January 2011 and September 2019, indicating that over this period inflows to the IDEA plant have dropped from an average of 7.0 ML/d in 2011 to an average of just under 6.1 ML/d in 2019, significantly below the IDEA capacity of 8 ML/d.

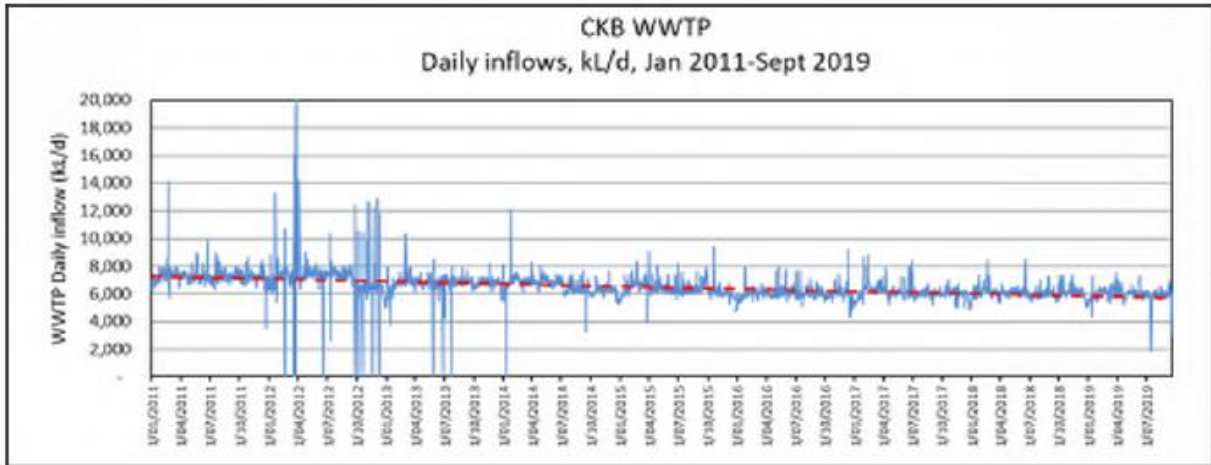


Figure 3: Historic WWTP inflows, 2011 - 2019

Flows during planned works

Stage A

During the refurbishment stage, the sewage flow will continue to be treated by the IDEA plant as per current operations. Tankered Cat 61 waste flows of approximately 5m³/day, will be diverted into the IDEA plant for the duration of Stage A works.

A temporary pump station will be installed in the treated effluent balance tank to transfer potential excess effluent to wastewater pond 2 for the duration of the planned works.

4.1.1 Key findings

The Delegated Officer has reviewed the information regarding stage “A” works and has confirmed that :

1. Prior to the commencement of Stage “A” works, the Licence Holder will be required to submit a licence amendment application to DWER requesting the disposal of Category 61 waste directly into the IDEA plant.

Stage B

During the refurbishment stage of ponding lagoons 2 and 3, 80 % of sewage inflow will be directed to the IDEA plant and 20% (including trade waste) to the refurbished ponding lagoon 1, as per normal operation.

According to Figure 3 inflow information above, with evaporation losses of 8mm/day, the refurbished pond will fill in 80 days without discharge. A temporary pump station will be installed to transfer partially treated pond effluent to the IDEA plant for dilution with IDEA effluent. Treated wastewater will then be transferred to the Old Boulder lagoons for irrigation purposes.

4.1.2 Key findings

The Delegated Officer has reviewed the information regarding stage “B” works and has confirmed that :

1. A compliance report for stage “A” works and a licence amendment will be required to prescribe the stage A infrastructure as per the application prior to directing partially treated effluent from ponding lagoon 1 to the IDEA plant;

2. Following the completion of stage “B” works, a compliance report and a licence amendment will be required to prescribe the stage B infrastructure prior to directing partially treated effluent from ponding lagoon 1 to ponding lagoon 2 for further treatment and transfer to the Old Boulder lagoon.

