Decision Report

Application for Licence

Part V Division 3 of the *Environmental Protection Act 1986*

Licence Number	L6956/1997/12
Applicant	Shire of Victoria Plains
File number	DWERVT1560
Premises	Bolgart Refuse Site Bolgart East Road BOLGART WA 6568 Legal description Lot 1 on Diagram 16424 Certificate of Title Volume 1182 Folio 811
Date of report	20/10/2021
Decision	Licence granted

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MANAGER WASTE INDUSTRIES REGULATORY SERVICES

an officer delegated under section 20 of the *Environmental Protection Act 1986* (WA)

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1. Decision summary

This decision report documents the assessment of potential risks to the environment and public health from emissions and discharges during the operation of the premises. As a result of this assessment, licence L6956/1997/12 has been granted.

2. Scope of assessment

2.1 Regulatory framework

In completing the assessment documented in this decision report, the Department of Water and Environmental Regulation (the department; DWER) has considered and given due regard to its regulatory framework and relevant policy documents which are available at https://dwer.wa.gov.au/regulatory-documents.

2.2 Application summary and overview of premises

On 16 June 2021, the Shire of Victoria Plains (the Licence Holder) submitted an application for a licence to the department under section 57 of the *Environmental Protection Act 1986* (EP Act).

The application is to seek a licence renewal relating to putrescible landfilling at the premises. The premises is approximately 1 km east of Bolgart. Some additional matters have been addressed within the scope of this assessment as follows:

- The Licence Holder undertook a groundwater investigation at the premises during 2021 to address the requirements of conditions in the existing licence. DWER has included an assessment of whether these investigations have satisfied condition 2.3.1 within the scope of the licence renewal assessment.
- Within their application, the Licence Holder provided an update on wastes currently accepted at the premises which reflect some changes from the wastes authorised for acceptance in the existing licence. DWER has considered these changes within the scope of the licence renewal assessment to ensure the revised licence accurately reflects current activities at the premises.

The premises relates to the category and assessed design capacity under Schedule 1 of the *Environmental Protection Regulations 1987* (EP Regulations) which are defined in licence L6956/1997/12. The infrastructure and equipment relating to the premises category and any associated activities which the department has considered in line with *Guideline: Risk Assessments* (DWER 2020) are outlined in the revised licence L6956/1997/12.

As part of the licence renewal assessment, the CEO has updated the format, appearance and terminology of the licence to align with current licensing requirements. These updates are detailed in Section 6.1, Table 6.

2.3 Background

Most of the premises is located within the Bolgart Water Reserve, a Priority 2 Public Drinking Water Source Area (P2 PDWSA). The revised *Bolgart Water Reserve Drinking water source protection plan* (herein referred to as the 'Water Source Protection Plan') was released in April 2016 (Department of Water 2016).

The Water Source Protection Plan outlined that the Bolgart Water Reserve boundary had been changed to reflect a better understanding of the hydrogeology of the area (DOW 2016). The new boundary was based on the surface catchment boundary for both the Western and Bull Road wellfields (DOW 2016). A map of the premises and surrounds is provided as Figure 1.

The licence was previously due to expire on 22 October 2019. Following an application from the

Licence Holder in 2019, DWER amended the licence on 17 October 2019 to extend its duration by two years to the current expiry date of 22 October 2021. Potential impacts from the premises to the PDWSA were one of DWER's key considerations when assessing the 2019 licence amendment application. The extension was provided to allow the Licence Holder time to prepare a Groundwater Sampling and Analysis Quality Plan (SAQP) in accordance with the conditions in the licence and commence groundwater investigations as set out in the SAQP.

The Licence Holder submitted a SAQP on 17 December 2019 (GHD 2019). DWER amended the licence again on 7 April 2020 to add conditions that required the Licence Holder to carry out the work proposed in the SAQP. The Licence Holder undertook groundwater investigations to address some of the requirements of the SAQP in 2021 and submitted a report on the findings of these investigations on 4 May 2021 (Cardno 2021). The findings of this report will be considered as part of the licence renewal assessment and are discussed in Section 3 below.

3. Groundwater investigations

3.1 Scope of investigations

Condition 2.3.1 in the existing licence required three monitoring bores to be installed at the following locations by 31 October 2020:

- MB01 at a north-eastern location inferred to be up hydraulic gradient from the landfill;
- MB02 at a north-western location inferred to be down hydraulic gradient from the landfill; and
- MB03 at a southern location inferred to be down hydraulic gradient from the landfill.

Schedule 2 of the existing licence required six monthly groundwater monitoring of the new bores to occur during the 2020-2021 annual period and annual groundwater monitoring thereafter.

In 2021, the Licence Holder undertook a groundwater investigation at the premises to address the requirements above. During the groundwater investigation, Cardno identified that the depth to groundwater was about 27 metres below ground level (m BGL) which was significantly greater than was predicted in the SAQP (3 to 10 m BGL). The Licence Holder's budgetary constraints meant they could only install one groundwater monitoring bore at the depth required to intersect the regional groundwater table.

As a result of this limitation, the Licence Holder revised the scope of the groundwater investigations and undertook the following investigations in February and March 2021:

- Installation of one groundwater monitoring bore (MB1/21) within the premises to a depth of about 31 m BGL and with an 18 m screened interval from 13 to 31 m BGL. This bore was installed at a location about 20 m south of the proposed location for MB03, inferred to be down hydraulic gradient from the active landfilling area in the north of the premises and up hydraulic gradient of the Water Corporation production bore (Figure 1) (Cardno 2021).
- Drilling of one soil bore to a depth of about 15 m BGL at an unspecified location (Cardno 2021).
- Groundwater quality sampling of monitoring bore MB1/21 using low flow sampling techniques.
- Water quality samples were also collected from Water Corporation production bore 6/81 and a tap at Bolgart Primary School in March 2021 (Figure 1). DWER has inferred that the tap sampled at the Bolgart Primary School sourced water from the reticulated town drinking water supply rather than an on-site groundwater production bore.

- Analysis of water quality samples for the following analytical suite:
    - field parameters (temperature, pH, dissolved oxygen, redox potential and electrical conductivity)
    - heavy metals (arsenic, cadmium, copper, chromium, lead, mercury, nickel and zinc)
    - major ions and total dissolved solids (TDS)
    - nutrients (nitrate, nitrite, ammonia, total N)
    - total recoverable hydrocarbons (TRH) and benzene, toluene, ethylbenzene and xylenes (BTEX)
    - polycyclic aromatic hydrocarbons (PAHs)
    - polychlorinated biphenyls (PCBs)
    - volatile organic compounds (VOCs)
    - semi-volatile organic compounds (SVOCs)
    - phenolics
    - pesticides/herbicides
    - perfluoroalkyl and polyfluoroalkyl substances (PFAS).

The Licence Holder has not reported the results of any additional groundwater sampling after the first sampling event that occurred in March 2021.

3.2 Investigation findings

Drilling at two locations within the premises during the groundwater investigation identified that the soil profile comprises sands, gravelly clays and clays (Cardno 2021). Based on the findings of the investigation, Cardno concluded that groundwater at MB1/21 is situated within the same aquifer as production bore 6/81. This conclusion was supported by the general groundwater quality and concentrations of some parameters such as metals being very similar between these bores (Cardno 2021).

Groundwater was encountered during drilling at the premises in February 2021 within a unit comprising interbedded layers of clay and sand, and overlain by a clay layer about three metres thick. Perched groundwater features were not observed during drilling, however it is noted that drilling occurred in summer when seasonal perched features are less likely to be present. Based on the soil profile intersected during drilling at MB1/21, DWER has identified that there is the potential for a perched groundwater feature to form at a depth of about 19 m BGL where a sandy layer overlies a clay layer.

During the March 2021 sampling event, the depth to groundwater at MB1/21 was about 27.3 m BGL. Groundwater was not encountered in the soil borehole drilled to 15 m BGL in February 2021 (Cardno 2021). From the March 2021 sampling event, the groundwater table at 6/81 was measured about 3.85 m lower in elevation than the groundwater table on the premises at MB1/21 (Cardno 2021). It is unclear to what extent the groundwater table at 6/81 was affected by pumping at the production bore when this measurement was taken.

Groundwater quality at MB1/21 was recorded as aerobic (5.45 mg/L dissolved oxygen), brackish (1,220 mg/L TDS), acidic (pH of 5.84) and displaying a positive oxidation reduction potential during the March 2021 sampling event (Cardno 2021). The concentrations of chloride and sodium in groundwater at MB1/21 and 6/81 were above the aesthetic drinking water quality guideline values. This finding is consistent with DWER's understanding that groundwater from 6/81 is brackish and is blended with fresher groundwater from 1/96 to produce Bolgart's drinking water supply (DOW 2016).

Detected concentrations of heavy metals and nutrients in water quality samples did not exceed aesthetic or health values from the Australian Drinking Water Quality Guidelines (ADWG). Cardno considered that detected heavy metal concentrations were likely to represent naturally occurring concentrations and detected nutrient concentrations were likely to represent background conditions for an area surrounded by agricultural land uses.

