Government of Western Australia
Department of Environment Regulation

Decision Report

Review and Renewal of Existing Licence

Division 3, Part V *Environmental Protection Act 1986*

Licence Number	L6832/1997/13
Licence Holder	Cell 6 Pty Limited
ACN	130 417 542
File Number	2011/000651
Premises	Non Organic Disposals 115 Furniss Road DARCH WA 6065 Lot 1 on Deposited Plan 69382 Certificate of Title Volume 2807 Folio 995
Date of Report	20 June 2017
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
ACM	Asbestos Containing Material
ACN	Australian Company Number
AER	Annual Environment Report
AHD	Australian Height Datum
the Application	The licence renewal application lodged 6 April 2017 by the Licence Holder
Category/ Categories/ Cat.	Categories of Prescribed Premises as set out in Schedule 1 of the EP Regulations
Clean Fill	as defined in the *Landfill Waste Classification and Waste Definitions 1996 (as amended December 2009)* published by the Department of Environment and Conservation.
CIRIA	Assessing risks posed by hazardous ground gases to buildings, Construction Industry Research Industry and Information Association (CIRIA C665), London 2007 (as amended from time to time).
CS Act	*Contaminated Sites Act 2003* (WA)
DER	Department of Environment Regulation
DER Asbestos Guidelines	Means the document titled "Guidelines for managing asbestos at construction and demolition waste recycling facilities", published by the Department of Environment and Conservation, as amended from time to time.
Decision Report	refers to this document.
Delegated Officer	an officer under section 20 of the EP Act.
EP Act	*Environmental Protection Act 1986* (WA)
EP Regulations	*Environmental Protection Regulations 1987* (WA)
Existing Licence	The Licence issued under Part V, Division 3 of the EP Act and in force prior to the commencement of, and during this Review
GSV	Gas screening value

ICMS	DER's Incident and Complaint Management System
Inert Waste Type 1	as defined in the *Landfill Waste Classification and Waste Definitions 1996 (as amended December 2009)* published by the Department of Environment and Conservation.
L_{A10}dB(A)	L_{A10} Assigned level means an assigned levels which, measured as $L_{A\ Slow}$ Value, is not to be exceeded for more than 10% of the representative assessment period (as defined in the *Environmental Protection (Noise) Regulations 1997)*
LFG	landfill gas
Licence Holder	Cell 6 Pty Limited
Landfill Definitions/ LWCWD	*Landfill Waste Classification and Waste Definitions 1996 (as amended December 2009)*, Department of Environment and Conservation.
m^3	cubic metres
NEPM	National Environmental Protection Measure
Noise Regulations	*Environmental Protection (Noise) Regulations 1997* (WA)
Occupier	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.
PM	Particulate Matter
PM_{10}	Used to describe particulate matter that is smaller than 10 microns (µm) in diameter.
The Premises	Non Organic Disposals as specified on the front page of this Decision Report
Prescribed Premises	has the same meaning given to that term under the EP Act.
Primary Activities	as defined in Schedule 2 of the Revised Licence
Residual Waste	refers to contaminants such as mixed paper, wood and plastics which have been screened out of the incoming waste material.
Review	this Licence review
Revised Licence	the amended Licence issued under Part V, Division 3 of the EP Act following the finalisation of this Review.
%v/v	Percentage volume / volume percent

2. Purpose and scope of assessment

Cells 6 Pty Ltd (Licence Holder) submitted a renewal application (Application) for Licence L6832/1997/12 on 6 April 2017, for the continued operation of the Non Organic Disposals Premises (Premises). The Existing Licence will expire on 20 June 2017.

This assessment of the Application has included a risk-based review (Review) in accordance with DER's Guidance Statement: Regulatory Principles (July 2015) and the Guidance Statement: Risk Assessment (February 2017) to the activities and infrastructure at the Premises which fall within the definition of Prescribed Premises Categories 13 and 62 in Schedule 1 of the *Environmental Protection Regulations 1987* (EP Regulations).

The risk presented from the historical landfilling activities at the Premises has also been considered as part of this Review. The future use of waste as fill on the Premises to aid site remediation and closure is not within the scope of this assessment.

This Review is documented through this Decision Report. As a result of this Review, the Existing Licence is replaced by the Revised Licence set out in Attachment 1.

2.1 Application details

Table 2 lists the documents submitted during the assessment process. Historical information submitted by the Licence Holder in respect of the Existing Licence has also been considered as part of this Review.

Table 2: Documents and information submitted during the assessment process

Document/information description	Date received
2017 Licence Application Cover Letter	6 April 2017
Non Organic Disposals Application Form	
General Information	
Record of Certificate of Title with Notifications	
Deed	
City of Wanneroo Cell 6 – Zoning Plan	
East Wanneroo Cell 6 Agreed Local Structure Plan	
Contaminated Sites Classification – letter from DER	
Operational Aspects	
Site Infrastructure Figure	
March 2017 Stockpile Assessment	
2017 March Survey	
2016 September Survey	
Non Organic Disposals Completion Program	
Emission Controls	
Non Organic Disposals Environmental Noise Assessment	
Site Closure/Closure Management	
Letter from Jeff Shivak (ENPOINT)	
Email Correspondence – Removal of infilling aspect from scope of assessment	8 June 2017
Updated Completion Program	
Updated monitoring bores map	

3. Background

The Premises operate as a construction and demolition recycling facility (Category 13) and an inert solid waste depot (Category 62).

The Licence for the Premises previously authorised the landfilling of Clean Fill and Inert Waste Type 1 under Category 63: class 1 landfill site. No landfilling has occurred at the Premises since Cell 6 Pty Ltd took operational control of the Premises in May 2009. Category 63 and therefore the approval to undertake landfilling activities on the Premises was removed from the Licence on 4 December 2015.

The licensed premises previously included the adjacent lot (Lot 2) to the east and south of the current Premises. The licence holder at that time undertook unauthorised landfilling activities whereby putrescible materials were buried within Lot 1 and Lot 2, which has led to both lots being classified under the *Contaminated Sites Act 2003* as "contaminated – restricted use".

In February 2016 the City of Wanneroo changed the address of the Premises lot from 50 Driver Road to 115 Furniss Road. The lot and plan number of the land parcel did not change. Records relating to the Premises prior to this change still refer to 50 Driver Road, such as the contaminated sites classification.

Table 3 details the Prescribed Premises Categories listed on the Existing Licence (L6832/1997/12) for the Premises.

Table 3: Prescribed Premises Categories

Classification of Premises	**Description**	***Approved premises production or design capacity or throughput***
Category 13	Crushing of building material: premises on which waste building or demolition material (for example, bricks, stones or concrete) is crushed or cleaned.	325,000 tonnes per annual period
Category 62	Solid waste depot: premises on which waste is stored, or sorted, pending final disposal or re-use.	325,000 tonnes per annual period

4. Overview of Premises

4.1 Operational aspects

The Licence Holder is listed as the registered proprietor on the Certificate of Title for Lot 1 on Deposited Plan 69382, the land on which the Premises is situated.

4.1.1 Waste acceptance

The Existing Licence allows the acceptance of Clean Fill and Inert Waste Type 1 at the Premises.

The Licence Holder describes the grades of wastes accepted as follows (Enpoint 2017):

- Clean Fill (GR1) – Clean Fill free from any debris.
- General building rubble (GBR).
- Clean concrete (G2) – clean concrete or sand with rubble (not to contain any contaminants requiring removal before crushing).
- Construction waste (G3) – mixed residential construction waste with <10% Residual Waste.

- Construction waste (G4) – mixed residential construction waste with ≤25% Residual Waste and wet concrete.
- Other waste (G5) – construction or civil waste with ≤25% Residual Waste.

4.1.2 Process description

Waste loads are visually inspected from a viewing platform prior to acceptance at the Premises. Any loads not meeting the classification types for Clean Fill and Inert Waste Type 1(including asbestos and tyres) are not accepted at the Premises.

Waste is unloaded and maintained in a damp state in accordance with the Licence Holder's Asbestos Management Plan, whilst visual inspections are undertaken for asbestos or asbestos containing material. Some initial sorting of waste loads is undertaken during these inspections using a front end loader as required to remove any larger non-conforming waste contaminants such as sheet metal, timber and carpet for offsite recycling or disposal.

The waste loads are then mechanically screened to separate out finer material prior to manual sorting by hand picking from the picking belt. Residual contaminants such as timber and plastics are removed from the waste stream for offsite recycling or disposal.

The waste remaining on the picking belt is then mechanically crushed and further mechanically screened.

4.1.3 Products produced

The Licence Holder describes the products produced from the sorting and crushing process as follows (Enpoint 2017):

- Clean Fill (F1) – screened sand, laboratory tested.
- Roadbase (RB1) – 16mm, co-mingled concrete/limestone/brick.
- Roadbase (GRB) – 16mm concrete and limestone.
- Cracker dust (CD) – off middle grade belt used as certified fill.

4.1.4 Current stockpiles

The Application indicates the types, heights and quantities for material stockpiles within the Premises as of March 2017, based on surveys completed in September 2016 and March 2017. This information is summarised within Table 4.

Table 4: Stockpiles (at March 2017)

Stockpile type	Height of tallest stockpile[1]	Cumulative quantity
Concrete bricks (to be processed)	1m	3,091m^3
Concrete (to be processed)	7m	46,139m^3
Soil	11m	97,496m^3
Soil and various other materials (still to be processed)	6m	53,921m^3
Stone and gravel	12m	164,544m^3
Paper, wood and plastic	Not stated	21,117m^3

Note 1: Height above natural ground level. Natural ground level varies between 52 to 48m AHD across the Premises.

Stockpiling of Residual Waste that has been screened out of the incoming waste material is discussed further in Section 0 and 9.7.

4.2 Proposed closure

4.2.1 Intended remediation

The Application states that the Licence Holder is seeking a renewal of the Licence for a period of three years, after which time the area is intended for use in residential development.

The Licence Holder proposes to continue operating the Premises while concurrently remediating the Premises to make it suitable for residential development. A closure timeline provided by the Licence Holder indicates that the remediation process is planned to commence in July 2017 with the levelling of the stone and gravel stockpile to fill the southern area of the Premises, and waste material will continue to be received for processing until March 2018. The remediation is planned to be completed in January 2020.

The Licence Holder has advised that a separate application will be submitted for the proposed infilling/ remediation works. Therefore, the remediation aspects are outside the scope of this Review.

4.3 Infrastructure

The Premises infrastructure as it relates to Category 13 and 62 activities are detailed in Table 5 with reference to the site plan in the Revised Licence.

Table 5: Premises Category 13 and 62 infrastructure

	Infrastructure	
	Prescribed Activity Infrastructure - Category 13 and Category 62	**Reference in site plan (attached in Revised Licence)**
1	Feed belt	Feed belt
2	Scalping screen	Scalping screen
3	Picking belt	Picking belt
4	Primary crusher including sprays	Primary crusher
5	Secondary crusher including sprays	Secondary crusher
6	Tertiary 2 deck screen	Tertiary 2 deck screen
7	3 x front end loaders	N/A
8	Auto reticulation lines	Auto Retic Lines
9	2 x water buffer tanks – 30 000L capacity each supplied by 2 x production bores	Water buffer tanks
10	4 x high pressure hoses fed by 3 x pumps (2 x 11Kw and 1 x 7.5Kw)	High pressure 22mm hose locations
11	Water cart – Bell 30,000L capacity 6x6 articulated water cart with sprays and cannon	N/A

	Infrastructure	
	Monitoring infrastructure	
12	9 x groundwater monitoring bores	NODGW01, NODGW02, NODGW03, NODGW04, NODGW05, NODGW06, DDW13, DDW28, DDW29
13	11 x landfill gas monitoring wells G30 was replaced in January 2013 due to damage to the original bore. The new bore was installed approximately 50m north west of the original bore. Wells G34, G35, G36, G37 and G38 were installed in March 2016. NODG02 was replaced in November 2016 due to damage to the original bore in late 2016.	G30 (Replacement well), G31, G32, G33, G34, G35, G36, G37, G38, NODG01, NODG02
	Other Infrastructure	
	Control room	Control Room
	Site offices	Offices
	Workshop	Workshop
	Self bunded fuel storage	Self Bunded Fuel Storage
	Bunded waste oil storage	Bunded Waste Oil Storage

5. Legislative context

5.1 Contaminated sites

The licensed premises previously included the adjacent lot (Lot 2) to the east and south of the current Premises. Both Lot 1 and Lot 2 on Plan 69382 were classified in 2009 as *'contaminated – restricted use'* under the *Contaminated Sites Act 2003*, due to the previous occupier undertaking unauthorised landfilling activities whereby putrescible materials were buried at the Premises.

The classification notes landfill gas and groundwater impacts, and states that *"the land use of the site is restricted to a managed 'Landfill Site' only"* (DER 2009).

The classification also notes that *"the site should be subject to an on-going program of on-site and perimeter landfill gas and groundwater monitoring".*

Other relevant approvals

5.1.1 Planning approvals

The City of Wanneroo confirmed by letter dated 25 May 2017 that planning approvals are consistent with the Application.

5.1.2 Department of Water

The Licence Holder does not hold a groundwater abstraction licence from the Department of Water (DoW 2017(a)) due to the subdivision however, the Licence Holder has advised that the Premises has access to an abstraction bore located on the adjacent Lot 2.

5.2 Part V of the EP Act

5.2.1 Applicable regulations, standards and guidelines

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

DER guidance statements which inform this assessment are:

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

5.2.2 Works approval and licence history

Table 6 summarises the works approval and licence history for the Premises since 2012.