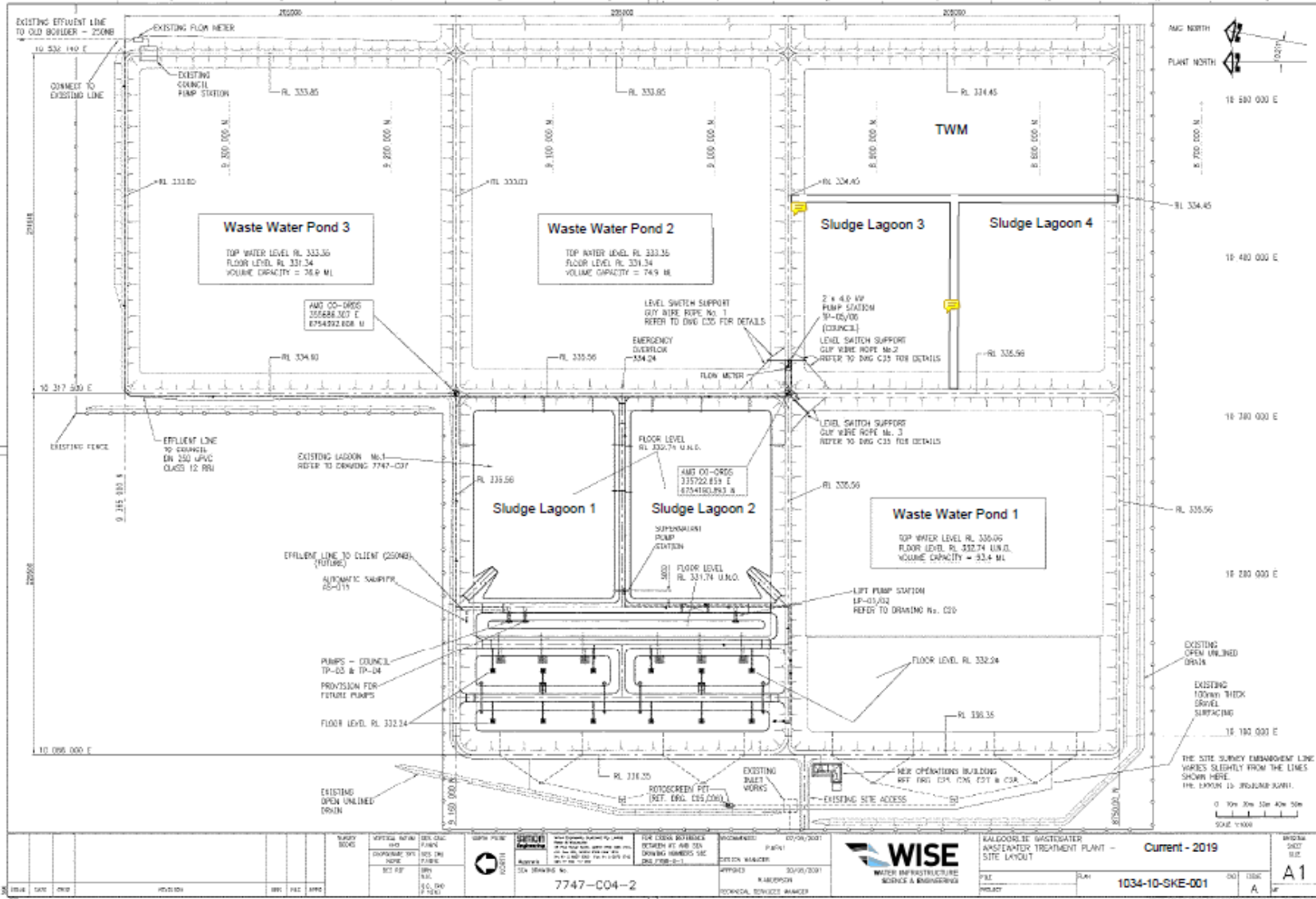


Figure 4: Plant layout

4.2 Infrastructure

The SBWWTP facility infrastructure, as it relates to Category 54, and 61 activities, is detailed in Table 4 and with reference to the Site Plan (attached in the Works Approval).

Table 4 lists infrastructure associated with each prescribed premises category.

Table 4: SBWWTP facility Category 54 and 61 infrastructure

	Infrastructure	Site Plan Reference
	Prescribed Activity Category 54 and 61	
Tankered waste from drop off pit (Category 61) and treated effluent from the IDEA plant to storage pond (Stage A)		
1	Refurbishment of wastewater ponding lagoon 1 <ul style="list-style-type: none"> • A dual train pond system free of leaks and defects with a permeability of $\leq 1 \times 10^{-9}$ m/sec; • Capacity of 93.4ML; • Embankments adequately refurbished to provide a permeability of $\leq 1 \times 10^{-9}$ m/sec and a minimum freeboard of 300mm; • HDPE pipelines with welded joints; and • Freeboard markers within each of the two cells. 	Figure 1 in the Works Approval
	Prescribed Activity Category 54 and 61	
Tankered waste from drop off pit (Category 61) and treated effluent from the IDEA plant to storage pond (Stage B)		
1	Refurbishment of wastewater ponding lagoon 2 <ul style="list-style-type: none"> • Capacity of 74.9ML; • Embankments to be compacted and refurbished, free of leaks and defects with a permeability of $\leq 1 \times 10^{-9}$ m/sec and a minimum freeboard of 300mm; • 45° bend at the inlet with stub baffle, 60m in length; • The secondary pond, free of leaks and defects with a permeability of $\leq 1 \times 10^{-9}$ m/sec; and • Freeboard markers. 	Figure 1 in the Works Approval
2	Refurbishment of wastewater ponding lagoon 3 <ul style="list-style-type: none"> • Capacity of 76.9ML; • Two 140m long baffles at equal longitudinal spacing; • 8000m³ rock filter at outlet; • Embankments to be compacted and refurbished, free of leaks and defects with a permeability of $\leq 1 \times 10^{-9}$ m/sec and a minimum freeboard of 300mm; 	Figure 1 in the Works Approval

	Infrastructure	Site Plan Reference
	<ul style="list-style-type: none"> Chlorination unit at the WWP3 outlet; Tertiary pond free of leaks and defects and with a permeability of $\leq 1 \times 10^{-9}$ m/sec; and Freeboard markers. 	

5. Legislative context

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

Relevant guidance documents are outlined in Appendix 1.

Table 5 summarises approvals relevant to the assessment.

Table 5: Relevant approvals and tenure

Legislation	Number	Subsidiary	Approval
Health (Treatment of Sewage and Disposal of Effluent and Liquid Waste) Regulations 1974	Approval No: B28/00000	City of Kalgoorlie Boulder	Approval from Department of Health not required. The Department has no objection to Stage A and B upgrade works subject to six consecutive daily samples of final effluent after chlorination.