The general groundwater quality at MB1/21 and 6/81 was very similar, however DWER identified some differences in concentrations between the bores for some parameters. These parameters include total nitrogen, ammonia, Total Kjeldahl Nitrogen and sulfate which recorded higher concentrations at MB1/21 than 6/81. MB1/21 recorded an ammonia as N concentration of 0.08 mg/L whereas ammonia was not detected above the LOR at 6/81 or in the tap water sample. MB1/21 recorded the highest concentration of sulfate at 106 mg/L compared to 50 mg/L at 6/81 and 29 mg/L in the tap water sample. Groundwater at MB1/21 was also more acidic and of lower alkalinity than groundwater at 6/81.

The tap water sample from Bolgart Primary School recorded higher concentrations of total nitrogen and nitrate as N (8.8 mg/L and 7.48 mg/L respectively) compared to MB1/21 (2.7 mg/L and 1.01 mg/L respectively) and 6/81 (1.6 mg/L and 0.98 mg/L respectively).

Organic contaminants of concern including BTEX, PAHs, TRH, PCBs, VOCs, SVOCs, phenolics, pesticides, herbicides and PFAS were not detected above the laboratory limit of reporting (LOR) in groundwater samples from MB1/21 or 6/81.

3.3 Key findings

The Delegated Officer has reviewed the *Groundwater assessment report* (Cardno 2021) and has for the purposes of this renewal assessment found:

1. The groundwater drilling program was not completed in accordance with the timeline specified in condition 2.3.1 of the existing licence and as a result, drilling occurred in summer rather than during the winter to spring period as intended.
2. The location of MB1/21 is considered suitable to monitor groundwater quality between the active landfill and production bore 6/81 and to satisfy the siting requirements for MB03 as shown in Figure 2 of the existing licence.
3. Monitoring bore MB1/21 was generally constructed in an accordance with the requirements of condition 2.3.1 in the existing licence, however it was installed with a very long screened interval (18 metres) compared to what is typically suitably for a monitoring bore. The screened interval appears to have been selected due to uncertainty during drilling about the depth of the regional groundwater table.
4. Monitoring bore MB1/21 is screened across three different geological units comprising a sand layer, overlying a clay layer, overlying interbedded layers of water-bearing clay and sand. Section 8.2.3.1 of Schedule B2 of the *National Environmental Protection (Assessment of Site Contamination) Measure* specifies *"To minimize the potential for vertical flow between aquifers via the well bore, screens should not be installed across different geological units or water-bearing zones."*
5. Based on the above considerations, the design of monitoring bore MB1/21 is not suitable because:
    - monitoring bore MB1/21 could act as a pathway for contamination between a potential seasonal perched feature at about 19 m BGL and the regional groundwater table at about 27 m BGL; and
    - leachate contamination in the potential seasonal perched feature may not be detected in groundwater samples from MB1/21 because of dilution from

groundwater in the regional water table aquifer.

The Delegated Officer considers that MB1/21 should be decommissioned to ensure it does not act as a pathway for contamination in the potential seasonal perched feature to migrate to the regional groundwater table.

6. The *Groundwater assessment report* did not provide detailed records of the development of monitoring bore MB1/21 as required by condition 2.3.1. In the future, well construction logs should include at a minimum the total volume of groundwater purged during development and a summary of any observations or monitoring of water quality during development.
7. The Licence Holder has not satisfied the requirement in condition 2.3.1 in the existing licence to install monitoring bores MB01 and MB02 in the north-east and north-west of the premises respectively. The Delegated Officer will consider whether the requirement for the Licence Holder to install monitoring bores MB01 and MB02 should be retained or removed in the revised licence as part of the scope of this licence renewal assessment.
8. The groundwater investigations conducted in 2021 did not identify any clear evidence of landfill leachate impacts in groundwater at MB1/21 on the premises.
9. Some minor differences in groundwater quality between MB1/21 and production bore 6/81 could be due to the influence of leachate emissions from landfill cells at the premises. However, there is currently insufficient evidence to confirm that leachate emissions are the cause of these differences.
10. The following data gaps remain about groundwater flow, levels and quality at the premises:
    - Groundwater flow direction beneath the premises.
    - Background concentrations of contaminants of potential concern in groundwater entering the premises (inferred to be entering from the north-east).
    - The seasonal maximum elevation of the regional groundwater table beneath the premises which is inferred to occur during or following winter (i.e. between August and October).
    - The potential presence of seasonal perched groundwater features above the regional groundwater table.
    - Groundwater quality sampling results from additional sampling events because further sampling is needed to verify the findings of the first sampling event. A sampling frequency of at least six monthly is required to assess potential seasonal trends in groundwater levels and quality.

4. Risk assessment

The department assesses the risks of emissions from prescribed premises and identifies the potential source, pathway and impact to receptors in accordance with the *Guideline: Risk Assessments* (DWER 2020).

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.

4.1 Source-pathways and receptors

4.1.1 Emissions and controls

The key emissions and associated actual or likely pathway during premises operation which have been considered in this decision report are detailed in Table 1 below. Table 1 also details the conditions in the existing licence to assist in controlling these emissions.

Table 1: Existing licence conditions

Emission	Sources	Potential pathways	Existing licence conditions
Leachate	Disposal of waste to unlined landfill cells	Seepage and infiltration to groundwater	1.3.1 – Waste acceptance specifications 1.3.3 – Minimum separation distance of 2 m between the base of the landfill and the highest groundwater level 1.3.5 – Cover requirements 2.3.1 and 2.3.2 – Groundwater bore installation and reporting 2.3.3, 2.3.4, 2.3.5 and Schedule 2 – Groundwater monitoring 3.2.2 – Groundwater reporting
Odour	Disposal of waste to unlined landfill cells Storage of green waste before processing or removal off-site	Air / windborne pathway	1.3.1 – Waste acceptance specifications 1.3.4 – Compaction of waste and rehabilitation requirements 1.3.5 – Cover requirements
Dust	Storage of some waste types (e.g. clean fill and Inert Waste Type 1), covering of landfilled waste and vehicle movements	Air / windborne pathway	1.3.3 – No waste is temporarily stored within 35 m from the premises boundary
Litter/ windblown waste	Disposal of waste to unlined landfill cells	Air / windborne pathway	1.3.3 – No waste is temporarily stored or landfilled within 35 m from the premises boundary 1.3.4 – Compaction of waste and rehabilitation requirements 1.3.5 – Cover requirements 1.3.9 – Windblown waste management
Attraction/ harbouring of vectors and vermin	Disposal of waste to unlined landfill cells	Movement of vectors and vermin	1.3.4 – Compaction of waste and rehabilitation requirements 1.3.5 – Cover requirements 1.3.8 – Control measures for pests, flies and vermin

Emission	Sources	Potential pathways	Existing licence conditions
Contaminated stormwater	Disposal of waste to unlined landfill cells Storage of waste (e.g. scrap metal, tyres, drum muster containers, green waste) before processing or removal off-site	Seepage and infiltration to groundwater Overland flow	1.2.2 – Spills response 1.2.3 – Stormwater management 1.3.3 – No waste is temporarily stored or landfilled within 35 m from the premises boundary 1.3.4 – Compaction of waste and rehabilitation requirements 1.3.5 – Cover requirements
Asbestos fibres	Disturbance of buried asbestos Acceptance of non-conforming waste loads	Air / windborne pathway	1.3.1 – Waste acceptance specifications 1.3.5 – Cover requirements 1.3.6 – Security measures 1.3.7 – Signage requirements 1.3.11 – Preventing disturbance of buried asbestos 1.3.12 – No acceptance of waste that contains or is suspected to contain visible asbestos or asbestos containing materials (ACM) 1.3.12 – Requirements for managing any asbestos or ACM that is suspected or detected 3.1.6 – Maintenance of a Special Waste Type 1 disposal register and plan
Contaminated firefighting water	Waste fire at the premises	Seepage and infiltration to groundwater Overland flow	1.3.3 – No waste is temporarily stored or landfilled within 35 m from the premises boundary 1.3.4 – Compaction of waste and rehabilitation requirements 1.3.5 – Cover requirements 1.3.6 – Security requirements 1.3.7 – Signage requirements 1.3.10 – No waste is burnt on the premises
Smoke/noxious gases	Waste fire at the premises	Air / windborne pathway	

4.1.2 Receptors

In accordance with the *Guideline: Risk Assessment* (DWER 2020), the Delegated Officer has excluded the Licence Holder's employees, visitors, and contractors from its assessment. Protection of these parties often involves different exposure risks and prevention strategies and is provided for under other state legislation.

Table 2 and Figure 1 below provide a summary of potential human and environmental receptors that may be impacted as a result of activities upon or emission and discharges from the prescribed premises *(Guideline: Environmental Siting* (DWER 2020)).