Table 6: Works approval and licence history

Instrument	Issued	Nature and extent of works approval, licence or amendment
L6832/1997/12	15 June 2012	Licence re-issue
	4 December 2015	Licence amendment – removal of Category 63 from the Licence and amendments to the monitoring program.
	30 August 2016	Licence amendment notice 1 - change to Premises address and addition of annual reporting requirement for recycled output sampling and testing results.

5.2.3 Key and recent licence amendments

30 August 2016

The most recent amendment to the Existing Licence occurred on 30 August 2016 by way of Amendment Notice 1 to correct the Premises address due to a change in street addressing requirements and to include a requirement to report in the AER, the results of asbestos testing required by Existing Licence condition 1.3.7.

4 December 2015

Previously, the licence was amended on the 4 December 2015 upon the request of the Licence Holder to remove Category 63 inert landfilling and to provide flexibility to monitoring periods from specified months to a defined biannual period. The Licence was converted to DER's updated licence format at the time and an improvement condition was placed on the licence to require the installation of additional monitoring wells across the western perimeter and southern portion of the Premises. Dissolved methane was also added to the groundwater analytical suite to better understand the potential for landfill gas migration off-site.

5.2.4 Compliance inspections and compliance history

Complaint history

From 22 July 2015 to 9 June 2017, DER has received 5 complaints in relation to emissions arising from the Premises. Of these complaints:

- 2 complaints were in relation to dust.
- 5 complaints were in relation to stockpile heights.
- 3 complaints were in relation to broken fencing.
- All of the complaints have been investigated and closed by DER, the only non-compliance found was in relation to stockpiling of non-conforming waste.
- DER Officers could not substantiate the dust complaints at the time of inspections.

Environmental Field Notice (EFR) 3202 was issued to the Licence Holder for failure to prevent hazardous materials entering the environment or remove and dispose of spills. The Licence Holder has since completed the work required in relation to this EFR and no further actions are required.

Compliance Inspection

DER Officers undertook an inspection of the Premises on 8 April 2014 and identified non-compliance with licence conditions relating to the removal of non-conforming waste on a weekly basis, resulting in a large quantity of light Residual Waste (mostly plastics) and timber becoming stockpiled onsite. DER required the non-conforming material to be removed from site by 30 June 2014. The Licence Holder failed to comply within the required timeframe.

On 13 August 2015, DER Officers attended site to undertake an assessment of compliance with the Licence Holder's asbestos management plan. This assessment was undertaken in relation to an application for reduced sampling rates. As a result of the assessment, DER Officers requested additional information to support the Licence Holder's application including an interpretation of the sampling results and evidence that the product specifications have been consistently achieved at the Premises for the previous six month period. This information has since been provided to DER. At the time of the inspection Officers noted continued non-compliance with Existing Licence conditions, as there remained a large amount of non-conforming waste stockpiled onsite. The Officer requested that the stockpiled non-conforming waste be removed by 1 December 2015. The Licence Holder transported 141 tonnes of waste off-site to Jurien Bay landfill facility, managed by the Shire of Dandaragan, by 28 August 2015 but failed to remove all of the non-conforming material.

DER Officers undertook an inspection of the Premises on 7 March 2016 and confirmed that there were two trucks present removing non-conforming waste. However, Officers estimated that approximately 11,000 cubic metres of non-conforming waste remained stockpiled onsite. As a result a DER Officer was tasked to undertake fortnightly inspections to monitor non-conforming waste removal from the Premises and to assess potential dust, odour and noise emissions.

A series of unannounced inspections were undertaken every two weeks, between 23 March and 26 July 2016, during which records of incoming/outgoing materials were obtained and photographs taken to compare stockpile volumes and verify non-conforming waste removal from site.

Prior to each inspection the Officer drove around the perimeter of the Premises to assess any unreasonable odour, noise or dust emissions that may be emitted from the site. No evidence of any unreasonable emissions was detected during these inspections. Dust

suppression from sprinklers, water cart and sprays on the crushing/screening plant were evident during inspections. Officers noted that there was no visible dust at the boundary of the Premises at the time of the inspection, and could not detect noise from the plant equipment at the boundary of the Premises.

Towards the end of July 2016, Cell 6 Pty Ltd were exploring the possibility of selling the Premises for re-development opportunities and were awaiting a decision by the body corporate on the future of the site. During this period non-conforming waste removal from site slowed and eventually ceased.

DER Officers inspected the Premises again on 8 February 2017and identified that the residual (non-conforming) waste stockpiles have increased in size and the sand and drainage rock product stockpiles have increased slightly. Another inspection, undertaken on 23 March 2017, verified that non-conforming waste removal from the Premises has ceased.

DER Officers attended site on 23 May 2017, to undertake an assessment of the Premises infrastructure with regard to potential emissions and discharges as part of a licence renewal application. There was no evidence of unreasonable or excessive noise, odour or dust emissions from the Premises. Officers observed increased stockpiles of residual light plastics and timber, in contravention of licence condition, and increased recycled product stockpile volumes.

6. Modelling and monitoring data

6.1 Monitoring of groundwater quality

The Licence Holder undertakes six monthly groundwater monitoring within the Premises. The Annual Environmental Report, includes the monitoring results and a comparison against the assessment levels within the Australian Drinking Water Guidelines (ADWG) (NHMRC/ARMCANZ 2011) and the non-potable use assessment levels within the Contaminated Sites Ground and Surface Water Chemical Screening Guidelines (NPUG) (DoH 2014).

The groundwater bores within the Premises are identified by the Licence Holder as being either background, up-gradient or down-gradient bores as listed in Table 7.

Table 7: Groundwater monitoring well placement (Enpoint 2017)

Placement	Well IDs	Detail
Background	NODGW05	Located along northern boundary of the Premises. This monitoring bore has been nominated as being representative of background groundwater quality in the area. Furness Road, with the Landsdale industrial Estate is located up-gradient of this well.
Up-gradient	NODGW01 NODGW02 NODGW06	Located along the eastern boundary of the Premises. Results may be representative of impacts originating from the former landfill directly adjacent, to the east of the Premises.
Down-gradient	NODGW03 NODGW04	Located along the southern boundary of the Premises. These bores are down-gradient of areas of the Premises that have not been filled. Results may be representative of impacts originating from the former landfill directly adjacent, to the east of the Premises.
	DDW13 DDW28 DDW29	Located along the western boundary of the Premises. These bores are down-gradient of waste buried at the Premises and may also indicate impacts originating from the former landfill directly adjacent, to the east of the Premises.

Groundwater monitoring was most recently undertaken in February and August 2016. Groundwater elevation contour plots developed using groundwater elevation data from this period indicates that groundwater flow was towards the southwest coming onto the Premises in the north-eastern portion and trending more south as it flows through the Site.

Table 8: 2016 monitoring results – contaminants above assessment level (Enpoint 2016)

CoPC	Sampling Period	Monitoring Well ID								
		BG	Up-gradient			Down-gradient				
		NODGW05	NODGW01	NODGW02	NODGW06	NODGW03	NODGW04	DDW13	DDW28	DDW29
pH	February									
	August									
Ammonia as N	February									
	August									
Arsenic	February		✓		✓					
	August		✓							
Benzo(a)pyrene	February		✓				✓			
	August		✓							
Total Hardness (as $CaCO_3$)	February									
	August									
Iron	February									
	August									
Manganese	February									
	August									
Sodium	February									
	August									
Sulphate	February									
	August			✓	✓	✓				
TDS	February									
	August									

Notes:
1. Green shading indicates concentration is above the ADWG (aesthetic) assessment level.
2. ✓ indicates concentration is above the ADWG (health) assessment level.
3. ☐ indicates concentration is above the NPUG.

A comparison of the historical data with the 2016 analytical results is presented in Table 9.

Table 9: Groundwater analytical results trends over time

Analyte	Trend		
	Decreasing	Static/No trend	Increasing
Ammonia (as N)	NODGW02	DDW13 DDW28 DDW29 NODGW01 NODGW03 NODGW06	NODGW04
Arsenic	NODGW03	NODGW01 NODGW02	NODGW06
Benzo(a)pyrene	NODGW01 NODGW04	NODGW03	
Hardness (as $CaCO_3$)	DDW13 NODGW01	DDW29	DDW28 NODGW02 NODGW03 NODGW04 NODGW06
Iron (filtered)	NODGW01 NODGW02 NODGW03 NODGW06	DDW13 DDW29	
Manganese (filtered)	DDW28 NODGW01 NODGW02 NODGW03	DDW13	NODGW06
Sodium	NODGW02		DDW13 DDW28 NODGW03 NODGW04 NODGW06
Sulphate	NODGW04	DDW13 DDW28	NODGW02 NODGW03 NODGW06
Total Dissolved Solids		DDW29 NODGW01	DDW13 DDW28 NODGW02 NODGW03 NODGW04 NODGW06

Note: Blue text is indicative of up-gradient monitoring wells.

Exceedances of groundwater criteria during the 2016 monitoring period are summarised in Figure 1 below. Monitoring bore NODGW04 showed high levels of ammonia and benzo(a)pyrene. High levels of ammonia and sulphate were also identified in monitoring bore NODGW03. High sulphate levels were also shown in monitoring bores NODGW02 and NODGW06.

It is noted that there have been spikes in analyte concentrations on occasions when comparing monitoring data over time, this may be indicative of a nearby external source of contaminants.

Key Finding: Analyte concentrations in monitoring bores to the east and south of the Premises suggest they have been impacted by contaminants, most likely from the historical landfilling activities which occurred on Lot 2, directly adjacent to the Premises on the east. According to groundwater flow contours, these contaminants appear to be flowing across the Premises in a southerly direction.

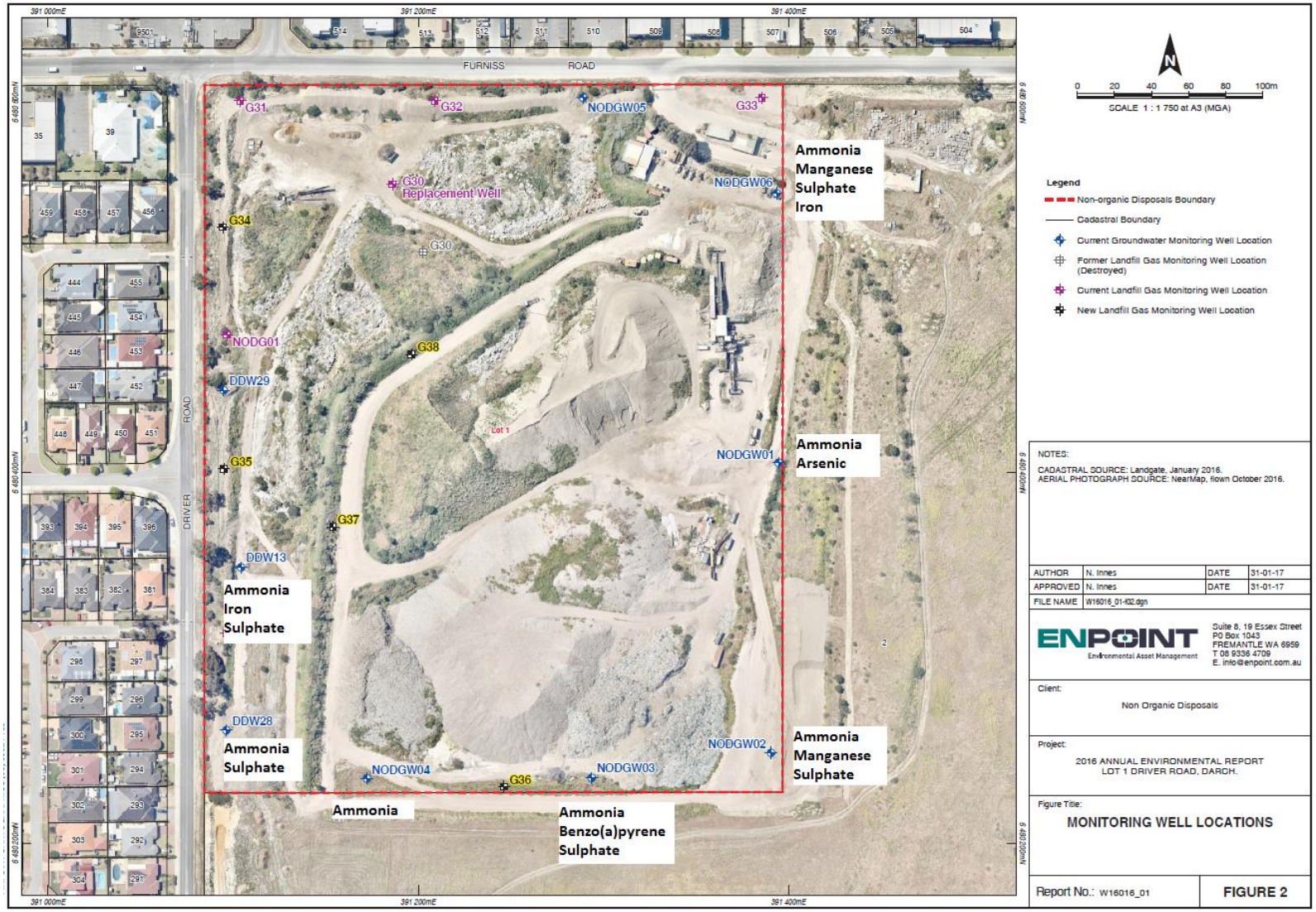


Figure 1: Groundwater level exceedances of relevant assessment criteria during the 2016 monitoring period. Contaminants in exceedance of defined levels are listed next to the relevant bores.