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: Decision Making (February 2017)*
- Guidance Statement: Risk Assessments (February 2017)*
- Guidance Statement: Environmental Siting (November 2016)*

5.1.2 Works approval and licence history

No recent works approvals have been issued for the premises. The last licence issued for the premises was L8560/2011/2, on 20 June 2016. This licence expires on 22 June 2036.

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
L8560/2011/1	29/04/2016	Notice of Amendment: to extend the expiry date of the Licence
L8560/2011/1	23/06/2016	Licence re-issued
W6350/2020/1	12/03/2020	New works approval to upgrade ponding lagoons 1, 2 and 3 (WWP1, WWP2 and WWP3).

5.1.3 Compliance inspections and compliance history

The premises has a history of shallow groundwater detected within the existing groundwater monitoring bore network. There is a possibility that containment/treatment infrastructure may be leaking and influencing the local groundwater regime. Licence conditions 4.1.1 (IR1) and 4.1.1 (IR2) was added to the Licence in 2016, requiring the Licensee to undertake an assessment of the rate of seepage from the main wastewater containment infrastructure on the premises.

The investigation report was submitted to DWER in July 2018. Results indicated that approximately 16.8% of total sewage flows was leaking from the IDEA plant and approximately 15% was leaking from the ponds.

6. Consultation

The Application was advertised for public comment in The West Australian newspaper on 6 February 2020. No submissions have been received.

7. Location and siting

7.1 Siting context

The City of Kalgoorlie-Boulder is located approximately 560 kilometres to the north-east of Perth. The WWTP is located approximately 4 km south of Kalgoorlie, Western Australia.

The site is within an area zoned “rural” in the City of Kalgoorlie-Boulder’s Town Planning Scheme No 1.

7.2 Residential and sensitive receptors

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 closest residential receptor to the premises is the town-site of South Boulder, located approximately 1.4 kilometres to the north.
Boulder Township	Located approximately 2 kilometres to the north.
BP Kalgoorlie truck stop	Located approximately 500 metres to the north-west of the premises.

7.3 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
Hannan's lake	The nearest major water natural water body is Hannan's Lake, which is a normally-dry ephemeral lake located immediately to the east of the premises.
Public Drinking Water Supply Area	The premises is not located within a Public Drinking Water Supply Area (PDWSA). Hannan's Lake is not a scheduled PDWSA.

7.4 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	Environmental value
Public drinking water source areas	The premises is not located within a Public Drinking Water Supply Area (PDWSA).	Hannan's Lake is not a scheduled PDWSA.
Groundwater	Depth to groundwater encountered at approximately 0.5m – 2.6mbgl (based on SWL information from the SBWWTP Facility).	Hypersaline groundwater. No beneficial uses of groundwater in the site vicinity.

7.5 Soil type

Based on the 1:100,000 Kalgoorlie map series, the geology under the SBWWTP is mapped as predominantly Colluvium (map unit: Czc) with Quaternary Alluvium (map unit: Qa) occurring in the southern third and the north-eastern corner of the SBWWTP. The colluvium present consists of extensive sheets of gravel, sand, silt and clay derived by weathering, erosion and transport of a number of rock types. The Quaternary Alluvium is confined to present day and recent (i.e. paleo-channels) drainage systems, consisting of unconsolidated clay, silt, sand and gravel.

7.6 Meteorology

7.6.1 Wind direction and strength

Wind speed and wind direction are important factors influencing the pathway of emissions. It effects noise propagation and transport of fugitive dust. The closest available wind data for the area can be sourced from the Kalgoorlie Boulder airport weather station (number 012038) which is located 8.4 km north-west of the premises. The Bureau of Meteorology (BoM) provides the 9am and 3pm wind speed and direction for Kalgoorlie Boulder airport weather station. Prevailing winds are to the east, north and south easterly in the mornings, and to the west, south easterly and north westerly in the afternoons. Refer to Figures 4 and 5.