Table 2: Sensitive human and environmental receptors and distance from premises

Human receptors	**Distance from premises**
Bolgart town residential area	900 m west of the premises
Bolgart Primary School	880 m west of the premises
Golf course	250 m south-west of the premises
Rural farmland	Adjacent to the western, northern, eastern and southern boundaries of premises
Environmental receptors	**Distance from premises**
Public Drinking Water Source Areas (PDWSAs)	The Bolgart Water Reserve is a Priority 2 PDWSA which comprises two wellfields associated with Water Corporation production bores 6/81 and 1/96. The southern portion of the premises is located within the Bull Road Wellfield PDWSA where production bore 6/81 is located. Production bore 6/81 is about 500 m south of the premises boundary. The Western Wellfield of the Bolgart Water Reserve is located 1.2 km west of the premises.
Groundwater	Groundwater was encountered at a depth of 27.3 m BGL at the premises during a monitoring event in March 2021. The potential presence of seasonal perched groundwater features is not known. The flow direction of groundwater in the vicinity of the premises is not known. Topography within the vicinity of the premises slopes down towards the south, west and north-west (Figure 1). Bolgart is underlain by crystalline basement rocks of the Yilgarn Craton. The basement is overlain by a weathered profile consisting of kaolinite clay, sandy clay and sand, and is covered by laterite on the hills, and locally by residual sand on the slopes (DOW 2016). The residual sand is unconsolidated and up to 30 m thick, possibly occupying depressions within the weathered profile (DOW 2016). Drilling at the premises in February 2021 encountered layers of gravelly clay, sand and clay between the ground surface and a depth of about 33 m BGL. Groundwater licences held by the Water Corporation for the two production bores servicing the town water supply are the only groundwater licences identified within 5 km of the premises. The DWER Water Information Reporting tool identified 23 groundwater bores within approximately 2 km of the premises. Groundwater bore owners included private owners, the Water Corporation, Bolgart Primary School (Department of Education) and the Public Works Department (current

	owner unknown).
Surface water	The Bolgart Brook is located about 1.4 km west of the premises. This is a non-perennial watercourse.
Surface Water Areas	The premises is within the Avon River Catchment Area.
Groundwater Areas	The Bolgart East Groundwater Area is 20 m south of the premises (across Bolgart East Road).
Waterways Conservation Areas	The Premises is located within the Avon River Management Area.
Threatened Ecological Communities	26 occurrences of the Wheatbelt Woodlands (Eucalypt woodlands of the Western Australian Wheatbelt) were identified within 2 km of the premises. This is a Priority 3 and critically endangered community.
Threatened/Priority Fauna	One Priority 4 fauna species (western brush wallaby), one endangered fauna species (shield-backed trapdoor spider) and one vulnerable fauna species (bilby) were identified within about 2 km of the premises.
Threatened/Priority Flora	Two Priority 1 flora species, two Priority 3 species and one Priority 4 species were identified within about 2 km of the premises.

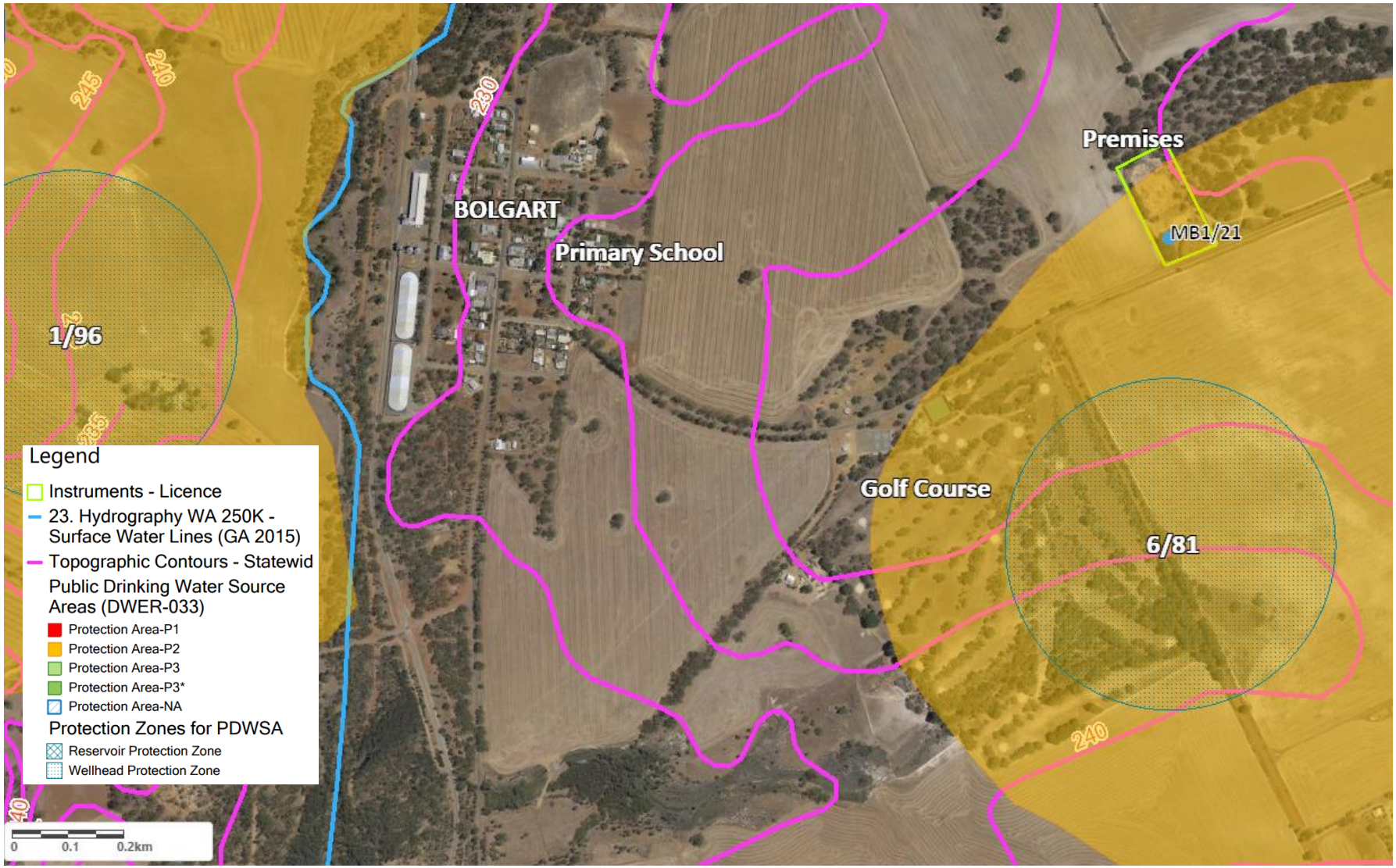

Figure 1: Distance to sensitive human and environmental receptors

4.2 Risk ratings

Risk ratings have been assessed in accordance with the *Guideline: Risk Assessments* (DWER 2020) for each identified emission source and take into account potential source-pathway and receptor linkages as identified in Section 4.1. Where linkages are incomplete they have not been considered further in the risk assessment.

Where the existing licence specifies mitigation measures/controls (as detailed in Section 4.1), these have been considered when determining the final risk rating.

Additional regulatory controls may be imposed where the controls in the existing licence are not deemed sufficient. Where this is the case the need for additional controls will be documented and justified in Table 3.

Licence L6956/1997/12 that accompanies this decision report authorises emissions associated with the operation of the premises i.e. Category 64 putrescible landfilling activities.

The conditions in the issued licence, as outlined in Table 3 have been determined in accordance with *Guidance Statement: Setting Conditions* (DER 2015).

Table 3: Risk assessment of potential emissions and discharges from the premises during operation

Risk events					Risk rating [1] C = consequence L = likelihood	Existing controls sufficient?	Conditions [2] of licence	Justification for additional regulatory controls
Sources / activities	**Potential emission**	**Potential pathways and impact**	**Receptors**	**Existing licence conditions**				
Disposal of waste to unlined landfill cells	Leachate	Seepage and infiltration to groundwater causing degradation of water quality and potential health impacts and ecosystem disturbance	Bolgart Water Reserve PDWSA Bolgart town drinking water supply Other down gradient groundwater users Down-gradient aquatic ecosystems	Refer to Section 4.1	Refer to Section 4.3	N	Condition 1, 6, 9, 20, 21, 22, 29 **Condition 8, 18, 19**	Refer to Section 4.3
	Odour	Air / windborne pathway causing impacts to health and amenity	Visitors to the golf course 250 m south-west, residences 900 m west, primary school 880 m west and farm workers on land immediately surrounding the premises	Refer to Section 4.1	C = Minor L = Unlikely **Medium risk**	Y	Condition 1, 9	N/A
	Litter/ windblown waste	Air / windborne pathway causing impacts to amenity	Adjacent farming properties	Refer to Section 4.1	C = Minor L = Possible **Medium risk**	Y	Condition 6, 8, 9, 13	N/A
	Attraction/ harbouring of vectors and vermin	Movement of vectors and vermin that may spread disease and cause impacts to amenity	Adjacent farming properties	Refer to Section 4.1	C = Minor L = Possible **Medium risk**	Y	Condition 8, 9, 11	N/A
	Contaminated stormwater	Seepage and infiltration to groundwater or overland flow causing degradation of soil and water quality, ecosystem disturbance and potential health impacts to groundwater users	Bolgart Water Reserve PDWSA Bolgart town drinking water supply Other down gradient groundwater users Adjacent farming properties Wheatbelt Woodlands TEC	Refer to Section 4.1	C = Minor L = Possible **Medium risk**	N	Condition 6, 9, 20, 21, 22, 29 **Condition 7, 8, 16**	Additional controls are required to limit where and how landfilling occurs to reduce the potential for stormwater interaction with waste. An outcome-based condition is required to prevent stormwater that has come into contact with waste from discharging off the premises.