6.2 Monitoring of landfill gas

The microbial degradation of putrescible waste produces landfill gas (LFG). The composition of LFG varies according to the conditions present within the landfill (aerobic / anaerobic conditions). LFG is generated at different rates throughout the degradation process and usually occurs post closure of the landfill.

The Premises were previously authorised as a Category 63 Class I inert landfill for the acceptance of Clean Fill and Inert Waste Type 1 as defined in the *Landfill Waste Classification and Waste Definitions 1996* (as amended December 2009). No landfilling has occurred at the Premises since May 2009 when Cell 6 Pty Ltd took operational control of the Premises. The site has a history of contamination issues relating to historical landfill activities and the burial of non-conforming wastes (putrescibles). The site, along with the adjoining lot to the east and south (Lot 2) was formerly part of Lot 8005 on Plan 36178. On the 24 November 2009 Lot 8005 was classified under the *Contaminated Sites Act 2003 as Contaminated – restricted use.* The main potential contaminant sources investigated prior to classifying the site as *Contaminated – restricted use* were underlying groundwater impacts and landfill gas.

As part of the amendment granted 4 December 2015, DER undertook a technical review of the licence and historical landfill gas monitoring records for the Premises. Several uncertainties in the dataset which were noted when considering the monitoring results for Lot 1 (collected since January 2011). The following concerns were highlighted:

- The available records indicate that a detailed site investigation of the waste mass has not been completed to date. The nature and extent of fill with an appreciable biodegradable component across Lot 1 is unknown. Investigations completed on the neighbouring lot (Lot 2 which was formerly part of the licensed Premises) indicate significant quantities of LFG were recorded in wells installed in the waste mass.
- Given the methane content reported in G30, and the extent of methane generation across Lot 2, it is likely that there is high potential for LFG generation across Lot 1.
- The western boundary of the Premises are bounded by residential areas to the west, located approximately 20 metres across Driver Road. Given the close proximity to these residential areas, the current LFG monitoring could be improved to provide greater accuracy on the characterisation and assessment of the potential for lateral LFG migration off-site and associated risks to adjoining residential land users.
- It is unclear whether LFG migration pathways (i.e. drainage lines, sub-surface infrastructure) exist beneath the site and immediately off-site and if these have been considered as potential preferential pathways available for LFG migration.

As a result of the review Improvement Condition 3.1.2 was placed on the licence to require the installation of additional monitoring wells across the western perimeter and southern portion of the site. The Licence Holder provided written confirmation on 21 May 2016 that these additional monitoring bores have been installed as per Figure 2. In addition the Licence Holder has installed an additional two landfill gas monitoring wells (G37 and G38) within the waste material of the former landfill.

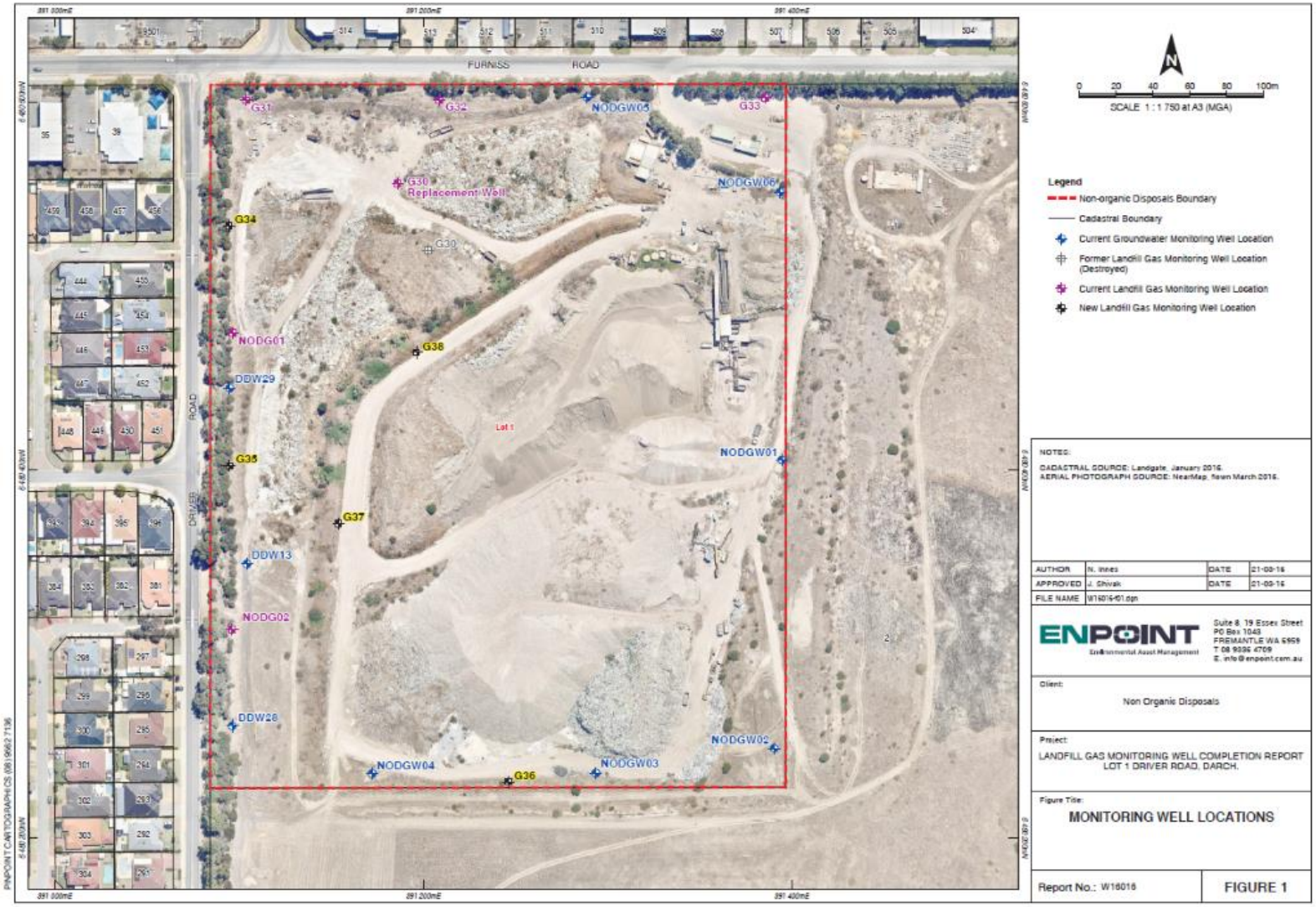


Figure 2: Landfill gas monitoring well locations

The Licence Holder is currently required to monitor landfill gas on a quarterly basis at six locations; with an additional three bores installed as of last year for volumetric flow rate, methane, carbon dioxide and oxygen in accordance with Licence Condition 2.4.1. Monitoring well G30R was installed in fill material to give an indication of landfill gases that are being generated by this material.

The *Construction Industry Research and Information Association* (CIRIA C665), *London 2007* provides an analysis method that gives a semi-quantitative estimate of risk posed by gassing sites. The gas screening value (GSV) (litres of gas per hour) = max bore flow rate (L/hr) x max gas concentration (%). The risk classifications as detailed in Figure 3 below

	Characteristic situation (CIRIA R149)	Comparable classification in DETR *et al* (1999)	Risk classification	Gas screening value (GSV) (CH_4 or CO_2) (l/hr)[1] Threshold	Additional factors	Typical source of generation
	1	A	Very low risk	<0.07	Typically methane £1 % and/or carbon dioxide £5 %. Otherwise consider increase to Situation 2	Natural soils with low organic content "Typical" made ground
	2	B	Low risk	<0.7	Borehole air flow rate not to exceed 70l/hr. Otherwise consider increase to characteristic Situation 3	Natural soil, high peat/organic content. "Typical" made ground
	3	C	Moderate risk	<3.5		Old landfill, inert waste, mineworking flooded
	4	D	Moderate to high risk	<15	Quantitative risk assessment required to evaluate scope of protective measures.	Mineworking – susceptible to flooding, completed landfill (WMP 26B criteria)
	5	E	High risk	<70		Mineworking unflooded inactive with shallow workings near surface
	6	F	Very high risk	>70		Recent landfill site

Notes on the use of Table 8.5

1 Gas screening value: (Litres of gas/hour) is calculated by multiplying the maximum gas concentration (%) by the maximum measured borehole flow rate (l/hr) – see Glossary.

2 Site characterisation should be based on gas monitoring of concentrations and borehole flow rates for the minimum periods defined in Table 5.5.

3 Source of gas and generation potential/performance should be identified.

4 Soil gas investigation should be in accordance with guidance provided in Chapters 4 to 6.

5 If there is no detectable flow, use the limit of detection of the instrument.

6 The boundaries between the Partners in Technology classifications do not fit exactly with the boundaries for the CIRIA classification.

Figure 3: Modified Wilson and Card classification, sourced from CIRIA C665, 2007

The annual monitoring results from 2014, 2015 and 2016 have found that the monitoring results of monitoring well G30R (previously G30) were relatively stable between 9 to 22%v/v methane and the flow rates are between 0 and 0.7L/hr. CIRIA C665 (2007) states that 1%v/v methane is classified as 'Very Low Risk' and above that level may need to be considered an increase to Situation 2 at 'Low Risk', however given the low flow rates (between 0 and 0.7L/hr) 'Very Low Risk' is considered appropriate. DER has considered that, as G30R was installed within fill material to assess the LFG generation, the low flow rates and the methane levels monitored at all of the other monitoring wells there is a low risk of landfill gas migration. Ongoing monitoring is required on the Licence to maintain this status.

The 2016 Landfill gas monitoring also identifies a number of monitoring wells with high levels of carbon dioxide close the boundary. Section 2.2.11 of CIRIA C665, (2007) states that acidic waters such as rainwater can react with calcium carbonate (e.g. chalk and limestone etc) to form carbon dioxide. Elevated concentrations of carbon dioxide (>5 per cent) which may explain the higher results, given the Tamala sands and limestone within the site.

The monitoring results for Carbon Dioxide from the past three years appear to be stable and considered very low risk under CIRIA C665 (2007), however there is a peak in the 2016 monitoring results at monitoring wells G35, G35 and G36 which does not seem to be related to the decomposition of the putrescible materials.

6.3 Monitoring of noise emissions

The Licence Holder submitted an acoustic consultant report carried out by Herring Storer Acoustics on behalf of Non Organic Disposals, *Non Organics Environmental Noise Assessment, March 2017*.

The acoustic assessment detailed that there is an acoustic barrier bund (at least 5m above grade) to the western boundary and there are significant stockpiles up to 20m above the processing plant levels which provide an effective acoustic barrier to the west and south residential areas. The report identified the processing plant including crusher and screeners are the higher noise generating activities on site.

The equipment considered as noise sources in the report included:

- Komatsu loader feeding the sorting plant
- Komatsu 380 loader, sorting the stockpiles
- Crusher
- Screener
- Kawasaki 70 loader
- Water cart

A noise assessment based on measured noise levels was provided within the Application. Noise level measurements were taken at four residential receptors adjacent to the Premises.

DER notes the following:

- The Acoustic Report states that the measurements were undertaken in normal operating conditions, it is unclear from the information provided whether this is 'worst case scenario'.
- The influencing factor seems to be incorrect, given that the Lot 2 on Plan 69382 is considered Urban Development instead of Industrial as listed in the Report. However, this does not seem to impact complying with the assigned levels.

- It is unclear whether the reversing alarm is tonal, it is recommended that reversing beepers should be replaced by broadband alarms. The Licence Holder has since confirmed that reversing alarms are not fitted to vehicle and machinery on the Premises.

The assessment concluded "*noise emissions to all surrounding receptors comply with the requirements of the Environmental Protection (Noise) Regulations 1997*".

7. Consultation

The Application was advertised in The West Australian newspaper on 8 May 2017.

The Application was also referred to the City of Wanneroo and 262 landowners and residents who the Delegated Officer considered may have an interest in the Application.

24 representations were received in relation to the Application. A summary of all representations received and how DER has considered these is included in Appendix 1.

The Licence Holder was provided a copy of the draft Decisions Report and licence for comment on 14 June 2017.

8. Location and siting

8.1 Siting context

The Premises are located within the suburb of Darch, in the City of Wanneroo and are approximately 14km north of the Perth central business district.

Due to urban encroachment over the years, the Premises is now immediately adjacent to residential dwellings to the west and south and industrial properties to the north.