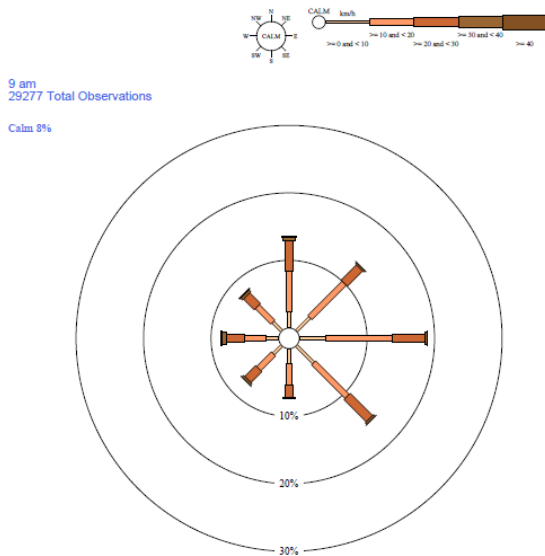


Figure 5: 9am Rose of Wind

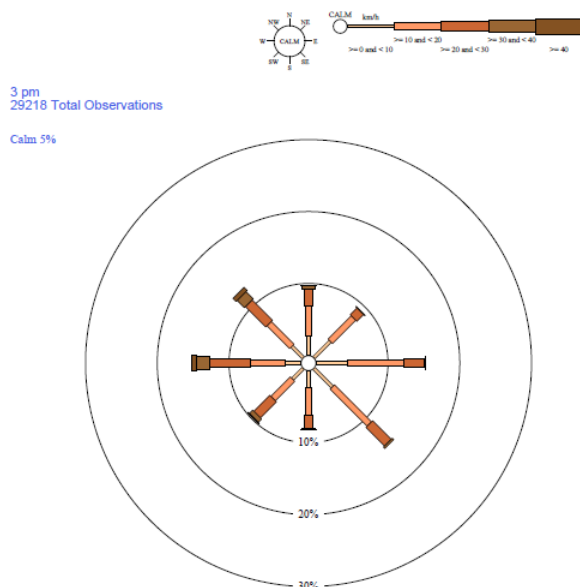


Figure 6: 3pm Rose of Wind

7.6.2 Rainfall and temperature

The closest weather station for rainfall and temperature data is Kalgoorlie Boulder airport site 012038 which is located 8.4 km north-west of the premises. Maximum average rainfall is received in January, February and June annually. Minimum average rainfall is received September to December annually (Figure 7).

Highest average temperatures are experienced December to February annually. Lowest average temperatures are experienced June and July (Figure 7).

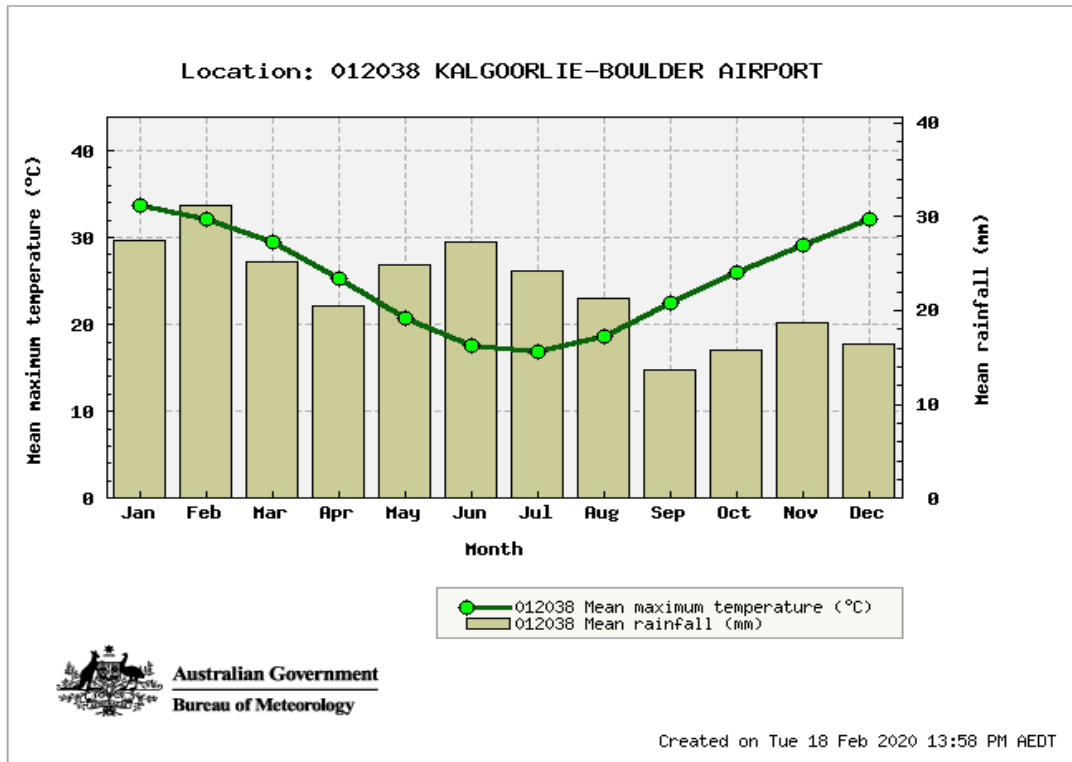


Figure 7: Rainfall and Temperature

8. Risk assessment

8.1 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 11.

The identification of the sources, pathways and receptors to determine Risk Events are set out in Tables 10 and 11 below.

Table 10. 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	Noise	Residential premises located 1.4k m north of the Premises boundary	Air / wind dispersion	Amenity impacts	No	The Delegated Officer considers a separation distance of 1.4km sufficient to ensure noise emissions will not significantly impact upon amenity. If any noise impacts that may arise can be regulated under the provisions of the <i>Environmental Protection (Noise) Regulations 1997</i> . No further risk assessment is required.
	Refurbishment of existing ponds and infrastructure	Dust			Amenity impacts	No	The Delegated Officer considers a separation distance of 1.4km sufficient to ensure dust emissions will not significantly impact upon amenity. The Delegated Officer considers that the provisions of section 49 of the EP Act is sufficient to regulate dust emissions during construction.