Risk events					Risk rating [1] C = consequence L = likelihood	Existing controls sufficient?	Conditions [2] of licence	Justification for additional regulatory controls
Sources / activities	**Potential emission**	**Potential pathways and impact**	**Receptors**	**Existing licence conditions**				
Storage of waste (e.g. scrap metal, tyres, DrumMuster containers, green waste) before processing or removal off-site.	Contaminated stormwater	Seepage and infiltration to groundwater or overland flow causing degradation of soil and water quality, ecosystem disturbance and potential health impacts to groundwater users	Bolgart Water Reserve PDWSA Bolgart town drinking water supply Other down gradient groundwater users Adjacent farming properties Wheatbelt Woodlands TEC	Refer to Section 4.1	C = Minor L = Possible **Medium risk**	N	Condition 7, 14, 20, 21, 22, 29 **Condition 1, 16**	Inclusion of waste acceptance specifications for scrap metal and DrumMuster containers is required to mitigate the risk of wastes contaminated by environmentally hazardous materials from being accepted and stored at the premises. An outcome-based condition is required to prevent stormwater that has come into contact with waste from discharging off the premises.
	Odour	Air / windborne pathway causing impacts to health and amenity	Visitors to the golf course 250 m south-west, residences 900 m west, primary school 880 m west and farm workers on land immediately surrounding the premises	Refer to Section 4.1	C = Slight L = Unlikely **Low risk**	Y	Condition 1	N/A
Storage of clean fill and inert waste type 1, covering of landfilled waste and vehicle movements	Dust	Air / windborne pathway causing impacts to health and amenity	Adjacent farming properties	Refer to Section 4.1	C = Slight L = Unlikely **Low risk**	Y	Condition 7	N/A
Disturbance of buried asbestos Acceptance of non-conforming loads	Asbestos fibres	Air / windborne pathway causing impacts to health	Visitors to the golf course 250 m south-west, residences 900 m west, primary school 880 m west and farm workers on land immediately surrounding the premises	Refer to Section 4.1	C = Severe L = Unlikely **High risk**	N	Condition 1, 2, 3, 9, 26 **Condition 6, 12, 31**	An on-site sign marking the location of the historical asbestos disposal area is required to mitigate the risk that this area will accidentally be disturbed. The premises is required to be manned when open to the public to prevent non-conforming wastes containing asbestos from being disposed at the premises. The Licence Holder is required to

Risk events					Risk rating [1] C = consequence L = likelihood	Existing controls sufficient?	Conditions [2] of licence	Justification for additional regulatory controls
Sources / activities	**Potential emission**	**Potential pathways and impact**	**Receptors**	**Existing licence conditions**				
								report non-compliances with waste acceptance and handling conditions to ensure DWER is aware of any non-conforming wastes received at the premises and how they are managed.
Waste fire at the premises	Contaminated firefighting water	Seepage and infiltration to groundwater or overland flow causing degradation of soil and water quality, ecosystem disturbance and potential health impacts to groundwater users	Bolgart Water Reserve PDWSA Bolgart town drinking water supply Other down gradient groundwater users Adjacent farming properties Wheatbelt Woodlands TEC	Refer to Section 4.1	C = Moderate L = Unlikely **Medium risk**	N	Condition 8, 9, 10, 12 **Condition 6, 7, 30**	The number of tyres allowed to be stored at the premises at one time is reduced from 99 to 60 and the maximum size of the DrumMuster compound is specified to limit the number of containers that can be stored at the premises at one time. These controls reduce the risks posed to the P2 PDWSA from a potential waste fire at the premises. The Licence Holder is required to report details of fire events to ensure DWER is made aware of risks to groundwater associated with waste fires at the premises.
	Smoke/noxious gases	Air / windborne pathway causing impacts to health and amenity	Visitors to the golf course 250 m south-west, residences 900 m west, primary school 880 m west and farm workers on land immediately surrounding the premises	Refer to Section 4.1	C = Minor L = Unlikely **Medium risk**	N	Condition 8, 9, 10, 12 **Condition 6, 7**	The number of tyres allowed to be stored at the premises at one time is reduced from 99 to 60 and the maximum size of the DrumMuster compound is specified to limit the number of containers that can be stored at the premises at one time. These controls reduce the risks posed from smoke/noxious gases which could be generated from a potential waste fire at the premises.

Note 1: Consequence ratings, likelihood ratings and risk descriptions are detailed in the *Guideline: Risk Assessments* (DWER 2020).

Note 2: Existing licence conditions are depicted by standard text. **Bold and underline text** depicts additional regulatory controls imposed by department.

4.3 Detailed risk assessment for leachate emissions to groundwater

4.3.1 Description of the emission

The decomposition of putrescible waste in active and inactive cells within the landfill has the potential to generate leachate with high concentrations of organic and inorganic contaminants. Infiltration of rainfall or dust suppression water through the waste mass can also contribute to leachate generation. Additional contaminants may be added to leachate through leaching of contaminated solid waste that may also be disposed to landfill cells at the premises.

Leachate emissions from the base of the unlined landfill cells will infiltrate into soil and may enter groundwater. Contamination of groundwater beneath the premises could adversely affect groundwater quality in the Bolgart Water Reserve. Migration of contaminants down gradient from the premises could pose a public health risk through impacts to water quality in the wellhead protection zone for production bore 6/81 and potentially affect the aquatic ecosystem of the Bolgart Brook.

4.3.2 Identification and general characterisation of emission

Landfill leachate is formed from the infiltration of water (rainfall or dust suppression water) through the landfill cells, and also from the moisture content of the buried waste. Leachate generated from a putrescible landfill may contain dissolved and decomposing organic matter, inorganic compounds (such as sulfates, chloride and ammonium salts), nutrients, hydrocarbons, metals and metalloids, pesticides, synthetic organic compounds and other miscellaneous contaminants.

The source of leachate emissions to groundwater is seepage from the base of the active and inactive landfill cells. Landfill cells at the premises are unlined and are sited on a soil profile comprising sand, gravelly clay and clays. Active landfilling currently occurs in the north of the premises and DWER understands that the south of the premises may have also been used for landfilling in the past.

Leachate generation rates, and the potential for a leachate phreatic surface to be present within the waste mass are unknown. The existing licence requires that putrescible waste, contaminated solid waste and Inert Waste Type 2 in active landfill cells are covered as soon as practicable and not later than the end of the working day in which the waste was deposited. Covering waste helps to reduce infiltration of rain or dust suppression water and can help to reduce leachate generate rates. However, whether daily cover requirements are consistently and effectively implemented on the active landfill cells is uncertain.

4.3.3 Description of potential adverse impacts

Leachate emissions from the base of the unlined active and inactive landfill cells will infiltrate into soil and may migrate vertically to groundwater. Investigations at the premises to date indicate that there is likely to be significant separation between the base of the landfill cells and the groundwater table. The potential presence of a seasonal perched feature below the premises is currently uncertain.

As most of the landfilling area is within the Bolgart Water Reserve, vertical migration of contaminants from leachate emissions through the soil profile to groundwater could lead to the degradation of groundwater quality in the P2 PDWSA. Once contaminants enter the regional groundwater aquifer, they have the potential to be transported down hydraulic gradient and towards receptors outside of the premises boundary. Groundwater flow direction at the premises is unknown but is inferred to follow topography and flow towards the south, west and north-west.

The wellhead protection zone for production bore 6/81 is 200 m south of the premises and the

production bore itself is about 500 m south of the premises. The Bolgart town drinking water supply is produced using a blend of groundwater from production bores 6/81 and 1/96 (Figure 1) because groundwater at 6/81 is too saline for human consumption (DOW 2016).

Groundwater investigations at the premises in 2021 identified that groundwater beneath the premises and production bore 6/81 were likely to draw groundwater from the same aquifer and the production bore is inferred to be down hydraulic gradient from the premises. There is therefore the potential that contaminants from leachate emissions could migrate to the 6/81 capture zone via groundwater and enter the town drinking water supply. Contaminants associated with landfill leachate could affect the aesthetic and health qualities of drinking water and pose a health and amenity risk to receptors using or consuming the town drinking water supply.

In addition to providing a drinking water supply, groundwater within the vicinity of the premises may also be extracted for additional purposes such as stock watering, irrigation water and domestic non-potable uses such as garden bores. If groundwater outside of the premises is impacted by leachate emissions from the landfill, down gradient groundwater users could be at risk of health and amenity impacts from contaminants associated with landfill leachate and groundwater could potentially become unsuitable for future extraction.

Groundwater migration of contaminants from leachate emissions has the potential to adversely impact water quality and ecosystem function of the Bolgart Brook which is a non-perennial watercourse 1.4 km west of the premises. The risks to Bolgart Brook are reduced by the substantial distance between the premises and this receptor and the potential for attenuation of contaminants along the groundwater flow path.

The findings of groundwater investigations completed at the premises to date are summarized in Section 3.

4.3.4 Criteria for assessment

Assessment levels relevant to assessing risks to human health, amenity and environmental receptors from leachate emissions to groundwater are summarised as follows:

- Australian Drinking Water Quality Guidelines (ADWG) (National Health and Medical Research Council 2011) – aesthetic and health values.
- Contaminated Sites Ground and Surface Water Chemical Screening (Department of Health 2014) – domestic non-potable use guidelines.
- Australian and New Zealand Guidelines for Fresh and Marine Water Quality (ANZECC and ARMCANZ 2000) – default trigger values for physical and chemical stressors, livestock drinking water guidelines and irrigation water short-term and long-term trigger values.
- Australian and New Zealand Guidelines for Fresh and Marine Water Quality (Australia and New Zealand Government 2018) – fresh water default trigger values for inorganic and organic toxicants for protection of 95% of species.