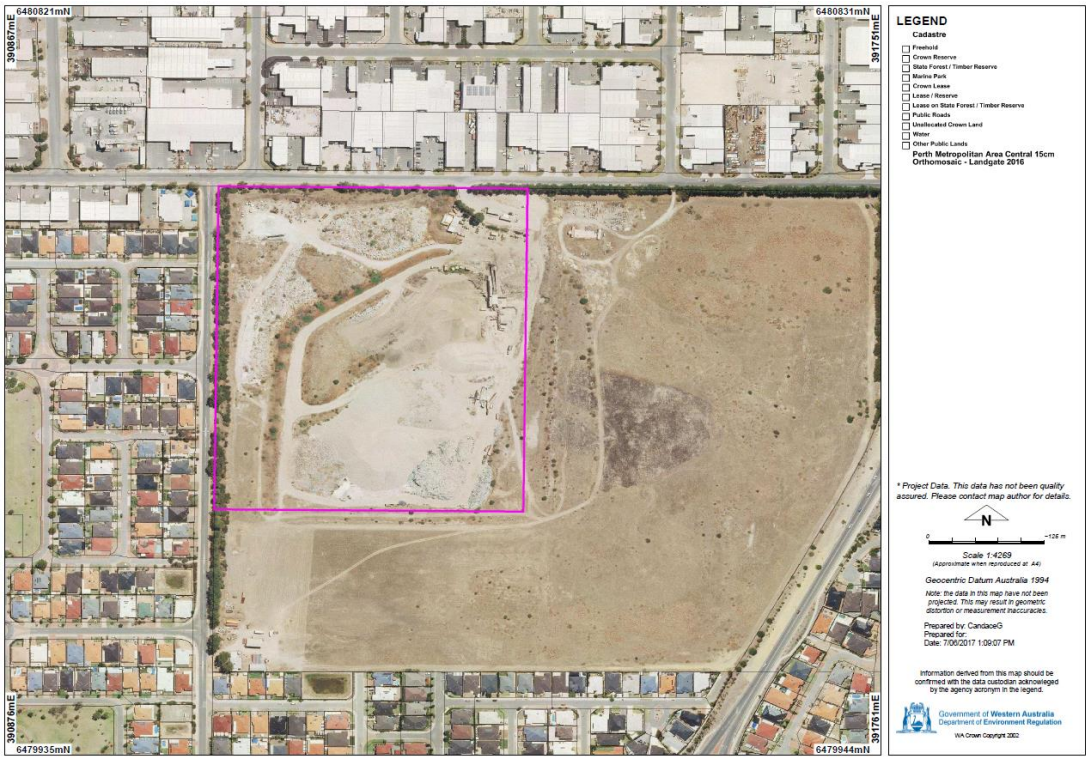


Figure 4: Premises location in relation to sensitive receptors

8.2 Residential and sensitive Premises

The approximate distances to residential and sensitive receptors are shown in Table 10.

Table 10: Receptors and distance from activity boundary

Sensitive Land Uses	Distance from Prescribed Activity
Childcare centre	20m west of the Premises boundary
Residential areas (densely populated)	20m west of the Premises boundary
	190m south of the Premises boundary
	400m east of the Premises boundary
Industrial premises	20m north of the Premises boundary

8.3 Specified ecosystems

Specified ecosystems are areas of high conservation value and special significance that may be impacted as a result of activities at or Emissions and Discharges from the Premises.

The distances to specified ecosystems are shown in Table 11.

Table 11: Environmental values

Specified ecosystems	Distance from the Premises
Resource enhancement sumpland	420m north of the Premises boundary
Conservation category dampland	1,000m east of the Premises boundary
Conservation category lake – Lake Gnangara	2,000m north east of the Premises boundary
Conservation category lake - Lake Goollelal	3,500m west of the Premises boundary
Threatened ecological community (Banksia attenuata woodland over species rich dense shurblands, Endangered).	800m south of the Premises boundary
Bush forever sites	1,500m north, 1,500m south and 2,100m north east of the Premises boundary

8.4 Groundwater and water sources

The distances to groundwater and water sources are shown in Table 12.

Table 12: Groundwater and water sources

Groundwater and water sources	Distance from Premises	Environmental Value
Public drinking water supply areas	1500m east of the Premises boundary and 1500m south of the Premises boundary	P3 protection area
	2500m east of the Premises boundary	P1 protection area
Groundwater within and adjacent to the Premises	Groundwater depth within the Premises is expected to range between 1 and 15m below ground level (mBGL) (DoW 2017(b)). The results of groundwater depth monitoring within the Premises have provided depths ranging from 5.07 mBGL to 13.33mBGL in the 2016 monitoring period. Monitoring also suggest that groundwater flow enters from the north-eastern portion of the Premises, flowing in a south westerly direction, and then flows in a southerly direction as it moves across the Premises (Enpoint 2017).	Groundwater may be utilised for non-potable uses via domestic bores in the surrounding residential area.
		Groundwater within the Premises has been impacted by arsenic, manganese and total chromium as a result of historical landfilling activities.

8.5 Soil type

The Premises is situated on the Swan Coastal Plain with soils categorised as Tamala Limestone (DoW 2017(c)). There is no known risk of acid sulfate soils at the Premises.

8.6 Other site characteristics

The locations of other receptors are shown in Table 13.

Table 13: Other landscape features, relevant factors or receptors

Other site characteristics	Detail
Stormwater flow	Due to the topography within the Premises stormwater runoff generally flows towards to centre of the Premises (between the two current soil stockpiles and the stone and gravel stockpile) which is the lowest point.

8.7 Meteorology

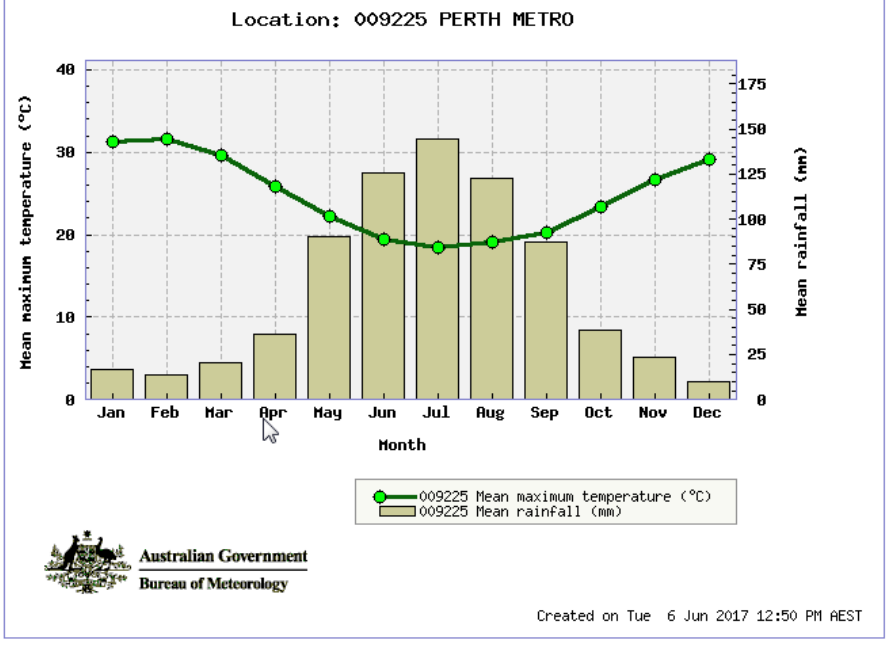
8.7.1 Regional climatic aspects

The Perth metropolitan area is characterised by cool, wet winters and hot, dry summers.

8.7.2 Rainfall and temperature

The closest Bureau of Meteorology (BoM) station with current weather data is Perth Metro WA (Site number: 009225) approximately 12.3 km from the Premises.

The mean rainfall and maximum temperature for the Perth WA BoM station is present in Figure 5 below. Based on the historical averages for the region, the Premises is likely to exhibit warm to hot temperatures between December to March with rainfall predominantly over June, July and August.



Statistics	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual	Years
Mean maximum temperature (°C) for years 1994 to 2017	31.2	31.6	29.6	25.9	22.2	19.4	18.4	19.1	20.3	23.4	26.6	29.1	24.7	23
Statistics	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**	**Annual**	**Years**
Mean rainfall (mm) for years 1993 to 2017	16.7	13.6	20.4	36.3	90.3	126.0	144.5	122.4	87.2	38.6	23.3	10.1	726.8	24

12.3 = Not quality controlled

Figure 5: Mean temperature and rainfall - Perth WA

8.7.3 Wind direction and strength

The following wind roses (Figure 6) provide the annual wind direction and strength (km/h) for 9am and 3pm between the years 1994 and 2011 in Perth (BoM 2017). The region has a dominant wind direction consisting of easterly winds during the morning and south-westerly winds in the afternoon.

It is important to note that these wind roses show historical wind speed and wind direction data for the Perth WA weather station and should not be used to predict future data.

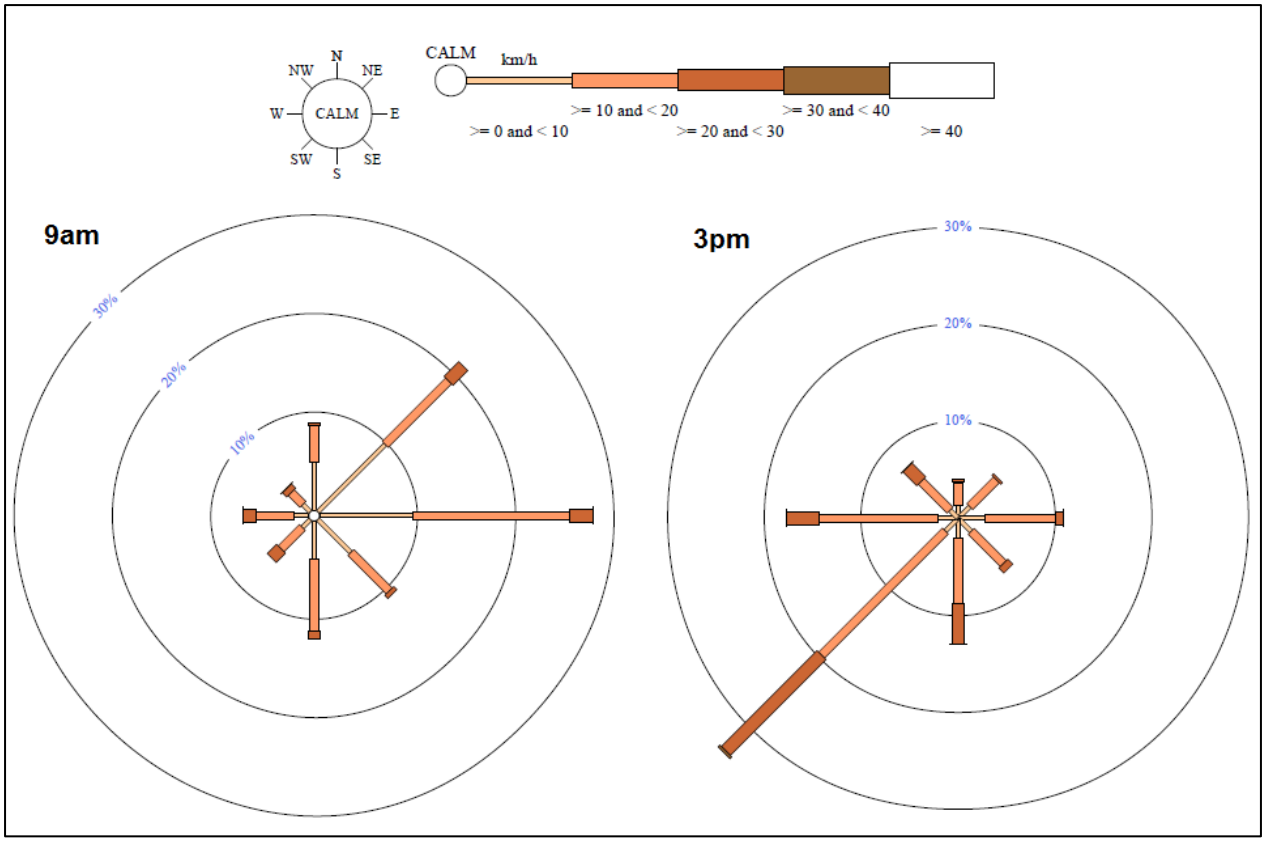


Figure 6: Wind roses for Perth weather station at 9am and 3pm

9. Risk assessment

9.1 Determination of emission, pathway and receptor

In undertaking its risk assessment, DER 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 14. The identification of the sources, pathways and receptors to determine Risk Events are set out in Table 14 below.