Risk Events					Continue to detailed risk assessment	Reasoning
Sources/Activities	Potential emissions	Potential receptors	Potential pathway	Potential adverse impacts		
Refurbishment of existing ponds and infrastructure	Spills of untreated and partially treated wastewater	Surface water within Hannan's lake, Groundwater and surrounding land	Overland flow, subsurface leaching	Surrounding land, surface water and groundwater contamination	No	<p>The refurbishment of the existing ponds is considered to include a low level of risk of spills outside of containment systems. Construction will be conducted in a staged approach to ensure treatment capacity is maintained.</p> <p>The Delegated Officer considers this staged approach for construction will minimise any risk of spills occurring. No further risk assessment is required.</p> <p>To ensure construction occurs via the proposed staged approach, thereby ensuring the risk is minimised, the Delegated Officer will apply the Applicant's construction commitments as conditions on the works approval.</p>
	Spills of hydrocarbons from vehicles and equipment	Direct discharge to land and surface water	Vegetation adjacent to Premises. Surface water within Hannan's lake (during winter months)	Soil contamination inhibiting vegetation survival and growth. Surface water contamination	No	<p>A portable pump will be utilised during stage "A" construction to pump treated effluent water from the treated effluent balance tank to the wastewater ponding lagoon 2.</p> <p>A temporary portable generator will be used to provide emergency power supply for the pump. The fuel storage for the pump will be contained within the shed on site with concrete hardstand floors.</p> <p>The Delegated Officer considers that the hardstand concrete floor will adequately contain potential fuel spills to minimise the potential for direct discharge to land and surface waters. No further risk assessment is required.</p>

Table 11: Identification of emissions, pathway and receptors during operation

Risk Events					Continue to detailed risk assessment	Reasoning	
Sources/Activities	Potential emissions	Potential pathway	Potential receptors	Potential adverse impacts			
Waste Water Treatment Plant	Treatment of sewage	Odour	Air / wind dispersion	Residential premises located 1.4km north of the Premises boundary	Amenity impacts	No	The Delegated Officer considers a separation distance of 1.4km sufficient to ensure odour emissions will not significantly impact upon amenity. No further risk assessment is required.
		Seepage of untreated sewage and treated wastewater from ponds	Overland flow Subsurface seepage	Vegetation adjacent to Premises Surface water within Hannan's lake	Soil contamination inhibiting vegetation survival and growth Surface water and Groundwater contamination	Yes	See section 8.4
		Overtopping of ponds with treated and untreated wastewater	Direct discharge to land and surface waters Emergency Discharges to Hannan's lake	Vegetation adjacent to Premises Surface water within Hannan's lake	Soil contamination inhibiting vegetation survival and growth Surface water contamination	Yes	See section 8.4
		Stormwater contamination	Direct contact during rainfall events	Vegetation adjacent to Premises Surface water within Hannan's	Soil contamination inhibiting vegetation survival and growth Surface water contamination	No	The WWTP will be designed to accommodate flood events up to the 1 in 20 year ARI critical rainfall event without overflow. Ponding lagoon 1 will be designed to maintain a minimum 300mm freeboard level, whereas for ponding lagoons 2 and 3 the outlet point for top water level will be at 1.3m water depth for entire maturation pond, and thereby reducing the likelihood of overtopping of ponds. To ensure construction occurs as specified, the Delegated Officer shall apply the Applicant's construction commitments as conditions on the works approval.

Risk Events					Continue to detailed risk assessment	Reasoning
Sources/Activities	Potential emissions	Potential pathway	Potential receptors	Potential adverse impacts		
Onsite operational equipment	Spills of hydrocarbons from equipment	Direct discharge to land and surface waters	Vegetation adjacent to Premises Surface water within Hannan's lake	Soil contamination inhibiting vegetation survival and growth Surface water contamination	No	<p>A temporary portable generator will be used to provide emergency power supply for the pump. The fuel storage for the pump will be contained within the shed on site with concrete hardstand floors.</p> <p>Vehicle refuelling is not required during operation of the WWTP.</p> <p>The Delegated Officer also considers that the hardstand concrete floor will adequately contain potential fuel spills to minimise the potential for direct discharge to land and surface waters, with emissions considered unlikely to occur and in the rare event that they do they would be localised and minor in nature.</p> <p>Under the <i>Environmental Protection (Unauthorised Discharges) Regulations 2004</i> (UD Regulations), it is an offence to cause or allow certain materials to enter the environment in connection with a commercial or business activity.</p> <p>The UD Regulations are intended to ensure that all people engaged in a commercial activity take responsibility for preventing the escape of contaminants from their business into the environment.</p> <p>The UD Regulations and general provisions of the EP Act will apply to operations at the SBWWTP compound - no additional regulatory controls will be included on the works approval for these potential emissions. No further risk assessment is required.</p>

Risk Events					Continue to detailed risk assessment	Reasoning	
Sources/Activities	Potential emissions	Potential pathway	Potential receptors	Potential adverse impacts			
Reuse Scheme	Irrigation of treated wastewater	Release of pathogens	Direct contact and ingestion of irrigation mist	Human receptors, and seepage of nutrients into groundwater	Pathogens in the wastewater may cause gastroenteritis, spread disease or create other public health impacts	No	<p>The Department of Health regulates public health impacts from the wastewater scheme. The Delegated Officer has reviewed the Department of Health approval for the reuse scheme and considers it appropriate for the regulation of public health impacts.</p> <p>The Delegated Officer considers that the treatment standard and the quality of water expected prior to irrigation will allow appropriate use of treated wastewater with a low risk to public health with operational control.</p>
		Chlorine gas	Inhalation, Ingestion and dermal contact	Human receptors	Health	No	<p>Chlorine gas is considered to be a Dangerous Good which are regulated by Department of Mines, Industry Regulation and Safety (DMIRS) under the <i>Dangerous Goods Safety (Storage and Handling of Non-Explosives) Regulations 2007</i>.</p> <p>CKB has indicated that the chlorination module will be fitted with gas detection alarms and emergency shut-off buttons on the interior and exterior of the module. A Self-contained Breathing Apparatus (SCBA) will also be located with the module; additionally, CKB operational practice states employees entering the compound will be required to have a SCBA in their vehicle when they enter the compound.</p>