4.3.5 Key findings

The Delegated Officer has reviewed the information regarding leachate emissions and has for the purposes of the risk assessment found:

11. The Bolgart Water Reserve PDWSA and town drinking water supply are the most sensitive receptors to leachate emissions to groundwater. This is due to their close proximity to the premises and the high water quality standards required to achieve a safe drinking water supply. The Delegated Officer will therefore conduct the risk assessment based on these key receptors.

12. The Bolgart town drinking water supply is at a lower risk of being contaminated by leachate emissions from the landfill than the Bolgart Water Reserve PDWSA based on the following factors:
    - Landfill cells are within the Bolgart Water Reserve PDWSA so vertical migration of leachate emissions from these cells to groundwater may directly impact the PDWSA. However, as the production bore is 500 m from the premises, there is potential for attenuation of groundwater contamination along the flow path between the premises and the production bore capture zone.
    - The town drinking water supply is derived from blending groundwater at production bores 6/81 and 1/96 which would dilute any potential contaminants from the landfill. The salinity of groundwater at 6/81 means that it would not be suitable as the sole drinking water supply bore to the town.
13. Based on investigations completed to date, groundwater quality at the premises does not show any clear evidence of impacts from landfill leachate. Further monitoring is required to verify the findings of the first groundwater monitoring event and some uncertainties remain about background groundwater quality and groundwater flow direction at the premises.
14. Migration of leachate to groundwater may be impeded by a significant separation between the base of the landfill cells and the groundwater table and the presence of lower permeability gravelly clay and clay layers in the premises soil profile. It is noted that the depth of the base of the landfill cells with regard to the elevation of the seasonal maximum groundwater table, and the potential presence of seasonal perched groundwater features is unknown. The extent to which clay layers were excavated in the process of forming landfill cells is also unknown.
15. The effectiveness of daily cover requirements to reduce leachate generate rates at the premises is uncertain as the Delegated Officer is not confident that these requirements are currently being implemented in accordance with the conditions in the existing licence.

4.3.6 Consequence

If leachate emissions to groundwater from the premises impact the Bolgart Water Reserve PDWSA and the Bolgart town drinking water supply, the Delegated Officer has determined that the ADWG aesthetic and health values are at risk of not being met. Therefore, the Delegated Officer considers the consequence of this risk event to be **moderate**.

4.3.7 Likelihood

The Delegated Officer has determined that leachate emissions from landfill cells on the premises causing groundwater in the Bolgart Water Reserve PDWSA to be contaminated at concentrations which exceed the aesthetic and health values for drinking water quality could occur at some time. Therefore, the Delegated Officer considers the likelihood of this risk event is **possible**.

4.3.8 Overall risk rating

The Delegated Officer has compared the consequence and likelihood ratings described above with the risk rating matrix and determined that the overall rating for the risk of leachate emissions is **medium**.

4.3.9 Regulatory controls for leachate emissions

The Delegated Officer has determined that additional regulatory controls to reduce stormwater infiltration into active landfill cells are required in the revised licence to help reduce leachate generation rates. To achieve this outcome, condition 8 in the revised licence requires that waste is disposed by landfilling within a defined trench or tipping area enclosed by earthen bunds and earthen bunding or surface grading are maintained to direct stormwater away from the landfilling trench or tipping area.

Based on the risks to the Bolgart Water Reserve PDWSA from landfilling activities at the premises, the Delegated Officer considers that ongoing groundwater sampling is required to monitor and assess potential groundwater impacts. This finding is consistent with one of the recommendations from the Water Source Protection Plan (DOW 2016).

Based on the findings of the 2021 groundwater investigation, the Delegated Officer considers that groundwater monitoring at one location between the landfilling area and production bore 6/81 will be adequate to assess potential groundwater impacts from the premises. The Licence Holder will not be required to install the additional monitoring bores in the north-east and north-west of the premises (MB01 and MB02) that were required in condition 2.3.1 of the existing licence.

As discussed in Section 3, monitoring bore MB1/21 is not considered suitable for ongoing monitoring as it could act as a pathway between a potential seasonal perched feature and the deeper regional groundwater table. The Delegated Officer has determined that MB1/21 should be decommissioned to ensure that it cannot act as an ongoing pathway for landfill contaminants from the potential seasonal perched feature to the regional groundwater table.

The Licence Holder will be required to install a replacement monitoring bore MB1/22 for the purpose of monitoring the regional water table aquifer. The installation of MB1/22 will be required to take place between August and September 2022 so that the presence of a seasonal perched feature can be assessed during drilling. If a perched feature is detected during drilling, the Licence Holder will be required to install a second monitoring bore MB2/22 that is screened within the perched feature. If a perched feature is not detected during drilling, MB2/22 will not be required to be installed.

Conditions in the licence specify how the new monitoring bores should be installed to ensure they are suitably designed to provide representative samples of groundwater from the perched and regional aquifers and do not act as migration pathways between different water-bearing zones in the subsurface.

Ongoing groundwater monitoring is required to be conducted on a six-monthly basis to provide seasonal information about groundwater levels and quality. The parameters required to be analysed in groundwater samples are consistent with those recommended in the SAQP (GHD 2019), with the addition of total phosphorus.

DWER will continue to review groundwater monitoring results from the premises and may revise the groundwater monitoring program in the future if required.

5. Consultation

Table 4 provides a summary of the consultation undertaken by the department.

Table 4: Consultation

Consultation method	Comments received	Department response
Application advertised on the department's website on 13 August	None received	N/A

Consultation method	Comments received	Department response
2021		
Licence Holder was provided with draft documents on 15 September 2021 and responded on 12 October 2021	Refer to Appendix 1	Refer to Appendix 1

6. Conclusion

Based on the assessment in this decision report, the Delegated Officer has determined that the application to renew licence L6956/1997/12 will be granted, subject to conditions commensurate with the determined controls and necessary for administration and reporting requirements.

DWER's *Guidance Statement: Licence duration* specifies that in determining the licence duration, the Delegated Officer will have regard to providing the maximum appropriate licence term, up to 20 years, and taking account of a number of factors such as the level of risk of harm to public health and the environment from the premises. Based on the need for ongoing review and assessment of potential risks from the premises to the Bolgart Water Reserve PDWSA, the Delegated Officer has determined to issue the renewed licence with a duration of five years and an expiry date of 22 October 2026.

The Delegated Officer considers that at least three years of additional six-monthly groundwater monitoring at the premises with the existing suite of analytical parameters is required to provide a more reliable and complete assessment of groundwater levels and quality. Once a further three years of groundwater monitoring is completed, the Licence Holder may consider applying for a licence amendment to seek changes to the groundwater monitoring program if they consider that there is sufficient evidence to reduce the groundwater sampling frequency and/or suite of analytical parameters.

The Delegated Officer recommends that the Licence Holder engage with the Water Corporation and regularly provide them with the findings of groundwater investigations and monitoring data from the premises. This will help improve the shared understanding about groundwater quality in the vicinity of production bore 6/81 and may be used to inform Water Corporation's future management decisions about the Bolgart town drinking water supply and production bore 6/81.

6.1 Summary of amendments

Table 5 provides a summary of the proposed amendments relating to this application and will act as record of implemented changes. Table 6 provides a summary of changes to the licence to update the format, appearance and terminology to align with the current licensing approach. All proposed changes have been incorporated into the Revised Licence as part of the amendment process.

Table 5: Summary of licence amendments

Condition no. (previous licence)	Proposed amendments
N/A	Expiry date revised from 22 October 2021 to 22 October 2026.
1.2.3 – Stormwater management	Amendment to stormwater management requirements to follow a more outcome-based approach that requires the Licence Holder to prevent stormwater that has come into contact with waste from discharging off the premises. Removal of the reference to the *Environmental Protection (Unauthorised Discharges)*