Table 14: Identification of emissions, pathway and receptors

Risk Events						Continued to detailed risk assessment?	Reasoning
Sources/Activities		**Potential Emissions**	**Potential Receptors**	**Potential Pathway**	**Potential Impacts**		
Waste acceptance and handling	Acceptance and handling of imported waste Solid waste contaminated with asbestos containing materials and/or asbestos fibres	Dust	Childcare centre - 20m west of the Premises. Residential receptors – nearest located 20m west of the Premises. Industrial receptors - 20m north of the Premises.	Air (windborne)	Health impacts from dust inhalation. Amenity and nuisance impacts from deposition on property or visible dust movement off the Premises.	Yes	See Section 10.4
		Asbestos fibres from non-conforming waste types at the Premises being released into the air			Health impacts from inhalation of asbestos fibres.	Yes	See Section 10.5
		Noise		Air	Health and amenity impacts.	Yes	See Section 10.6
Crushing and screening	Operation of crushing and screening plant	Dust	Childcare centre - 20m west of the Premises. Residential receptors – nearest located 20m west of the Premises. Industrial receptors - 20m north of the Premises.	Air (wind borne)	Health impacts from dust inhalation. Amenity and nuisance impacts from deposition on property or visible dust movement off the Premises.	Yes	See Section 10.4
		Asbestos fibres fibres from non-conforming waste types at the Premises being released into the air			Health impacts from inhalation of asbestos fibres.	Yes	See Section 10.5

Risk Events						Continued to detailed risk assessment?	Reasoning
Sources/Activities		**Potential Emissions**	**Potential Receptors**	**Potential Pathway**	**Potential Impacts**		
Waste acceptance and handling, crushing and screening and vehicle movements	Loading, sorting and unloading of material. Operation of crushing and screening plant. Vehicle and equipment movements.	Noise	Childcare centre - 20m west of the Premises. Residential receptors – nearest located 20m west of the Premises. Industrial receptors - 20m north of the Premises.	Air	Health and amenity impacts.	Yes	See Section 10.6
Waste storage	Stockpiles	Dust	Childcare centre - 20m west of the Premises. Residential receptors – nearest located 20m west of the Premises. Industrial receptors - 20m north of the Premises.	Air (windborne)	Health impacts from dust inhalation. Amenity and nuisance impacts from deposition on property or visible dust movement of the Premises.	Yes	See Section 10.4
		Pests and Vermin		Pests and vermin attracted to waste materials.	Health and amenity impacts.	No	The Delegated Officer does not consider that the material to be stockpiled onsite is conducive to the attraction or breeding of pests and vermin, therefore the risk of pests and vermin has not been assessed further.
Residual Waste storage (non-inert)	Storage of residual/ contaminant wastes removed during processing (e.g. metal, timber, plastic and other	Leachate	Groundwater within the Premises and within adjoining land Potential nearby groundwater users	Seepage through soil Transport through groundwater	Further contamination of groundwater supply. Reduced availability of offsite groundwater for nearby users.	Yes	See Section 10.7

Risk Events						Continued to detailed risk assessment?	Reasoning
Sources/Activities		Potential Emissions	Potential Receptors	Potential Pathway	Potential Impacts		
	contaminants)	Pests and Vermin	Threatened ecological community 260m south of the Premises.	Pests and vermin attracted to waste materials.	Health and amenity impacts.	No	The Delegated Officer considers that the nature of residual waste is not conducive to the attraction or breeding of pests and vermin and therefore, the risk of pests and vermin has not been assessed further.
Final Recycled Product	Recycled waste contaminated with asbestos containing material and/or asbestos fibres sold to third parties.	Asbestos fibres form non-conforming waste types at the Premises being released into the air and included in the final product.	Childcare centre - 20m west of the Premises. Residential receptors – nearest located 20m west of the Premises. Industrial receptors - 20m north of the Premises Onsite workers, customers and potential end-users of the recycled product.	Air (windborne)	Health impacts from inhalation of asbestos fibres.	Yes	See Section 10.5
Historic landfilling	Buried putrescible materials from historical landfilling activities.	Leachate	Groundwater within the Premises and within adjoining land Potential nearby groundwater users Threatened ecological community 260m south of the Premises.	Seepage through soil Transport through groundwater	Further contamination of groundwater supply. Reduced availability of offsite groundwater for nearby users.	Yes	See Section 10.8

Risk Events						Continued to detailed risk assessment?	Reasoning
Sources/Activities		Potential Emissions	Potential Receptors	Potential Pathway	Potential Impacts		
		Landfill gas	Childcare centre - 20m west of the Premises. Residential receptors – nearest located 20m west of the Premises. Industrial receptors - 20m north of the Premises.	Lateral migration through soil, or Passive venting to air	Health impacts and explosion risk from potential high methane concentration	Yes	See Section 10.9
		Odour	Childcare centre - 20m west of the Premises. Residential receptors – nearest located 20m west of the Premises. Industrial receptors - 20m north of the Premises.	Passive venting to air	Health and amenity impacts	Yes	See Section 10.9

9.2 Consequence and likelihood of risk events

A risk rating will be determined for risk events in accordance with the risk rating matrix set out in Table 15 below.

Table 15: 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

DER will undertake an assessment of the consequence and likelihood of the Risk Event in accordance with Table 16 below.

Table 16: Risk criteria table

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

^ Determination of areas of high conservation value or special significance should be informed by the *Guidance Statement: Environmental Siting.*
* In applying public health criteria, DER may have regard to the Department of Health's *Health Risk Assessment (Scoping) Guidelines.*
"onsite**"** means within the Prescribed Premises boundary.

9.3 Acceptability and treatment of Risk Event

DER will determine the acceptability and treatment of Risk Events in accordance with the Risk treatment Table 17 below:

Table 17: Risk treatment table

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

9.4 Risk assessment – dust emission and impact

9.4.1 Description of dust emission and impact

The waste handling, processing and storage within the Premises may generate dust emissions which may result in health and amenity impacts near the Premises.

The potential sources of dust within the Premises are:

- material unloading upon delivery;
- manual and mechanical sorting, screening and crushing;
- movement of material to storage areas;
- storage of material (lift-off from stockpiles);
- loading of material for transport off the Premises;
- vehicle movement on unsealed ground;
- soil bunds on the perimeter of the Premises; and
- tracking of soil onto Furniss Road by vehicles leaving the Premises.

9.4.2 Identification and general characterisation of emission

The frequency and time of exposure of receptors to dust may vary depending on the activities carried out at the Premises and weather conditions.

The risk associated with the release of asbestos fibres is assessed separately in Section 9.5.

9.4.3 Description of potential adverse impact from the emission

Dust emissions have the potential to impact public health when inhaled; affecting both the respiratory and cardiovascular systems. Amenity may also be impacted by visible dust plumes and the deposition of material on a variety of surfaces such as vehicles, dwellings and clothing.

The submissions from the community consultation (as detailed in Appendix 1) have raised concerns with the potential for emissions from the Premises impacting health and amenity. Submissions have not been verified; however residents have reported allergies and asthma resulting from the dust and excessive dust impacting properties.

The receptors most affected by dust emissions from the Premises would be adjacent residents, children and staff at a childcare centre and staff at the adjacent industrial premises, all of which are located approximately 20m from the Premises boundary.

9.4.4 Criteria for assessment

Impacts can be assessed against the general provisions of the EP Act, specifically whether fugitive dust unreasonably interferes with the health, welfare, convenience, or comfort of any person.

9.4.5 Licence Holder controls

This assessment has reviewed the controls set out in Table 18 below.

Table 18: Licence Holder's proposed controls for dust emissions

Source	Control(s)	Operation details
Bunds/material stockpiles	Auto reticulation lines and water buffer tanks (total storage capacity 60,000L)	Variable automatic programs. Longer run-times per station are utilised in summer months vs. winter.
Waste receival	4x high pressure hoses and 3x pumps	Used to wet down all incoming loads during tipping
Unsealed ground	Water cart (30,000L capacity) with sprays and cannon	Used to wet down unsealed roads.
Crushing	Water sprays on primary and secondary crusher	Used during crushing and screening operations.
Fugitive Dust	Plant shutdown and vehicle movement restrictions.	Plant shut down and restriction of vehicle movement to tipping area during high dust generating conditions

9.4.6 Key findings

The Delegated Officer has reviewed the information regarding dust emission and impact and has found:

1. Given the location of the auto reticulation lines and from observations during site visits, the Delegated Officer does not consider that these are an adequate control for suppressing dust on stockpiles.
2. Soil bunds which act as noise bunds on the perimeter of the Premises have the potential to contribute to dust emissions from the Premises. Given the close vicinity of these bunds to receptors, additional controls are required to effectively manage the risk of dust emissions.
3. Submissions received from the community have raised dust from the site as a significant concern.

9.4.7 Consequence

If the emission of dust occurs, then the Delegated Officer has determined that the impact of exposure of receptors to dust may be mid-level impacts to amenity or low level/occasional medical treatment. Therefore, the Delegated Officer considers the consequence of dust emission and impact to be **moderate**.

9.4.8 Likelihood of Risk Event

The Delegated Officer has determined that dust being emitted and causing amenity or health impacts could occur at some time. Therefore, the Delegated Officer considers the likelihood of dust emission and impact to be **possible**.

9.4.9 Overall rating of dust emission and impact

The Delegated Officer has compared the consequence and likelihood ratings described above with the risk rating matrix (Table 15) and determined that the overall rating for the risk of dust emission and impact is **medium**.

9.5 Risk assessment – asbestos fibres emission and impact

9.5.1 Description of asbestos fibres emission and impact

Asbestos is a hazardous material that was used extensively in Australian buildings and structures from the 1950s through to 1990. Due to this widespread use, there is potential for the incoming wastes to contain asbestos fibres.

The waste handling, processing and storage within the Premises have the potential to release asbestos fibres, as asbestos may be contained within loads of waste delivered to the Premises. Asbestos fibres may cause health impacts for people nearby the Premises or final end users of products produced on the Premises.

The potential sources for the release of asbestos fibres within the Premises are:

- material unloading upon delivery;
- manual and mechanical sorting, screening and crushing;
- movement of material to storage areas;
- storage of material; and
- loading of material for transport off the Premises.

9.5.2 Identification and general characterisation of emission

The frequency and time of exposure of receptors to asbestos fibres would vary depending on the degree of contamination of the waste materials within the Premises, the activities carried out at the Premises, and weather conditions.

9.5.3 Description of potential adverse impact from the emission

Asbestos fibres have the potential to impact public health when inhaled; severe health impacts include asbestosis and mesothelioma. The submissions from the community consultation (as detailed in Appendix 1) have raised concerns with the potential for asbestos to be present at the Premises.

The receptors most affected by asbestos fibre emissions from the Premises would be adjacent residents, children and staff at a childcare centre and staff at the adjacent industrial premises, all of which are located approximately 20m from the Premises boundary.

9.5.4 Criteria for assessment

Asbestos content in final product is specified in DER's Asbestos Guidelines which provide that any product deemed to contain 0.001% weight for weight must be treated as waste, deemed as potentially contaminated material and considered for off-site disposal, or it should be subject to further actions to remediate it or demonstrate its acceptability by further assessment.

The Licence Holder undertakes asbestos sampling as per the requirements of DER's Asbestos Guidelines. During the 2016 annual period, the Licence Holder collected 747 asbestos samples with a total weight of 1,102.2kg. Of the 747 samples analysed, the following was identified:

- Asbestos containing material (ACM) in 6 samples with a total weight of 5.3g; and
- Asbestos fines (AF) in 58 samples with a total weight of 1.1g.

The Licence Holder provided in the 2016 Annual Environmental Report that when the concentration of AF is calculated on a per sample basis, 19 samples were found to contain AF at a concentration above the 0.001% w/w criteria.

Key finding: From the Annual Environmental Report submitted for the 2016 reporting period, it was unclear what actions were undertaken by the Licence Holder in response to the identification of ACM and asbestos fines in the respective samples during the reporting period.

9.5.5 Licence Holder controls

An Asbestos Management Plan was submitted to DER on the 23 April 2013 as part of an Environmental Improvement Plan which consists of the controls outlined in Table 19 below.

Table 19: Licence Holder's proposed controls for asbestos fibres emissions

Source	Control(s)	Operation details
Incoming waste	Pre-acceptance procedures	• 'No asbestos' clause on price lists • 'No asbestos' signage displayed at entrance and load inspection station. • Load receival register • Load refusal register
	Acceptance procedures	• The load assessment supervisor visually inspects the load. • IF ACM is identified in a load before it is tipped, the truck is turned away, if identified after tipping, the truck is reloaded. • Drivers complete the load receival register. If the driver refuses to sign, or ACM is observed, the load is refused entry and the vehicle/operator details are entered into the load refusal register.
	Load inspection after acceptance	• The tipping area officer visually confirms whether the load is low or high risk when tipped. • High-risk waste is tipped in a separate area to allow a more thorough examination. • The load is wetted down with high pressure water and further visual inspections are carried out for ACM. • The tipping area officer supervises the mechanical grab/loader when sorting through the waste in the high risk tipping area, which is spread over a larger area to give better visual access. • Trucks with suspect loads • Where necessary, the tipping officer liaises with the load assessment officer to determine what grade the load was assessed upon entry to the facility. • Where any doubt is raised as to the loads' asbestos risk, the area is immediately wetted down, cordoned off and site management advised. • If ACM is identified during the above, it is placed in marked sealed containers for disposal at a licensed facility
Waste processing	Waste processing controls	• The feed stockpile for the inspection conveyor is to be kept damp at all times. • Damp waste is passed down the picking conveyor belt with staff to maintain a watch for any material suspected of containing asbestos. When suspect waste is identified the conveyor is stopped, staff wear required PPE and the suspect material is placed in designated drums.

Source	Control(s)	Operation details
		• Sections of the stopped conveyor belt before and after where the suspect material was located are then further scrutinised to ascertain if the ACM was isolated or more generally found on the conveyor belt. If it is the latter, the conveyor is immediately wetted down and site management notified. • The front end supervisor and plant supervisor are tasked with maintaining constant supervision of the conveyor belt and belt picker's activity. • The bottom end supervisor clears away processed waste from under the 4 stackers which separates material based on size and type of material.
Waste storage	Stockpile management	• Maintaining separation between different stockpiled material. • Maintaining dust suppression as required.
Final product	Product sampling	• Asbestos sampling occurs directly from the fines stockpiling conveyor belt at a minimum rate of 1 sample per 70m^3 of product output. • The only time sampling is conducted from stockpiles is when the plant is not in operation. • When samples are collected, a minimum of three samples are collected from the mixed material.

9.5.6 Key findings

The Delegated Officer has reviewed the information regarding asbestos fibre emissions from the Premises and has determined that the Licence Holder's Asbestos Management Plan has been derived from DER's Asbestos Guidelines.

9.5.7 Consequence

If the emission of asbestos fibres occurs, then the Delegated Officer has determined that the impact of the exposure of receptors to asbestos fibres may be ongoing medical treatment or loss of life. Therefore, the Delegated Officer considers the consequence of asbestos fibres emission and impact to be **severe**.