Risk Events					Continue to detailed risk assessment	Reasoning	
Sources/Activities		Potential emissions	Potential pathway	Potential receptors			Potential adverse impacts
		Nitrogen and Phosphorus	Overland flow Subsurface seepage	Soil, groundwater, stormwater runoffs	Mounding of groundwater below the application area; Inundation of the root zone; Change in soil chemistry; and Impacts to surrounding vegetation.	Yes	See section 8.5

8.2 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 12 below.

Table 12: 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 13 below.

Table 13: 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	<ul style="list-style-type: none"> 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 	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> 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 	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> 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 	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> onsite impacts: low level offsite impacts local scale: minimal offsite impacts wider scale: not detectable Specific Consequence Criteria (for environment) likely to be met 	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> onsite impact: minimal Specific Consequence Criteria (for environment) met 	<ul style="list-style-type: none"> 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.

8.3 Acceptability and treatment of Risk Event

DWER will determine the acceptability and treatment of Risk Events in accordance with the Risk treatment Table 14 below:

Table 14: 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.

8.4 Risk Assessment – Seepage/overflow of untreated sewage and treated wastewater from ponds

8.4.1 Description of the risk event for storage pond failure and overtopping of ponds

Seepage of wastewater from the storage ponds and overtopping of ponds will release a range of contaminants to the environment resulting in contamination of the surrounding soils and the groundwater. The storage ponds will be lined with in-situ soil with a permeability 1×10^{-9} m/s.

8.4.2 Identification and general characterisation of emission

The treated/untreated wastewater may contain high levels of pathogens and nutrients. Key contaminants of concern include pathogens (bacteria, viruses etc.) and nutrients (nitrogen and phosphorous).

8.4.3 Description of potential adverse impact from the emission

Wastewater accidentally discharged to the environment during the treatment process may cause soil contamination inhibiting vegetation survival and growth, surface water and groundwater contamination.

8.4.4 Criteria for assessment

The following criteria have been used to evaluate the risk associated to reuse of treated wastewater:

- Department of Health's *Guidelines for the non-potable uses of recycled water in Western Australia*, low exposure risk for surface irrigation with some restricted access and application.

- Heavy metals in wastewater should not exceed the quality criteria for irrigation use given in the *Australian and New Zealand guidelines for fresh and marine water quality*.
- Australian water quality guidelines (*ANZECC and ARMCANZ 2000*) provide recommended trigger values for fresh and marine water.
- *Turf Guideline (2014)*.
- *DER Guideline: Assessment and Management of Contaminated Sites (2014)* provides ecological and human health assessment levels for soil.

8.4.5 Applicant/Licence Holder controls

This assessment has reviewed the controls set out in Table 15 below.

Table 15: Applicant's/Licence Holder's proposed controls for pond failure and overtopping of ponds

Site infrastructure	Description
Ponding lagoons 1,2 & 3	The storage ponds will be lined with in-situ soil with a permeability 1×10^{-9} m/s.
	Ponding lagoons will be designed to store a 24-hour duration, 1 in 20 year ARI critical rainfall event without overflow
	Ponding lagoon 1 will be designed to have a minimum freeboard of 300 mm
	Emergency overflow events will be controlled to divert all discharges to Hannan's lake to prevent overtopping and preserve infrastructure viability
	Treated effluent quality will continue to be managed in accordance with the current licence L8560/2011/2 conditions.

8.4.6 Key findings

The Delegated Officer has reviewed the information regarding pond failure and overtopping of pond and has found:

1. Untreated sewage will be appropriately stored in ponding lagoons lined with in-situ soil with a permeability of 1×10^{-9} .
2. Conditioning of the design and construction specification for the ponding lagoons will ensure that the proposed works are able to meet the requirements of licence prior to construction and to ensure that the risk of sewage discharge from overtopping and storage pond failures can be adequately managed.
3. Refurbishment of the existing Lagoon 1, 2 and 3 embankments is considered to improve treated effluent containment.
4. The existing Licence includes conditions related to the management of the Premises to prevent overtopping of the ponds and includes specific operational controls (e.g. freeboard and reportable events, discharge to maintain pond capacity and other pond maintenance controls)

8.4.7 Consequence

Should overtopping and failure of ponds occur, 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 overtopping of ponds with untreated and treated wastewater to be **Moderate**.

8.4.8 Likelihood of Risk Event

Based upon the proposed infrastructure and management controls, the Delegated Officer has determined that the likelihood of wastewater emissions will probably not occur in most circumstances. Therefore, the Delegated Officer considers the likelihood to be **Rare**.

8.4.9 Overall rating of seepage/overflow of untreated sewage and treated wastewater from ponds

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 seepage/overflow of untreated sewage and treated wastewater from ponds to be **Medium**.

8.5 Risk Assessment – Nitrogen and phosphorous release

8.5.1 Description of the risk event for nitrogen and phosphorous release

During irrigation the release of Nitrogen(TN) and Phosphorus(TP) by overland flow and subsurface seepage (pathway) may lead to vegetation adjacent to the Premises and groundwater sources (receptors) suffering from a change in soil chemistry, inundation of the root zone and mounding of groundwater in the local area.