Condition no. (previous licence)	Proposed amendments
	Regulations 2004 as these regulations are applicable and enforceable without being referenced in instruments issued under Part V of the EP Act.
1.3.1 – Waste acceptance	Addition of scrap metal and used agricultural chemical containers (DrumMuster) to the waste types allowed to be accepted at the premises including related acceptance specifications. The Licence Holder was already accepting these waste types at the premises and this change clarifies that they are allowed to be accepted. Removal of plastics from the Inert Waste Type 2 waste acceptance specifications as the Licence Holder only accepts tyres under this waste type.
1.3.3 – Waste processing	Amendment of waste processing conditions including: • Limit landfilling to the active landfilling area specified in Schedule 1, Figure 2. • Allow for Clean Fill and Inert Waste Type 1 to be used as cover material. • Clarify that Inert Waste Type 2 can be removed off-site, add storage requirements for tyres and reduce the number of tyres that can be stored at one time from 99 to 60. • Remove allowance for putrescible waste and contaminated solid waste to be stored before disposal. • Clarify that green waste can be removed off-site for re-use. • Specify that scrap metal and used agricultural chemical containers can be received, handled and stored before being removed off-site and designation of the storage requirements for each of these waste types.
1.3.4 – Landfilling	Amendment of conditions relating to landfill activities including: • Require that waste is disposed by landfilling within a defined trench or tipping area enclosed by earthen bunds. • Require that earthen bunding and surface grading are maintained to direct stormwater away from the landfilling trench or tipping area. • Remove the requirement for rehabilitation to take place within six months after disposal in that cell or phase is complete. Capping and final cover requirements for landfill cells should be approved by DWER through a licence amendment or works approval application which is supported by a Landfill Closure Management Plan. As no such approvals are currently in place for the premises, the requirement for rehabilitation to occur has been removed. The Licence Holder should seek advice from DWER about the appropriate approval pathway to undertake landfill closure activities at least twelve months in advance of the proposed commencement date for these works.
1.3.5 – Cover	Reduction in the minimum frequency of covering green waste, putrescible waste and contaminated solid waste from daily to weekly (refer to discussion in Appendix 1).
1.3.6 – Security	Addition of requirement that the premises is manned at all times while open to the public to ensure there is appropriate control of wastes accepted at the premises and reduce the risks from non-conforming waste types being accepted.
2.3.1 – Groundwater monitoring bores	Removal of the requirement for monitoring bores MB01 and MB02 in the north-east and north-west of the premises respectively as the Delegated Officer has determined that these are not required to be installed at this stage. Amendment of condition requiring groundwater monitoring bores to be installed to require the new monitoring bores MB1/22 (water table aquifer) and MB2/22 (perched aquifer). The condition includes more detailed specifications of how these bores should be constructed and requires that well design and construction is supervised by a suitably qualified person (this term is also defined in the licence for clarity). Addition of requirement for MB1/21 to be decommissioned.

Condition no. (previous licence)	Proposed amendments
2.3.2 – Bore construction report	Amendment of condition requiring a bore construction report to be submitted to also include evidence of monitoring bore decommissioning (MB1/21).
3.2.2 – Groundwater monitoring report	Amendment of the due date of the groundwater monitoring report to align with the submission of the AER. Removal of the requirement for the groundwater monitoring report to include an aerial image that shows groundwater level contours, flow direction and hydraulic gradient as it is not possible to assess these parameters based on only one groundwater monitoring location at the premises.
3.3.1 – Notification requirements	Addition of more detail to be reported in relation to fire events. Addition of requirement to report certain non-compliances within seven days.
4.1.1 – Groundwater monitoring	Changes to groundwater monitoring requirements as follows: • Remove reference to the two monitoring bores MB01 and MB02 that were not installed. • Update the name of the newly installed monitoring bore to MB1/21 (to be sampled between 1 July 2021 and 30 June 2022). • Add the names of the additional monitoring bores to be installed MB1/22 and MB2/22 (to be sampled from 1 July 2022 onwards). • Update the monitoring frequency to six monthly on an ongoing basis and specify that six monthly monitoring events are completed in February to April and October to November (1 July 2021 to 30 June 2022) and February to April and August to October (1 July 2022 onwards). • List the parameters required for analysis in groundwater samples, based on the parameters specified in the SAQP (GHD 2019) with the addition of total phosphorus.
4.1.2 – Timing of monitoring	Removal of annual monitoring timing requirements as there is no annual monitoring specified in the revised licence.
New condition (6 in the revised licence) – Infrastructure and equipment	New condition specifying operational requirements for infrastructure and equipment including: • Designation of the location of the active landfilling area (Schedule 1, Figure 1). • Requirement for a defined DrumMuster compound that is sited at least 35 metres from the premises boundary, enclosed by a chain mesh fence, is no more than 25 m^2 in area and with containers stacked no higher than 1.8 m. • Requirement for the historical Special Waste Type 1 (asbestos) disposal area to be marked with an on-site sign. • Requirement for monitoring bores to be maintained in good working order to allow representative groundwater samples to be collected.
Definitions	Removal of definitions or documents not referenced in the revised licence. Addition of a definition for a suitably qualified person (to supervise groundwater bore installation), contaminated solid waste and guidelines referenced in licence conditions.
Schedule 1 – Premises map	New premises map showing the designated location of the active landfilling area.
Schedule 1 – Map of groundwater monitoring locations	New map showing the location of monitoring bore MB1/21 and the designated locations of monitoring bores MB1/22 and MB2/22.

Table 6: Consolidation of licence conditions in this amendment

Existing condition	Condition summary	Revised licence condition	Conversion notes
All relevant	'shall'	'must'	Wording updated to current terminology.
N/A	Interpretation section	Interpretation section	Part (d) updated to current licensing format which specifies that references to standards, guidelines, or codes of practice: (i) if dated, refers to that particular version; and (ii) if not dated, refers to the latest version and therefore may be subject to change over time. Definitions of standards and guidelines in Table 8 amended accordingly.
1.1.1 1.1.2	Definitions	N/A Interpretation section, Definitions and Table 8	Redundant conditions. Revised to current licensing format.
1.1.3 1.1.4	Australian or other standard Reference to a guideline or code of practice	N/A Interpretation section	Redundant condition. Adequately covered by Interpretation section. Deleted from licence.
1.1.5	Emissions	Interpretation section	Redundant condition. Adequately covered by Interpretation section. Deleted from licence.
1.2.1	Pollution control and monitoring equipment	N/A	Redundant condition. Adequately covered by alternative existing conditions. Deleted from licence.
1.2.2	Recovery and removal of spills	Conditions 14 and 15	Revised to current licensing format.
1.2.3	Stormwater management	Condition 16	Amended as outlined in Table 5 above.
1.3.1 Table 1.3.1	Waste acceptance	Condition 1 Table 1	Revised to current licensing format and amended as outlined in Table 5 above.
1.3.2	Handling of non-conforming waste	Conditions 4 and 5	Revised to current licensing format.
1.3.3	Waste processing	Condition 7 Table 3	Some requirements related to landfilling moved to the infrastructure and equipment table (Table 2). Also amended as outlined in Table 5 above.
1.3.4	Landfilling	Condition 8	Amended as outlined in Table 5 above.

Existing condition	Condition summary	Revised licence condition	Conversion notes
1.3.5 Table 1.3.3	Cover requirements	Condition 9 Table 4	Amended as outlined in Table 5 above.
1.3.6	Security measures	Condition 12	Amended as outlined in Table 5 above.
1.3.7	Sign at the entrance	Condition 6 Table 2	Requirements moved to infrastructure and equipment table (Table 2).
1.3.8	Pest management	Condition 11	New numbering only.
1.3.9	Windblown waste	Condition 13	Minor rewording and new numbering.
1.3.10	Burning of waste	Condition 10	New numbering only.
1.3.11	Management of buried asbestos	Condition 6 Table 2	Requirements moved to infrastructure and equipment table (Table 2).
1.3.12	No acceptance of asbestos or ACM	Condition 2	New numbering only.
1.3.13	Handling of suspected or detected asbestos or ACM	Condition 3	New numbering only.
2.1.1 2.1.2	Calibration of equipment	N/A	Redundant condition. Adequately covered by alternative existing conditions. Deleted from licence.
2.2.1 Table 2.2.1	Monitoring of waste inputs and outputs	Condition 17 Table 5	Revised to current licensing format. Rejected loads are required to be monitored and recorded separately under condition 4.
2.3.1 Table 2.3.1 2.3.2	Groundwater monitoring bore installation and reporting	Conditions 18 and 19	Amended as outlined in Table 5 above.
2.3.3 2.3.4 2.3.5	Groundwater monitoring requirements	Conditions 20, 21 and 22	New numbering only.
3.1.1	Maintaining auditable books	Condition 23	Revised to current licensing format by requiring records for maintenance of infrastructure and equipment.
3.1.2	Auditable books requirements	Condition 24	New numbering only.
3.1.3	Staff awareness of licence	N/A	Redundant condition as the Licence Holder is responsible for complying with the conditions of the licence, regardless of this condition. Deleted from licence.

Existing condition	Condition summary	Revised licence condition	Conversion notes
3.1.4	Annual Audit Compliance Report	Condition 27	New numbering only.
3.1.5	Complaints Management	Condition 25	Revised to current licensing format.
3.1.6	Special Waste Type 1 register	Condition 26	New numbering only.
3.2.1 Table 3.2.1	Annual Environmental Report	Condition 28 Table 7	Revised to current licensing format.
3.2.2	Groundwater monitoring report	Condition 29	Amended as outlined in Table 5 above.
3.3.1 Table 3.3.1	Notification requirements	Conditions 30 and 31	Revised to current licensing format, redundant notification requirements removed and amended as outlined in Table 5 above.
4.1.1 4.1.2 (Schedule 2)	Groundwater monitoring	Conditions 32 and 33	Amended as outlined in Table 5 above.
4.2.1 (Schedule 2)	Quality assurance and quality control	Condition 34	New numbering only.