9.5.8 Likelihood of Risk Event

The Delegated Officer has determined that asbestos fibres being emitted and causing health impacts may only occur in exceptional circumstances. Therefore, the Delegated Officer considers the likelihood of asbestos fibres emission and impact to be **unlikely**.

9.5.9 Overall rating of asbestos fibres emission and impact

The Delegated Officer has compared the consequence and likelihood ratings described above with the risk rating matrix (Table 15) and determined that the overall rating for the risk of asbestos fibres emission and impact is **high**.

9.6 Risk assessment – noise emission and impact

9.6.1 Description of noise emission and impact

Waste handling and processing within the Premises may generate noise emissions which may result in health and amenity impacts for people nearby the Premises.

The potential sources of noise within the Premises are:

- operation of vehicles (trucks making a delivery or pick up, front end loaders and the water cart); and
- operation of the crushing and screening infrastructure.

9.6.2 Identification and general characterisation of emission

The Premises typically operates between the hours of 7:30am and 3:30pm Monday to Friday.

A noise assessment based on measured noise levels was provided within the Application. The measured noise levels at residential receptors adjacent to the Premises are provided in Table 20.

Table 20: Measured noise levels at residential receptors

Receptor location	Measured noise level (L_{A10} dB(A))
75 Driver Road	44
61 Driver Road	48[1]
28 Esmerelda Pass	39
31 Rosemary Ave	62

Note 1: Measured level plus 5dB(A) due to the presence of a tonal characteristic

It was noted within the noise assessment that the measured noise level at 31 Rosemary Ave was due to noise from Mirrabooka Avenue, which is within 40m of the residence.

9.6.3 Description of potential adverse impact from the emission

Noise emissions have the potential to reduce public wellbeing, amenity and comfort. The submissions from the community consultation (as detailed in Appendix 1) have raised concerns with noise emissions from the Premises.

The receptors most affected by noise emissions from the Premises would be adjacent residents and children and staff at a childcare centre which are located approximately 270m from the processing area within the Premises (area of greatest noise generation), and staff at the adjacent industrial premises located approximately 100m from the processing area within the Premises.

9.6.4 Criteria for assessment

Regulations 7 and 8 within the *Environmental Protection (Noise) Regulations 1997* (Noise Regulations) set out assigned levels (at the premises receiving the noise) which the Premises must not cause or significantly contribute to. The assigned levels which apply to the receptors adjacent to the Premises, during the Premises operation hours are shown in Table 21.

Table 21: Assigned noise levels at receptors

Type of premises receiving noise	Time of day	Assigned level (dB)		
		$L_{A\ 10}$	$L_{A\ 1}$	$L_{A\ max}$
Noise sensitive premises: highly sensitive area	0700 to 1900 hours Monday to Saturday	45 + influencing factor	55 + influencing factor	65 + influencing factor
Industrial and utility premises other than those in the Kwinana Industrial Area	All hours	65	80	90

Influencing factors, which attempt to estimate background noise levels, are applied due to the presence of industrial land uses and a major road within 450m of the receptor. The influencing factors as calculated within the noise assessment provided and the adjusted assigned levels are shown in Table 22.

Table 22: Assigned noise levels including adjustment for the influencing factor

Receptor location	Influencing factor (IF)		Assigned level (including adjustment for the IF) (dB)	DER calculated Assigned Level
	Land use factor	Traffic factor		
75 Driver Road	12	0	57	53
61 Driver Road	10	0	55	51
28 Esmerelda Pass	7	2	54	49
31 Rosemary Ave	6	6	57	52

**This Table has been sourced from the data provided in the Acoustic Consultant Report with DER calculated assigned levels added.

The noise assessment concludes that the noise emissions from the Premises at all surrounding receptors comply with the assigned levels.

DER's Noise Management Branch has noted that the assigned levels provided by the consultant may be incorrect as Lot 2 on Plan 69382 is zoned Urban Development rather than Industrial as detailed in the Report. For example the Influencing Factor for 28 Esmeralda Pass is +4dB and for 75 Driver Road the Influencing Factor would be +10dB, however, this did not change the outcome of the assessment.

9.6.5 Licence Holder controls

This assessment has reviewed the controls set out in Table 23 below.

Table 23: Licence Holder's controls for noise emissions

Source	Control(s)	Reference to Figure 5
Construction and screening operations. Vehicle & equipment movements	Bunds constructed of material processed on site or other clean sand – located around the perimeter of the Premises	Bund
	Location of crushing and screening equipment within a position in the Premises which is below the ground level at Furniss Road and Driver Road.	Recycling Operations below grade
	Location of significant height stockpiles close to the recycling plant, providing increased acoustic barriers to the nearest noise sensitive receptors to the west and south.	Stockpiles

Figure 7: Sourced from the Acoustic Consultant Report showing recycling operation locations, stockpiles, bunds and noise monitoring locations

9.6.6 Key findings

The Delegated Officer has reviewed the information in relation to noise emissions from the Premises. It is noted that the Acoustic Consultant Report referred to both Lot 1 and Lot 2 has 'Industrial' land use, however Lot 2 has been re-zoned as 'Urban Development'. Therefore DER has adjusted the calculated Assigned Levels in Table 22. It is noted that even with the adjusted Assigned Levels the noise monitoring results provided comply with the *Environmental Protection (Noise) Regulations 1997*.

9.6.7 Consequence

The Delegated Officer has determined that noise is likely to meet Specified Consequence Criteria (Noise Regulations at sensitive receptors Therefore, the Delegated Officer considers the consequence of noise emissions and impacts to be **Minor**.

9.6.8 Likelihood of Risk Event

The Delegated Officer has determined that the likelihood of noise emissions exceeding the Specified Consequence Criteria (Noise Regulations) will probably not occur in most circumstances. Therefore, the Delegated Officer considers the likelihood of noise emissions and impacts to be **Unlikely**.

9.6.9 Overall rating of noise emission and impact

The Delegated Officer has compared the consequence and likelihood ratings described above with the risk rating matrix (Table 15) and determined that the overall rating for the risk of noise emissions and impact is **Medium.**

9.7 Risk assessment – Residual Waste leachate impact

9.7.1 Description of leachate impacts

Non-conforming materials removed during processing (Residual Wastes) are stockpiled onsite prior to removal offsite. These wastes have the potential to generate leachate, which in turn may enter groundwater and impact groundwater users.

9.7.2 Identification and general characterisation of emission

Residual Wastes consisting of timber, plastics and scrap metal are temporarily stored on the Premises prior to removal offsite.

The Premises consists of Tamala Limestone category soils and has a depth to groundwater ranging from 1 to 15 metres. Given the soil type and depth to groundwater, there is a potential pathway to groundwater for leachate emissions.

Groundwater beneath the Premises has been identified as being contaminated by historical landfill leachate (see Section 6.1).

9.7.3 Description of potential adverse impact from the emission

Groundwater within the immediate vicinity of the Premises is used for non-potable purposes such as the irrigation of gardens and reserves. Leachate generated from Residual Waste has the potential to further contaminate the groundwater beneath the Premises which may affect these groundwater users.

9.7.4 Criteria for assessment

Impacts to groundwater can be assessed against the Australian Drinking Water Guidelines (NHMRC/ARMCANZ, 2011) as well as the Non-Potable Use Guidelines (DoH, 2014). Given that groundwater is utilised for non-potable purposes, it is considered that the Non-Potable Use Guidelines are the most appropriate criteria as per DER's *Guideline for assessment and management of contaminated sites.*

9.7.5 Licence Holder controls

This assessment has reviewed the controls set out in Table 24 below.

Table 24: Licence Holder's proposed controls for residual leachate impacts

Control	Description
Diversion drains	The Licence Holder controls stormwater on the Premises through diversion drains which direct any surface water away from the unprocessed waste storage and sorting areas to sandy, well drained areas that are free from landfill.
Temporary storage	Condition 2 of the Existing Licence requires that timber, plastics and scrap metal wastes recovered from the sorting process are stored in a quarantined storage area or container and removed to an appropriately authorised facility prior to the close of business every Friday.

9.7.6 Key findings

The Delegated Officer considers it unlikely that leachate from Residual Wastes on the Premises will enter groundwater provided these materials are only stored temporarily prior to removal offsite, however notes that there has been previous non-compliance in respect of the extended storage of these residual wastes on the Premises.

9.7.7 Consequence

The Delegated Officer has determined that the impact of the leachate emissions on groundwater on a local scale will be low level. Therefore, the Delegated Officer considers the consequence of Residual Waste leachate emissions and impact on groundwater to be **moderate**.

9.7.8 Likelihood of Risk Event

The Delegated Officer has determined that the likelihood of leachate from Residual Waste causing a moderate impact will probably not occur in most circumstances provided the Residual Waste is not stored onsite for an extended period of time. Therefore, the Delegated Officer considers the likelihood of leachate emissions and impacts to be **unlikely**.

9.7.9 Overall rating of Residual Waste leachate impact

The Delegated Officer has compared the consequence and likelihood ratings described above with the risk rating matrix (Table 15) and determined that the overall rating for the risk of leachate emissions and impacts from Residual Waste is **medium**.

9.8 Risk assessment – landfill leachate impact

9.8.1 Description of landfill leachate

Leachate generated from putrescible materials buried during previous landfilling operations has the potential to enter groundwater, impacting offsite groundwater users.

9.8.2 Identification and general characterisation of emission

Landfilling activities are no longer occurring at the Premises, however historic landfilling included the unauthorised acceptance of putrescible materials which have the potential to generate leachate.

As above, given the depth to groundwater beneath the Premises and the soil type, there is a potential pathway for leachate to enter the groundwater.

Groundwater beneath the Premises has been identified as being contaminated by historical landfill leachate (see Section 6.1).

9.8.3 Description of potential adverse impact from the emission

As above, groundwater within the immediate vicinity of the Premises is used for non-potable purposes such as the irrigation of gardens and reserves. Leachate generated from historic landfilling has the potential to further contaminate the groundwater beneath the Premises which may affect these groundwater users.

Where groundwater is a pathway to surface waters, contaminated groundwater may also cause indirect impacts to surface waters at the surface expression of the groundwater. This may result in eutrophication and excessive growth of algae impacting the survival of aquatic biota through light attenuation and dissolved oxygen reduction in lakes, rivers and wetlands

9.8.4 Criteria for assessment

Impacts to groundwater can be assessed against the Australian Drinking Water Guidelines (NHMRC/ARMCANZ, 2011) as well as the Non-Potable Use Guidelines (DoH, 2014). Given that groundwater is utilised for non-potable purposes, it is considered that the Non-Potable Use Guidelines are the most appropriate criteria as per DER's *Guideline for assessment and management of contaminated sites.*

9.8.5 Licence Holder controls

The Licence Holder undertakes six monthly ambient groundwater monitoring and reports these results as discussed in Section 6.1 of this Decision Report.

The Licence Holder is no longer undertaking landfilling activities at the Premises.

9.8.6 Key findings

The Delegated Officer considers that the generation of leachate from historical landfilled materials has been reduced since landfilling operations at the Premises have ceased.

9.8.7 Consequence

The Delegated Officer has determined that the impact of leachate emissions will be low level impacts on a local scale. Therefore, the Delegated Officer considers the consequence of landfill leachate emissions and impacts on groundwater to be **moderate**.

9.8.8 Likelihood of Risk Event

The Delegated Officer has determined that the likelihood of leachate from the historical landfilling activities continuing to impact groundwater could occur at some time given that contaminants continue to be identified during groundwater monitoring. Therefore, the Delegated Officer considers the likelihood of further groundwater impacts occurring from the current operations to be **possible**.

9.8.9 Overall rating of landfill leachate risk

The Delegated Officer has compared the consequence and likelihood ratings described above with the risk rating matrix (Table 15) and determined that the overall rating for the risk of historical landfill leachate emissions and impacts is **medium**.

9.9 Risk assessment – landfill gas and odour impact

9.9.1 Description of landfill gas and odour emission and impact

Emissions of landfill gas (LFG) from the historical landfilling practices of non-conforming waste (putrescibles) on site being released into the air via passive venting or sub-surface lateral migration causing health impacts from inhalation, ecotoxicity, fire / explosion, asphyxiation and odour.

9.9.2 Identification and general characterisation of emission

Landfill gas is generated by the biodegradation of waste and consists of a mix of bulk gases such as methane, carbon dioxide, nitrogen, oxygen and hydrogen and many trace gases such as hydrogen sulphide, carbon monoxide, halogenated organics and aromatic hydrocarbons. The rate of LFG emissions is dependent on the conditions present within the waste mass, including the composition of waste, the age of the landfill, moisture content and temperature. LFG monitoring records for the Premises, reported to DER in accordance with licence conditions, indicate that the presence of LFG is mainly isolated in the area around G30/G30R. The typical ‘rotten egg’ type odour is emitted from the generation of hydrogen sulphide.

9.9.3 Description of potential adverse impact from the emission

LFG can be passively vented to the atmosphere through the surface of the landfill where a low permeability cap or cover material has not been applied, which is the case for the Non Organics Disposal Landfill. It can also migrate through the sub-surface and through features such as pipelines and service ducts in the gas and leachate collections systems. Potential impacts associated with releases of LFG include toxicity from inhalation, ecotoxicity, fire and explosion if gas collects in high enough concentrations, asphyxiation and odour.