8.5.2 Identification and general characterisation of emission

The treated/untreated wastewater may contain high levels of pathogens and nutrients. Key contaminants of concern include pathogens (bacteria, viruses etc.) and nutrients (nitrogen and phosphorous).

8.5.3 Description of potential adverse impact from the emission

If wastewater is discharged to the irrigation area prior to meeting emission standards this could lead to the facilitated growth of weeds, increase in nutrient levels in soil and ponding in the irrigation area as well as adjacent areas.

8.5.4 Criteria for assessment

The following criteria have been used to evaluate the risk associated to reuse of treated wastewater:

- Department of Health's *Guidelines for the non-potable uses of recycled water in Western Australia*, low exposure risk for surface irrigation with some restricted access and application.
- Heavy metals in wastewater should not exceed the quality criteria for irrigation use given in the *Australian and New Zealand guidelines for fresh and marine water quality*.
- Australian water quality guidelines (*ANZECC and ARMCANZ 2000*) provide recommended trigger values for fresh and marine water.
- *Turf Guideline (2014)*.

- Department of Water and Environmental Regulation (2008) Water Quality Protection Note 22 (WQPN-22) Irrigation with nutrient-rich wastewater
- Department of Water (2010) Water Quality Protection Note 33 (WQPN-33) Nutrient and irrigation management plans

8.5.5 Applicant/Licence Holder controls

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

Table 16: Applicant's/Licence Holder's proposed controls for release of high concentration of nitrogen and phosphorus

Site infrastructure	Description
Effluent reuse scheme	Treated effluent quality will continue to be managed in accordance with the current licence L8560/2011/2 conditions.
	Installation of baffles in square lagoon ponds will help in attaining better water quality.
	The proposed upgrade will increase retention of wastewater in ponding lagoons and therefore will provide further treatment time to reduce Nitrogen and Phosphorus concentrations in treated wastewater.
	Irrigation only to occur within the designated areas approved by DoH.

8.5.6 Key findings

The Delegated Officer has reviewed the information regarding the risk associated to the release of high concentration of nitrogen and phosphorous and has found that:

1. A nutrient irrigation management plan will be required for the reuse scheme so that treated wastewater irrigation can be appropriately managed. The Delegated Officer notes that further information will be required during the licence amendment assessment phase to determine nutrient loading of soils as a result of irrigation within the reuse scheme in order to determine regulatory controls for monitoring discharges to land. This information will include, but not limited to, nutrient application and loading rates for both TN and TP.

8.5.7 Consequence

Should nutrient overloading loading occurs, the Delegated Officer has determined that the impact of a change in soil chemistry, inundation of the root zone and mounding of groundwater in the local area will cause low level on-site impacts and minimal off-site impacts. Therefore, the Delegated Officer considers the consequence of nitrogen and phosphorus release to be **Minor**.

8.5.8 Likelihood of Risk Event

The Delegated Officer has determined that the likelihood of impacts from nutrient loading could occur at some time. Therefore, the Delegated Officer considers the likelihood of releasing high concentration of nitrogen and phosphorous via irrigation to be **Possible**.

8.5.9 Overall rating of seepage/overflow of untreated sewage and treated wastewater from ponds

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 releasing high concentration of nitrogen and phosphorous via irrigation to be **Medium**.

8.6 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 17 below. Controls are described further in section 9.

Table 17: Risk assessment summary

	Description of Risk Event			Applicant controls	Risk rating	Acceptability with controls (conditions on instrument)
	Emission	Source	Pathway/ Receptor (Impact)			
1.	Seepage of untreated sewage and treated wastewater from ponds	<i>Ponding lagoons 1,2&3</i>	Vegetation adjacent to Premises & Surface water within Hannan's lake. Via direct discharge causing impacts on water quality and soil contamination inhibiting vegetation survival and growth.	Infrastructure and management controls.	Moderate consequence Rare likelihood Medium risk	Acceptable subject to Applicant controls conditioned and some regulatory controls
2.	Overtopping of ponds with treated and untreated wastewater	<i>Ponding lagoons 1,2&3</i>	Vegetation adjacent to Premises & Surface water within Hannan's lake. Via direct discharge causing impacts on water quality and soil contamination inhibiting vegetation survival and growth.	Infrastructure and management controls.	Moderate consequence Rare likelihood Medium risk	Acceptable subject to Applicant controls conditioned and some regulatory controls
3.	Nitrogen and Phosphorus-discharge of treated sewage	Irrigation	Direct discharge-reserves and parks. Change in soil chemistry, Inundation of the root zone, and mounding of groundwater	Siting, Infrastructure and management controls (water quality monitoring, notifications)	Minor consequence Possible likelihood Medium Risk	Acceptable subject to Applicant controls conditioned and some regulatory controls

9. Regulatory controls

9.1 Works Approval control

- Condition 1 allows construction of the infrastructure as per Table 1 in the Works Approval.
- Conditions 2 and 3 requires an audit of the construction compliance works to be carried out and a report to be submitted to the CEO, to confirm all infrastructure has been constructed as required by each stage of construction.
- Conditions 4 and 5 relates to time limited operations of the WWTP for the purpose of transitioning to licensed operations. The Applicant is permitted to operate for a period of 9 months. This limited operating period will allow the Applicant to operate whilst a Licence amendment is undertaken.
- Conditions 7 to 10 relates to authorised emissions and monitoring from the proposed works.
- Condition 11 requires the submission of further documentation prior to requesting to operate the Reuse Scheme. For this to occur, the Applicant should apply for a Licence amendment to prescribe the upgraded infrastructure.
- Conditions 13 and 14 require accurate record keeping and outlines that a Works Approval Holder must comply with a Department Request within 14 days.