References

1. ANZECC and ARMCANZ 2000, *Australian and New Zealand Guidelines for Fresh and Marine Water Quality,* Canberra.
2. Australia and New Zealand Government 2018, *Australian and New Zealand Guidelines for Fresh and Marine Water Quality,* Canberra.
3. Cardno 2021, *Groundwater assessment – Bolgart landfill site,* Perth. (DWER reference A2002572)
4. Department of Environment Regulation (DER) 2015, *Guidance Statement: Setting Conditions*, Perth, Western Australia.
5. DER 2016, *Guidance Statement: Licence duration,* Perth, Western Australia.
6. Department of Health 2014, *Contaminated Sites Ground and Surface Water Chemical Screening,* Perth.
7. Department of Health 2021, *Guidelines for Assessment, Remediation and Management of Asbestos Contaminated Sites in Western Australia.*
8. Department of Water (DOW) 2016, *Bolgart Water Reserve Drinking water source protection plan,* Perth.
9. Department of Water and Environmental Regulation (DWER) 2020, *Guideline: Environmental Siting*, Perth, Western Australia.
10. DWER 2020, *Guideline: Risk Assessments*, Perth, Western Australia.
11. GHD 2019, *Bolgart Landfill Sampling and Analysis Plan for groundwater monitoring,* Perth. (DWER reference A1852522)
12. National Health and Medical Research Council 2011, *Australian Drinking Water Quality Guidelines,* Canberra.

Appendix 1: Summary of Licence Holder's comments on draft conditions

Condition	Summary of Licence Holder's comment	Department's response
1 – Waste acceptance	*In response to DWER's request for the Licence Holder to confirm if they receive any Inert Waste Type 2 materials other than tyres and DrumMuster containers (with regard to the Landfill Waste Classification and Waste Definitions 1996), the Licence Holder responded:* No other Type 2 waste is received at the facility.	No changes made. Inert Waste Type 2 acceptance specification is limited to tyres only and DrumMuster containers are listed as a separate waste type, as outlined in the draft revised licence.
	In response to DWER's request for the Licence Holder to confirm whether the proposed annual acceptance rates for scrap metal and used agricultural chemical containers are consistent with current waste acceptance rates, the Licence Holder responded: It is understood that the proposed annual acceptance rates are consistent with current acceptance tonnages.	No changes from the draft revised licence.
6 – Infrastructure and equipment	*In response to the requirement for groundwater monitoring wells to be maintained in good working order to allow representative groundwater samples to be collected, the Licence Holder responded:* Subject to bores being required, and only if they intersect with the water table at drilled depths (i.e. bores will be dug to no more than 5 metres below the known deepest landfill base). Formal comment from agency(s) on logic of intersecting sample bores (with potential for contamination) with drinking water source aquifers required.	Refer to response for condition 18 below. Condition retained from the draft revised licence with no changes.
7 – Waste processing	*In response to condition relating to Inert Waste Type 2 requiring that no more than 30 tyres be stored onsite at any one time, the Licence Holder responded:* Is this 30 tyres in a pile or smaller quantities in separated piles? Would request that 2 piles of 30 be allowed with suitable separation.	The Delegated Officer considers that the storage of two separate piles of no more than 30 tyres each is acceptable if they are adequately separated. The licence condition has been mended accordingly.
9 – Cover requirements	*In response to at least daily cover requirements for green waste, putrescible waste and contaminated solid waste, the Licence Holder responded:* This daily condition is not practical at small rural landfills. The availability of suitable equipment is restricted by the size of the Shire's operation and staff	The requirement for daily cover on these waste types was a condition of the existing licence. The Delegated Officer accepts that daily cover of putrescible waste, green waste and contaminated solid waste is not necessary at the premises based on its siting and

Condition	Summary of Licence Holder's comment	Department's response
	resources. Management of the waste between cover episodes can be accomplished through supervised disposal, insecticide application and litter barriers. This landfill is far enough removed from residences to prevent odour issues.	relatively small design capacity of only 800 tonnes per annual period. However, the Licence Holder did not propose an alternative cover frequency. The Delegated Officer considers that weekly cover of these waste types is appropriate to mitigate the potential emissions and impacts associated with landfilled waste and has amended the licence condition accordingly.
18 – Groundwater monitoring wells	**New groundwater monitoring well installation:** This condition is considered environmentally flawed. The landfill has been in operation since the 50s and it is only in the recent period that the Department of Water decided to extend its catchment to encompass part of the landfill area. The bores are being required to be installed in locations which may or may not be positioned to accurately capture samples down stream of the landfilling area - the underground water flow direction is unknown and it should not be a Shire responsibility to determine this indicator. That work should have been undertaken by the DoW prior to extending the water area to determine whether that catchment was already suitable protected or not. So, the placement of any bores is in question until that indicator is known. In addition, the introduction of possible breaches into local water sources many metres under the ground and, in any case, many metres more than 2 below the lowest known landfill levels, in ground with high clay content, if leachate is even present, would seem to significantly increase an opportunity for contamination of a (potentially) uncontaminated water source, for no environmentally sound purpose. The Shire may be willing to consider the installation of a shallow sample bore or two in reasonable proximity to the perimeter of the historical and operational landfill areas, to a depth of no more than 5 metres below the lowest known landfill level, to monitor for leachate, however it is considered most likely that with the soil type, management of the site and depth to known water tables or aquifers, that the presence of any water in these holes is unlikely. However, if water is found in a bore, it would be sampled against the schedule 2 parameters and if contamination greater than background levels usually associated with historical use of the surrounding lands is found, liaison would be undertaken with the agency to formalise continued sampling if required (and amend this condition to reflect any agreed course of action). Until then, and until the DoW prove underground water flows and existing water bodies (i.e. location, depth, flow direction, existing water condition/contamination etc) and an environmentally sound sampling regime, no bores should be constructed.	The Department of Water consulted the Licence Holder during the preparation of the revised Water Source Protection Plan (DOW 2016). The expansion of the PDWSA in 2016 aligned the boundary of the PDWSA with the surface catchment boundary for the Western and Bull Road wellfields (DOW 2016). While this change resulted in the inclusion of part of the landfill premises within the PDWSA, the potential for the landfill premises to impact groundwater quality in the PDWSA or production bore 6/81 already existed prior to the PDWSA boundary being changed. The purpose of a licence is to impose conditions that aim to prevent, control, abate or mitigate pollution or environmental harm as a result of the operation of prescribed premises. Even though the landfill was in place before the PDWSA boundary changed, the Licence Holder is still responsible for ensuring they operate the premises in a manner which does not cause pollution or environmental harm. As groundwater in the Bolgart Water Reserve PDWSA is the most sensitive receptor within the vicinity of the premises, the Delegated Officer considers it appropriate to impose conditions on the licence to monitor and assess potential impacts from the premises on this resource and ensure it is not impacted by premises activities. The current uncertainty about groundwater flow is not sufficient justification for no new monitoring bores to be installed at the premises. DWER selected the location of the new monitoring bores specified in the draft revised licence on the following basis: • As groundwater flow direction in the vicinity of the premises has not been determined through intrusive investigations, inferring the groundwater flow direction based on topography is a suitable alternative basis for the design of the groundwater monitoring program. The new monitoring bores are inferred to be down hydraulic gradient from the active landfilling area.

Condition	Summary of Licence Holder's comment	Department's response
	Monitoring well decommissioning: This work harks to comments made above regarding the environmental veracity of breaching water tables without detailed knowledge of the water bodies in the area. The cost of this work to effectively result in the expenditure of many thousands of dollars for no outcome is of great concern to the Shire. It is considered grossly unfair that the Shire in good faith installed a bore at the whim of the Water agency, which now has to be decommissioned because of a lack of knowledge by that agency of the water aquifers within the water catchment area (extended to include the landfill). Again, it is the Shire's strong opinion that no further bores should be installed to any significant depth unless by the DoW, and if the Shire is to install localised shallow bores in the vicinity of the landfill, they will be no lower than 5 metres below the base of the adjacent landfilled area - deep enough to collect any leachate if it is present and migrating, but not so deep as to breach any local aquifers.	• The new bores are located directly between the active landfilling area and the drinking water supply bore 6/81 so are suitably placed to assess potential impacts from the premises to the most sensitive nearby receptor. The Delegated Officer considers that there are sufficient grounds for the selected siting of the new monitoring bores in the revised licence. It is noted that the area specified for the new monitoring bores has been amended from the draft revised licence by shifting it slightly further to the south-west. This change was made to ensure that the new monitoring bores are not installed within the authorised active landfill area shown in Figure 1 of the revised licence and to better capture potential groundwater pathways between the landfill cells at the premises and production bore 6/81. An area in which the bores must be installed has been specified to give the Licence Holder some flexibility to choose the best location based on site and operational limitations. If undertaken appropriately and in accordance with the conditions of the renewed licence and relevant guidance (e.g. Section 8 of Schedule B2 of the *Assessment of Site Contamination NEPM)*, the installation of monitoring bores will not provide a pathway for landfill leachate to migrate to the regional groundwater table. This will require supervision by a suitably qualified person (as defined in the revised licence), appropriate selection of the screened interval based on observations during drilling to avoid screening across different water-bearing zones, sealing the bore with a bentonite seal above the screened interval and backfilling with a suitable grout. Monitoring bore MB1/21 requires decommissioning because it was not installed using best practice bore design or in accordance with guidance in Section 8 of Schedule B2 of the *Assessment of Site Contamination NEPM*, as referenced in condition 2.3.1 in the existing licence. The Licence Holder proposed to install shallow bores which would potentially be screened within the unsaturated zone above the regional groundwater table as an alternative to those specified in the revised licence. It would not be possible to obtain representative groundwater samples from bores within the unsaturated zone and installation and monitoring of such bores would provide negligible information to assist in DWER's assessment of potential risks to the Bolgart Water Reserve PDWSA from landfilling at the premises. The Delegated Officer