9.9.4 Criteria for assessment

DER's *Assessment and management of contaminated sites, Contaminated Sites Guidelines*, December 2014 landfill gas assessment refers to the methodology and monitoring requirements in 'Assessing Risks Posed by Hazardous Ground Gases to Buildings' (CIRIA C665, 2007) as detailed in Figure 8.

Component	Assessment Levels
Methane	• 1% v/v – reference value for assessing risk posed by ground gases to buildings at the Site above which protective measures may need to be considered (CIRIA C665, 2007)[1] • Gas screening value (GSV)[2] per CIRIA C665 (2007) Table 8.5
Carbon Dioxide	• 5% v/v – reference value for assessing risk posed by ground gases to buildings at the Site above which protective measures may need to be considered (CIRIA C665, 2007)[1] • 5,000ppm - time-weighted average occupational exposure limit (NOHSC, 1995)[3] for exposure of humans to air concentrations • GSV[2] per CIRIA C665 (2007) Table 8.5
Carbon Monoxide	• 30ppm time-weighted average occupational exposure limit (NOHSC, 1995)
Hydrogen Sulphide	• 10ppm time weighted average occupational exposure limit (NOHSC, 1995)

Notes:

[1] Per CIRIA C665 Table 8.5 for concentrations of methane and carbon dioxide that may necessitate raising the CIRIA Characteristic Situation and DETR Classification

[2] GSV: (Litres of gas per hour) is calculated by multiplying the maximum gas concentration (%) by the maximum measured borehole flow rate (L/hr). The 0.07L/hr GSV threshold value is the value below which no protection measures in buildings are required (as listed in Table 8.5 of Wilson et al., 2007)

[3] Occupational exposure limits cannot be directly compared to concentrations of gases in ground

Figure 8: Assessment levels sourced from 2016 Annual Environmental Report, Non Organic Disposals, lot 1 on Plan 69382 Driver Road, Darch 31 January 2017

CIRIA C665 (2007) also states the following toxicity effects on humans from hydrogen sulphide:

Asphyxiant at 400 – 500ppm

OELs 10 ppm (short-term) and 5 ppm (long-term)

EAL 140µ/m³ (long-term)

150 µ/m³ (short-term)

9.9.5 Licence Holder controls

The Licence Holder has not specified any controls for managing the landfill gas impact other than allowing the LFG to passively vent to the atmosphere and undertaking periodic monitoring of LFG at dedicated monitoring wells, no other control mechanisms are being implemented or proposed for the Premises.

9.9.6 Key findings

The Delegated Officer has reviewed the information, including monitoring data relating to landfill gas and concluded that as the landfilling of non-conforming waste has ceased, it is likely that the rate of landfill gas generation has reduced and will continue to reduce.

9.9.7 Consequence

The Delegated Officer has determined that the landfill gas specific consequence criteria for public health are at risk of not being met. Therefore, the Delegated Officer considers the consequence of landfill gas emissions and impacts on sensitive receptors to be **Moderate.**

9.9.8 Likelihood of Risk Event

The Delegated Officer has determined that the likelihood of landfill gas emissions impacting on sensitive receptors could occur at some time. Therefore, the Delegated Officer considers the likelihood of landfill gas emissions and impacts to be **Possible.**

9.9.9 Overall rating of landfill gas emissions

The Delegated Officer has compared the consequence and likelihood ratings described above with the risk rating matrix (Table 15) and determined that the overall rating for the risk of Landfill gas emissions and impacts on sensitive receptors is **Medium.**

9.10 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 25 below. Controls are described further in Section 10.

Table 25: Risk assessment summary

	Description of Risk Event			Applicant controls	Risk rating	Acceptability with controls (conditions on instrument)
	Emission	**Source**	**Pathway/ Receptor (Impact)**			
1.	Dust	Waste handling, processing and storage	Via air/wind to sensitive receptors causing health impacts from inhalation and amenity/nuisance impacts from deposition.	Infrastructure and management controls	Moderate consequence Possible likelihood **Medium risk**	Acceptable subject to Licence Holder controls being conditioned and regulatory controls.
2.	Asbestos fibres	Waste handling, processing and storage	Via air/wind to sensitive receptors causing health impacts from inhalation.	Management controls	Severe consequence Rare likelihood **High risk**	Acceptable subject to Licence Holder controls being conditioned and regulatory controls.
3.	Noise	Waste handling and processing	Via air to sensitive receptors, causing health and amenity impacts.	Infrastructure and management controls	Moderate consequence Unlikely likelihood **Medium Risk**	Acceptable subject to Licence Holder controls being conditioned.
4.	Leachate	Residual Waste storage (non-inert)	Via soil and groundwater to receptors causing further groundwater contamination and reduced availability of off-site groundwater for nearby users.	Infrastructure and management controls	Minor consequence Unlikely likelihood **Medium risk**	Acceptable subject to Licence Holder controls being conditioned.
5.	Leachate	Historical landfilled wastes	Via soil and groundwater to receptors causing further groundwater contamination and reduced availability of off-site groundwater for nearby users.	Management controls	Moderate consequence Unlikely likelihood **Medium risk**	Acceptable subject to Licence Holder controls being conditioned
6.	Landfill gas & odour	Historical landfilled wastes	Via soil and air to sensitive receptors causing health impacts and explosion risk due to high methane concentration.	Management controls	Moderate consequence Possible likelihood **Medium Risk**	Acceptable subject to Licence Holder controls being conditioned

10. Regulatory controls

A summary of regulatory controls determined to be appropriate for the Risk Event is set out in Table 26. The risks are set out in the assessment in Section 10 and the controls are detailed in this section. DER will determine controls having regard to the adequacy of controls proposed by the Licence Holder. The conditions of the Licence will be set to give effect to the determined regulatory controls.

Table 26: Summary of regulatory controls to be applied

		Controls (references are to sections below, setting out details of controls)								
		10.1.1 Throughput restrictions	**10.1.2 Waste restrictions and classification**	**10.1.4 Waste acceptance and load inspection**	**10.1.5 Stockpile management**	**10.1.6 Infrastructure and equipment**	**10.1.7 Product testing and supply**	**10.1.8 Noise controls**	**10.1.9 Monitoring**	**10.1.10 Reporting**
Risk Items (see risk analysis in Section 9)	**1. Dust from waste handling, storage, processing and vehicle movements.**	●			●	●				
	2. Asbestos fibres from waste handling, processing and storage		●	●	●	●				
	3. Asbestos fibres in final product						●			
	4. Noise from waste handling and processing	●				●		●		
	5. Leachate from Residual Waste storage		●	●						
	6. Leachate from historical landfilled waste		●			●			●	●
	7. Landfill gas & odour from historical landfilled wastes		●			●			●	●

10.1 Licence controls

10.1.1 Throughput restrictions

The Licence Holder shall be subject to total annual volume limitations of throughput of 325,000 tonnes of Waste (combined throughput across Category 13 and 62). The Licence Holder will be required to record volumes of incoming and outgoing waste.

Grounds: the likelihood of dust and noise emissions are related to the throughput at the Premises. Throughput influences the rate of turnover of materials, number of vehicle movements and the length of time machinery is operational. All these activities are sources of noise, dust and potentially asbestos emissions.

10.1.2 Waste type restrictions and classification

The Licence Holder must only accept Inert Waste Type 1 and Clean Fill that does not contain visible asbestos or ACM. The Licence Holder must comply with a number of acceptance criteria including, maintaining visible signage at the Premises and obtaining signed declarations from suppliers. The Licence Holder must visually inspect loads as they arrive at the Premises, reject loads suspected of containing asbestos and maintain accurate records.

Note: These controls are derived from DER's Asbestos Guidelines, which the Licence Holder has implemented as part of its Asbestos Management Plan (2013).

10.1.3 Waste acceptance and load inspection

The Licence Holder must maintain a designated unloading are where wastes cannot mix, maintain solid wastes in a damp state, maintain records for classified loads and continue to visually inspect loads at all stages of storage, sorting and screening.

Residual, non-conforming waste types removed during the screening process will be required to be removed from site to an authorised facility on at least a weekly basis.

Grounds: These controls are derived from DER's Asbestos Guidelines which the Licence Holder has implemented as part of its Asbestos Management Plan (2013).

The requirement for removal of residual, non-conforming wastes is appropriate to ensure materials are not stored onsite for extended periods which may result in an increased risk of leachate generation from these materials.

10.1.4 Stockpile management

The Licence Holder must within two months of the date of the Revised Licence issue, maintain unprocessed, tested processed and untested processed material in three separate stockpiles. Unprocessed stockpiles and product stockpiles should also be kept clearly separate at a minimum three metre distance. Signage must also be erected on respective stockpiles to clearly identify and delineate tested products, untested products and unprocessed waste.

Grounds: Separation of stockpiles and clear signage addresses the risk of cross-contamination between processed and unprocessed waste to provide effective controls to mitigate the risk of potential asbestos contamination in materials.

10.1.5 Infrastructure and equipment

The Licence Holder must maintain the following equipment to control dust emissions at the Premises:

- Auto reticulation lines and water buffer tanks
- High pressure hoses and pumps

- Water cart with sprays and cannon capable of reaching top of stockpiles/bunds
- Water sprays on primary and secondary crusher

The Licence Holder will be required to install wheel washing facilities that are capable of removing sediment form the wheels and underside of all trucks and vehicles exiting the Premises.

The Licence Holder must maintain the following groundwater monitoring infrastructure and equipment at the Premises:

- Groundwater monitoring bores: NODGW01, NODGW02, NODGW03, NODGW04, NODGW05, NODGW06, DDW13, DDW28, DDW29

The Licence Holder must maintain the following landfill gas infrastructure and equipment at the Premises:

- Landfill gas monitoring wells: G30R, G31, G32, G33, G34, G35, G36, G37, G38, NODG01, NODG02

Grounds: The above controls have been derived from the Licence Holder's current controls. Additional requirements have been included following DER Officers' visits to the Premises and feedback from the community.

10.1.6 Dust emission controls

The Licence Holder will be required to use specified infrastructure to keep all wastes, stockpiles and unsealed roads in a damp state. The wheel washing facilities will be required to be used for all vehicle movements from the Premises.

The Licence Holder will be required to ensure that prior to leaving the Premises, all trucks have their load areas dampened or covered to prevent dust emissions arising from the load area of the truck.

The Licence Holder will be required to ensure dust suppression of stockpiles within the Premises through the use of reticulated sprinklers or a chemical dust suppressant where the surface of product stockpiles will not be disturbed for an extended period of time.

The Licence Holder will be required to ensure dust suppression of soil bunds within the Premises through the use of a chemical dust suppressant within two months of the date the Revised Licence is issued.

Grounds: The above controls have been derived from the Licence Holder's current controls. Additional requirements have been included following DER officers visits to the Premises and community feedback to ensure that dust from vehicle movements exiting the Premises are appropriately controlled and to manage the uplift of dust from stockpiles and bunds at the Premises.

10.1.7 Product testing and supply

The Licence Holder must test all finished products in accordance with Section 4.3 of the DER Asbestos Guidelines. Finished products must not be supplied to customers unless testing demonstrates the finished product meets the specification of 0.001% asbestos weight for weight for asbestos content (in any form). Records must be kept for at least two years.

The Licence Holder will be required to report the product testing results annually within a Compliance Report to demonstrate compliance with the above provisions. An interpretive summary shall be provided and shall include a detailed summary on how exceedances of limits were managed.

Note: These controls are derived from DER's Asbestos Guidelines, which the Licence Holder has implemented as part of its Asbestos Management Plan (2013).

10.1.8 Noise emission controls

The Licence Holder will be required to adhere to specified hours of operation and to maintain the noise bund located on the western side of the Premises boundary.

Note: These controls have been derived from the Licence Holder's current controls.

10.1.9 Monitoring

The Licence Holder will be required to monitor a suite of analytes to determine and monitor the extent of leachate contamination and landfill gas impacts from the historical landfilling activities at the Premises.

The monitoring of hydrogen sulphide has been included on the licence in response to the concerns of the community relating to odour.

Note: This monitoring is currently being undertaken by the Licence Holder and is appropriate to determine the extent of groundwater contamination and landfill gas impacts from historic landfilling operations at the Premises. These monitoring requirements do not negate requirements under the *Contaminated Sites Act 2003* (CS Act).

10.1.10 Reporting

The Licence Holder will be required to report monitoring results annually within a Compliance Report. A summary of the results should be presented in a tabulated form within the report, raw data will also be required to be submitted in a separate excel document. An interpretive summary and assessment of results against previous monitoring results and relevant assessment levels for water as published in the DER Guideline *Assessment and management of contaminated sites guidelines* (DER, December 2014) should also be provided. Trend graphs should be provided to support the interpretive summary.

The Licence Holder must ensure that sampling and field analysis is undertaken according to the methods specified and that sample analysis is conducted by laboratories with current NATA accreditation for the analysis specified.

Grounds: Reporting requirements have been revised to ensure appropriate information is submitted to assess groundwater and landfill gas impacts and to determine any impacts from the historical landfilling activities as well as current operations. These reporting requirements do not negate requirements under the CS Act.

11. Determination of Licence conditions

The conditions in the Revised Licence in Attachment 1 have been determined in accordance with DER's *Guidance Statement: Setting Conditions*.

DER's *Guidance Statement: Licence Duration* has been applied and the Revised Licence expires in 3 years from date of issue.

Table 27 provides a summary of the conditions to be applied to the Revised Licence.