10. 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 18 provides a summary of the conditions to be applied to this Works Approval.

Table 18: Summary of conditions to be applied

Condition Ref	Grounds
Infrastructure and Equipment 1	These conditions are valid, risk-based and contain appropriate controls.
Environmental Compliance 2 and 3	Environmental compliance is a valid, risk-based condition to ensure appropriate linkage between the licence and the EP Act.
Time limited operations 4 - 6	These conditions are valid, risk-based and consistent with the EP Act.
Emissions 7 - 10	This condition is valid, risk-based and consistent with the EP Act.
Information 11, 12, 13, 14 and 15	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 approvals under the EP Act.

11. Applicant's comments

The Applicant was provided with the draft Decision Report and draft Works Approval on 28 February 2020. The Applicant provided comments which are summarised, along with DWER's response, in Appendix 2.

12. 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.

**A/MANAGER WASTE INDUSTRIES
REGULATORY SERVICES**

Appendix 1: Key documents

	Document title	In text ref	Availability
1.	Licence L8560/2011/2 – City of Kalgoorlie Boulder	L8560/2011/2	accessed at www.dwer.wa.gov.au
2.	South Boulder Wastewater Treatment Plant Project Application form including supporting documents: <ol style="list-style-type: none"> 1. Attachment 1A - Proof of occupier status 2. Attachment 2 – SBWWTP site plan 3. Attachment 3A – Overview of proposed activities 4. Attachment 4 – Additional information- stage A and stage b work including emissions and Discharges 5. Attachment 5 – Proposed Fee Calculation 	W6350/2020/1	DWER records (DWERDT232560)
3.	DER, July 2015. <i>Guidance Statement: Regulatory principles.</i> Department of Environment Regulation, Perth.	DER 2015a	accessed at www.dwer.wa.gov.au
4.	DER, October 2015. <i>Guidance Statement: Setting conditions.</i> Department of Environment Regulation, Perth.	DER 2015b	
5.	DER, August 2016. <i>Guidance Statement: Licence duration.</i> Department of Environment Regulation, Perth.	DER 2016a	
6.	DER, November 2016. <i>Guidance Statement: Risk Assessments.</i> Department of Environment Regulation, Perth.	DER 2016b	
7.	DER, November 2016. <i>Guidance Statement: Decision Making.</i> Department of Environment Regulation, Perth.	DER 2016c	

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

Condition	Summary of Licence Holder comment	DWER response
Decision Report-Clause 4.1 Page 5 final dot point	Decision Report Draft– The Old Boulder Lagoons are not a part of the premises under licence L8560/2011/2.	Information removed.
Decision Report Draft Clause 5 Table 5	Please find attached letter from the Department of Health relating approval of the refurbishment project.	Information noted
Decision Report Draft Clause 8.5.6	Nutrient application rate for TN and TP according to WQPN-22 does not apply to treated municipal wastewater (sewage) which requires specific approval under the Health Act 1911 (WQPN -22 Page 2 “Scope”). The City of Kalgoorlie-Boulder has implemented a nutrient mapping testing programme through the recycled water supply network.	Information noted
Works Approval Draft Clause 5 (a)	The City of Kalgoorlie-Boulder requests the time period be extended to 120 days for the time limited operations phase.	Request adopted

Attachment 1: Department of Health Approval



Government of **Western Australia**
Department of **Health**

Your Ref: 1034-10-LET-013
Our Ref: F-AA-69632
Enquiries: Natalla Ramswell (08) 9222 2000

Mr Peter Rees
Water Services Project Manager
City of Kalgoorlie-Boulder
PO Box 2042
Boulder WA 6432

Dear Mr Rees

SOUTH BOULDER WASTEWATER TREATMENT PLANT UPGRADE WORKS

Thank you for your email of 17 February 2020 providing details of the proposed upgrade works for the South Boulder Wastewater Treatment Plant.

It is noted that the proposed upgrade work will be undertaken in three stages A, B and C. Stage A & B includes refurbishment, increase of treatment capacity and hydraulic detention for the primary and secondary ponds and decrease of water depth for tertiary pond followed by rock filtration of the final pond to improve wastewater quality.

This Department has no objection to Stage A and B upgrade works subject to six consecutive daily samples of final effluent after chlorination at the Boulder WWTP in compliance with recycled water as per the Approval B28/00000.

Please note that the Stage C detailed scope of upgrade works will need to be submitted to this Department for review prior to proposed work commencement.

Should you have queries or require further information please contact Environmental Health Directorate on (08) 9222 2000 or ehinfo@health.wa.gov.au

Yours sincerely

A handwritten signature in black ink that reads "MC Rodriguez".

Clemencia Rodriguez
**A/MANAGING SCIENTIST WATER
ENVIRONMENTAL HEALTH DIRECTORATE**

6 March 2020

Environmental Health Directorate | Public and Aboriginal Health Division
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Attachment 2: Works Approval W6350/2020/1