Condition	Summary of Licence Holder's comment	Department's response
		therefore considers that this proposal would not be an acceptable alternative to installation of deeper monitoring bores that intersect the regional groundwater table.
19 – Groundwater monitoring well construction and decommissioning report	Remove until agreement is reached on way forward with sampling.	See response to condition 18 above. Condition retained from the draft revised licence with no changes.
29 – Groundwater monitoring report	Remove until agreement is reached on way forward with sampling.	See response to condition 18 above. Condition retained from the draft revised licence with no changes.
Definitions – 'rehabilitation'	*The draft revised licence included a statement in relation to the definition for 'rehabilitation' that:* *'DWER currently has very limited information about how the Licence Holder undertakes rehabilitation of landfill cells at the premises. Capping and final cover profiles for landfills should be designed to minimise infiltration of water into the waste, provide a long-term stable barrier between waste and the environment, prevent the uncontrolled escape of landfill gas and provide a suitable land surface based on the intended future use of the premises. Licence Holder to confirm the capping and final cover measures currently implemented at the premises such as emplacement of low-permeability capping layers of clay or geomembrane and rehabilitation cover layers such as soil sub-base or topsoil/mulch.'* *In response to the above statement, the Licence Holder responded:* Not DWER's role to approve or otherwise the proposed capping methodology of a cell. Perhaps instead insert a condition as follows - "Capping and final cover profiles for the landfill should be designed to minimise infiltration of water into the waste, provide a long-term stable barrier between waste and the environment, prevent the uncontrolled escape of landfill gas and provide a suitable land surface based on the intended future use of the premises. Details of any rehabilitation engineering adopted should be recorded by the licence holder upon the closure of any cell. In any case, the post closure and rehab plan would include this information?	Licences and works approvals issued under Part V of the EP Act contain conditions that aim to prevent, control, abate or mitigate pollution or environmental harm as a result of the construction and operation of prescribed premises. Landfill closure measures including capping and final cover are important controls in preventing and minimising pollution and environmental harm from landfill premises and are within the scope of activities regulated by DWER under Part V of the EP Act. DWER requested information from the Licence Holder about their current capping and final cover measures because condition 1.3.4(c) in the existing licence specified that rehabilitation be completed within 6 months after disposal in a cell or phase of the landfill ceased. DWER is not aware of there being an approved Landfill Closure and Management Plan already in place for the premises. Based on the Licence Holder's response, it is assumed that the Licence Holder does not have an existing protocol for capping and final cover of landfill cells. The Delegated Officer considers that the capping and final cover controls for landfill cells at the premises should be assessed by DWER through a licence amendment or works approval application prior to implementation. The Delegated Officer has therefore determined to amend the licence by removing the condition requiring rehabilitation to be undertaken as part of this licence renewal. When the Licence Holder determines to close the landfill at the premises, they will need to submit a licence amendment or

Condition	Summary of Licence Holder's comment	Department's response
		works approval application to DWER to seek approval for their proposed capping and final cover measures. This application should be submitted at least six months in advance of the proposed works and be supported by a Landfill Closure Management Plan.
Premises map	*The draft revised licence included a request in relation to the premises map:* *'Licence Holder to confirm the location of the historical Special Waste Type 1 (asbestos) disposal area is correctly shown. DWER has based this area on the GPS coordinates provided by the Licence Holder via email on 9 September 2021 but notes that this area is not consistent with previous maps provided by in the Asbestos Management Plan or licence renewal application.'* *In response to the above statement, the Licence Holder responded:* Based on information provided by shire staff to EHO (respondee). Difficult to ascertain without disturbing the ground but will source previous employees with better knowledge of old site in time to confirm accuracy of coordinates.	DWER intended to include the historical Special Waste Type 1 (asbestos) disposal area on the premises map in the revised licence to ensure this information is recorded for future reference. However, the Licence Holder has reported three different locations for this area to DWER within the past 18 months. Based on this conflicting information, the Delegated Officer considers that there is too much uncertainty about the location of the historical Special Waste Type 1 disposal area to depict it on the premises map and has removed this area from the premises map in the revised licence. The Delegated Officer notes that condition 26 in the revised licence requires the Licence Holder to maintain a register of Special Waste Type 1 disposed of at the premises which includes a plan showing the position of disposed waste. The Licence Holder should resolve the uncertainty about the location of the Special Waste Type 1 disposal area and maintain an accurate plan of this area to ensure compliance with condition 26 of the licence. Condition 6 of the revised licence requires the Licence Holder to operate the premises in a manner that prevents buried asbestos waste from being disturbed. To ensure compliance with this condition and given the current uncertainty about the location of historically disposed asbestos at the premises, the Licence Holder should assume that any waste disposal area at the premises may contain asbestos and take appropriate precautions to prevent asbestos being disturbed and mitigate associated risks.
Map of groundwater monitoring locations	Not required until sampling discussed and agreed.	See response to condition 18 above. Map retained from the draft revised licence with no changes.
33 – Timing of groundwater monitoring	Per note above - Dependant on shallow bore(s) containing water.	See response to condition 18 above. Condition retained from the draft revised licence with no changes.

Condition	Summary of Licence Holder's comment	Department's response
events		

Appendix 2: Application validation summary

SECTION 1: APPLICATION SUMMARY			
Application type			
Renewal	☒	Current licence number:	L6956/1997/11 L6956/1997/12– new version
Date application received		16/6/2021	
Applicant and Premises details			
Applicant name/s (full legal name/s)		Shire of Victoria Plains	
Premises name		Bolgart Refuse Site	
Premises location		Lot 1 on Diagram 16424	
Local Government Authority		Shire of Victoria Plains	
Application documents			
HPCM file reference number:		DWERDT465248	
Key application documents (additional to application form):		Site Map Certificate of Title Previously submitted (separate to application) – Cardno Groundwater Bore Construction and Monitoring Report A2002572	
Scope of application/assessment			
Summary of proposed activities or changes to existing operations.		Licence renewal, application form includes the following changes: - Addition of new waste type – scrap metal - Addition of new infrastructure – drum muster compound	

Category number/s (activities that cause the premises to become prescribed premises)

Table 1: Prescribed premises categories

Prescribed premises category and description	Assessed production or design capacity	Proposed changes to the production or design capacity (amendments only)
Category 64: Class II or III putrescible landfill	800 tonnes per annual period	N/A – no changes

Legislative context and other approvals		
Has the applicant referred, or do they intend to refer, their proposal to the EPA under Part IV of the EP Act as a significant proposal?	Yes ☐ No ☒	Referral decision No: N/A Managed under Part V ☐ Assessed under Part IV ☐

Does the applicant hold any existing Part IV Ministerial Statements relevant to the application?	Yes ☐ No ☒	Ministerial statement No: N/A EPA Report No: N/A
Has the proposal been referred and/or assessed under the EPBC Act?	Yes ☐ No ☒	Reference No: N/A
Has the applicant demonstrated occupancy (proof of occupier status)?	Yes ☒ No ☐	Certificate of title ☒ CoT held by the Victoria Plains Road Board of Calingiri – this is the former entity which was replaced by Shire of Victoria Plains in 1961 General lease ☐ Expiry: Mining lease / tenement ☐ Expiry: Other evidence ☐ Expiry:
Has the applicant obtained all relevant planning approvals?	Yes ☐ No ☐ N/A ☒	Approval: Expiry date: If N/A explain why? No explanation provided – assume to be public works exemption
Has the applicant applied for, or have an existing EP Act clearing permit in relation to this proposal?	Yes ☐ No ☒	CPS No: No clearing is proposed.
Has the applicant applied for, or have an existing CAWS Act clearing licence in relation to this proposal?	Yes ☐ No ☒	Application reference No: N/A Licence/permit No: N/A No clearing is proposed.
Has the applicant applied for, or have an existing RIWI Act licence or permit in relation to this proposal?	Yes ☐ No ☒	Application reference No: Licence/permit No: Licence / permit not required.
Does the proposal involve a discharge of waste into a designated area (as defined in section 57 of the EP Act)?	Yes ☒ No ☐ No point source discharges but potential infiltration of leachate from unlined landfill	Name: Avon River Catchment Type: Proclaimed Surface Water Area Has Regulatory Services (Water) been consulted? Yes ☒ No ☐ N/A ☐ Water Source Protection (WSP) was originally consulted on the existing facility as it lies within a PDSWA. Additional advice to be sought on renewal application

		from WSP. Advice not sought from the regional office. Regional office: Swan-Avon
Is the Premises situated in a Public Drinking Water Source Area (PDWSA)?	Yes ☒ No ☐	Name: Bolgart Water Reserve Priority: P2 Are the proposed activities/ landuse compatible with the PDWSA (refer to WQPN 25)? Yes ☐ No ☒ N/A ☐
Is the Premises subject to any other Acts or subsidiary regulations (e.g. *Dangerous Goods Safety Act 2004, Environmental Protection (Controlled Waste) Regulations 2004, State Agreement Act xxxx*)	Yes ☐ No ☒	
Is the Premises within an Environmental Protection Policy (EPP) Area?	Yes ☐ No ☒	
Is the Premises subject to any EPP requirements?	Yes ☐ No ☒	
Is the Premises a known or suspected contaminated site under the *Contaminated Sites Act 2003*?	Yes ☐ No ☒	Classification: N/A Date of classification: N/A

Direct interest stakeholders	
None identified – LGA is applicant	