Table 27: Summary of conditions to be applied

Condition Ref	Grounds
Emissions Condition 1	This condition is valid, risk-based and consistent with the EP Act.
Throughput restrictions 2 and 3	These conditions are valid, risk-based and contain appropriate controls (see section 10 of this Decision Report)
Waste type restrictions and waste classification 4, 5, 6, 7, 8 and 9	
Waste processing restrictions 10	
Waste acceptance and load inspection 11, 12, 13, 14, 15, 16 and 17	
Stockpile management 18	
Infrastructure and equipment 19, 20 and 21	
Dust emission controls 22, 23, 24, 25, 26, 27 and 28	
Product testing and supply 29, 30, 31, 32 and 33	
Noise emission controls 34 and 35	
Monitoring requirements 36, 37 and 38	
Record-keeping 39 and 40	These conditions are valid and are necessary administration and reporting requirements to ensure compliance.
Reporting 41, 42 and 43	

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

12. Licence Holder's comments

The Licence Holder was provided with the draft Decision Report and draft Revised Licence on 14 June 2017. The Licence Holder provided comments which are summarised, along with DER's response, in Appendix 3 of this Decision Report.

13. Conclusion

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

This assessment was also informed by a site inspection by DER officers on 23 May 2017.

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

Ruth Dowd
Senior Manager Industry Regulation (Waste Industries)

Delegated Officer
under section 20 of the *Environmental Protection Act 1986*

Appendix 1: Summary of submissions and other decision making authorities' comments

The Department received 25 submissions in relation to the Licence Review. These submissions may relate to individuals, community groups or government agencies.

Aspect	Number of submissions	Summary of submission points	DER's response
Noise	5	Concerns relating to the noise emanating from the Premises. The use of heavy machinery causing excessive noise.	The risks associated with noise have been considered in Section 9.6 of this Decision Report. The Licence Holder has undertaken and submitted noise monitoring results and additional controls have been included in the Licence to ensure compliance with the Noise Regulations and to ensure risks associated with noise are managed to acceptable levels.
Dust	18	The dust management is not efficient and concerns with the Licence Holder complying with the dust control conditions. There are issues with the dust migrating over the site given the prevailing winds and during the dryer months. The dust emissions effect air conditioning units, damages outdoor furniture, cars and solar panels. There is a concern with the level of the dust in the area and the close proximity to a child care centre and the potential long term impacts to exposure to	The risks associated with dust have been considered in Section 9.4 of this Decision Report. Additional controls relating to the management of dust emissions have been included in the Revised Licence to manage risks to public health and the environment to acceptable levels. DER will undertake periodic compliance inspections on the premises to identify whether these controls are being appropriately implemented and to verify that the dust controls are adequate.

		the dust and particulates. Health concerns involved with the amount of dust produced on site that may be in breach of OHS legislation. Dust has caused issued with employees causing asthma attacks. Dust causing health concerns including asthma, allergies, hay fever, bronchitis and reduced lung function. The dust emissions have had an impact of commercial companies that have caused damage to machinery, products and cars. The vegetation buffer has been removed resulting in more dust impacts.	
Vibration	3	Residents have noticed an increase of cracking of houses that is thought to be from the vibration noise at the Premises.	Vibrations associated with noise are outside the scope of DER's jurisdiction.
Asbestos	4	There is no guarantee that the building material being disposed of does not contain asbestos. Concerns that the material contains asbestos material and that is being crushed therefore concerns about the health implications of asbestos fibres in the dust emissions.	The risks associated with asbestos have been considered in Section 9.5 of this Decision Report. Controls relating to asbestos have been included in the Revised Licence to manage risks to public health. DER will undertake periodic compliance inspections to identify whether the controls are being appropriately implemented.

Vermin / Pests	4	Rubbish on site leads to the vermin and pests issues and increases the amount of snakes in the area.	Vermin and pests are not considered to be a reasonably foreseeable risk of the operations given the nature of materials handled at the Premises. The Revised Licence imposes restrictions on the types of waste which may be accepted at the Premises.
Visual amenity	13	Large stockpiles should have a limit. The Premises previously had vegetation screening along the boundary which has now being removed causing an reduction in aesthetic value.	Visual amenity lies outside the scope of DER's jurisdiction. Under the EP Act DER regulates emissions and discharges from prescribed premises. Visual amenity is a planning issue. The risk of dust emissions from the Premises has been considered in Section 9.4 of this Decision Report.
Groundwater contamination	2	Leachate from the landfill may be contaminating the groundwater which is used by residents by bores.	The risks associated with leachate from historical landfilling activities have been considered in Section 9.8 of this Decision Report. Groundwater monitoring and reporting requirements have been included in the Revised Licence.
Odour	1	Unpleasant odours.	The Revised Licence imposes restrictions on the types of waste which may be accepted at the Premises. An additional monitoring requirement has been

			included in the Revised Licence to monitor hydrogen sulphide.
Other	8	Residents were advised that this site would be closing down within a year or two, which was six years ago and replaced with a housing development with public open spaces. Effects people's quality of life. This site has a negative impact on the value of houses in the area. Phosphates in the pool. Increased traffic. Concerns about the increase in throughput should be restricted. Concerns regarding the large stockpiles and teenagers accessing the site with mountain bikes.	The Delegated Officer has assessed the Application under Part V of the EP Act and has considered the reasonably foreseeable risks associated with the general operations of the Premises including dust, noise, asbestos and leachate emissions as documented in this Decision Report. The City of Wanneroo should be contacted in regards to the land use planning and development of the site, as well as traffic considerations and stockpile heights. It is noted that the Licence Holder is seeking to close the site and remediate and DER is expecting an application in the near future to progress this.

Community Consultation

DER notes that the community within the City of Wanneroo including suburbs of Darch, Landsdale and Madeley has submitted a petition to the City of Wanneroo in regards to the Premises on 31 March 2016. The concerns raised by the community have been addressed by the submissions in table above.

Appendix 2: Key documents

In-text references			
	Document Title	**In text ref**	**Availability**
1.	Bureau of Meteorology - Climate data online. Accessed 26 May 2017.	BoM 2017	http://www.bom.gov.au/climate/data/
2.	Department of Environment and Conservation, 2012. *Guidelines for managing asbestos as construction and demolition waste recycling facilities.*	DEC 2012	https://www.der.wa.gov.au/our-work/licences-and-works-approvals/publications
3.	Department of Environment and Regulation, 2014. *Assessment and management of contaminated sites Contaminated sites guidelines.*	DER 2014	accessed at http: https://www.der.wa.gov.au/your-environment/contaminated-sites/61-contaminated-sites-guidelines
4.	Department of Environment Regulation (26 November 2009). Letter *Notice of a classification of a known or suspected contaminated site given under section 15 of the contaminated sites act 2003.*	DER 2009	DER records (A49066) Note: a basic summary of records containing the same information is available via the DER Contaminated Sites Database online. https://secure.dec.wa.gov.au/idelve/css/
5.	Department of Health, 2014. *Contaminated Sites Ground and Surface Water Chemical Screening Guidelines.*	DoH 2014	http://ww2.health.wa.gov.au/~/media/Files/Corporate/general%20documents/Environmental%20health/Ground%20and%20Surface%20Chemical%20Water%20Screening%20Guidelines.ashx
6.	Department of Water – Water Register. Accessed 8 May 2017.	DoW 2017(a)	https://maps.water.wa.gov.au/#/webmap/register
7.	Department of Water - Perth Groundwater Atlas. Accessed 13 April 2017.	DoW 2017(b)	http://atlases.water.wa.gov.au/idelve/gwa/
8.	Department of Water – Perth Groundwater Map. Accessed 2 June 2017.	DoW 2017(c)	accessed at https://maps.water.wa.gov.au/#/webmap/gwm
9.	Enpoint, 2017. *2016 Annual Environmental Report, Non Organic Disposals, Lot 1 on Plan 69382 Driver Road, Darch*.	Enpoint 2017	DER records (A1396171)
10.	Herring and Storer, Non Organic Disposals Environmental Noise Assessment.		DER records (A1408561)

11.	National Health and Medical Research Council / Agriculture and Resource Management Council of Australia and New Zealand, 2011. *Australian Drinking Water Guidelines.*	NHMRC/ARMC ANZ 2011	https://www.nhmrc.gov.au/guidelines-publications/eh52
12.	Peter Margetic and Luwam Araya, 2013. Non Organic Disposals Environmental Improvement Plan incorporating the site Asbestos Management Plan.	Asbestos Management Plan 2013	DER records (A950547)
13.	Shivak, J. (4 April 2017). Letter *Environmental Protection Act 1986: Licence Renewal Application*. Submitted within licence renewal application received by DER 6 April 2017.	Shivak 2017 [letter]	DER records (A1408561)
Other documents			
	Document Title	**In text ref**	**Availability**
14.	DER *Guidance Statement on Regulatory principles,* July 2015	DER 2015a	accessed at http://www.der.wa.gov.au
15.	DER *Guidance Statement on Setting conditions,* September 2015	DER 2015b	
16.	DER *Guidance Statement on Licence duration,* November 2014	DER 2014	
17.	DER *Guidance Statement on Risk Assessments* November 2016	DER 2016a	
18.	DER *Guidance Statement on Decision Making,* November 2016	DER 2016b	
19.	DER *Guidance Statement on Environmental Siting*. November 2016	DER 2016c	

Appendix 3: Summary of applicant's comments on risk assessment and draft conditions

Condition	Summary of Licence Holder comment	DER response
17	The Licence Holder would like to amend the date from one month to three months, to ensure that any timber, plastics and scrap metal wastes removed during the sorting and screening processes are removed from the Premises and thereafter must ensure that these wastes are removed from the Premises on a weekly basis. The Licence Holder also requested that the following comment be included in the condition: The existing timber and plastic waste currently on site will be disposed of in accordance with the revised programme dated June 2017	DER is not considering the revised programme dated June 2017 submitted by the Licence Holder at this time, therefore it has not been included in this condition. DER has considered the request to extend the timeframe of removal of non-conforming wastes. However DER is of the view that the Licence Holder has already been given notice of this requirement and an ample timeframe to remove the non-conforming waste as discussed in Section 5.2.4. DER will therefore only grant a two week extension to the initial time frame DER amended the date in condition 17 to six weeks from the date of issue of the Revised Licence.
18	Licence Holder agrees with the condition as written.	DER notes the Licence Holder comments.
19	Licence Holder agrees with the condition as written.	DER notes the Licence Holder comments.
20	Licence Holder would like to amend the condition to state 3 months from date of issue of licence, to install a wheel washing facility.	DER has accepted the proposed amendment to 3 months, considering the Revised Licence is being granted in June and Perth is likely to have a higher rainfall during the winter months, which is likely to reduce the potential for dust emissions.
21	Table 5, Row 1, Column 2 the Licence Holder would like clarification on what detail is required for the Operational Requirements. Additional information was provided by the Licence Holder.	DER has included the operational requirements provided by the Licence Holder.

Condition	Summary of Licence Holder comment	DER response
23	Licence Holder agrees with the 3 month time period to implement the use of automated sprinklers, but would like to see a provision in this clause allowing the re-shaping, lowering of stockpile height to allow permanent dust suppression (as per condition 23) to reduce the scope of automated reticulation (water usage).	DER has considered that condition 23 is outcome based and has accepted that the Licence Holder may use either automated sprinklers or effective chemical dust suppressant as a means of preventing visible uplift of dust. Condition 23 and 24 have been amended. DER acknowledges that stockpile shape may need modification to accommodate the effective use of dust suppression. Specifically, to accommodate the placement and spray coverage of sprinklers and the effective application of chemical dust suppressant. To ensure that re-shaping of stockpiles does not result in infilling activities, an additional requirement has been included in Condition 10, Table 4 that states that 'no infilling of waste should take place on site'.
24	Licence Holder agrees with the condition and notes that there is approximately 5,000m² of bund surface area to Driver and Funiss Roads.	DER notes the Licence Holder comments.
Schedule 2	Table 7 Plan Reference has been updated by the Licence Holder.	DER notes the Licence Holder comments.
N/A	As noted in our meeting, the portion of the licence associated with testing, data form, reporting, interpretation etc. for asbestos requires the inclusion of ACM at .01% (w/w) (pages 30 & 31) as per the DoH and DER issued guidelines. As stated, I have a number of issues with the guideline for managing asbestos on C13, 62 sites, but that	DER notes the Licence Holder comments.

Condition	Summary of Licence Holder comment	DER response
	will (I suspect) remain an ongoing issue, as at present the guideline is the only spanner in the toolbox with regard to licence regulation (relevant to asbestos management). Furthermore, my belief is that the material produced should be treated as a single strata (as defined in the CS Regs) due to the feed being homogeneous which translates into the output being the same, that is of being a single strata and treated as such within interpretation of sample results. This can be demonstrated by the fact that if say 40,000 m3 of tested sand was taken from a producer and used as fill in a civil project, it would (under the CS Regs) at any future date be treated as a single strata.	
N/A	Apart from my comments yesterday, I do not take the product sizes (page 29) as a given, this at present is of no real significance (but often what is deemed as such becomes significant over time). My contention is referenced to the classification of “Recycled drainage rock”. BG load bearing retention / drainage cells constructed of crushed rock typically contain < 60 – 100 mm material, the <20 – 27mm material is typically used as aggregate in forming a composite product. I understand this is not up for debate within the context of the licence and it is stated as per the guideline. What the stated classifications achieve, in my interpretation, is the omission of < 60 – 100 mm aggregate from being a “main recycled product”.	DER notes the Licence Holder comments.

Attachment 1: Revised Licence L6832/1997/13