Government of Western Australia
Department of Water and Environmental Regulation

Amendment Notice 1

Licence Number	L8889/2015/1
Licence Holder	Eastern Metropolitan Regional Council
File Number:	DER2015/000777
Premises	Red Hill Waste Management Facility Lot 11 on Diagram 69105, Lot 2 on Diagram 68630 and Lot 1 on Diagram 15239 Toodyay Road, Red Hill and Lot 12 on Plan 26468 Toodyay Road, Gidgegannup.
Date of Amendment	6 September 2017

Amendment

The Chief Executive Officer (CEO) of the Department of Water and Environmental Regulation (DWER) has amended the above Licence in accordance with section 59 of the *Environmental Protection Act 1986* as set out in this Amendment Notice. This Amendment Notice constitutes written notice of the amendment in accordance with section 59B(9) of the EP Act.

Date signed: 6 September 2017

Alan Kietzmann

Manager Licensing, Waste Industries

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

Definitions and interpretation

Definitions

In this Amendment Notice, the terms in Table 1 have the meanings defined.

Table 1: Definitions

Term	Definition
AER	Annual Environment Report
Application	Licence amendment application submitted by EMRC on the 7 June 2017 seeking Part V approval for the acceptance, handling and landfilling (disposal) of Perfluoroalkyl and Polyfluoroalkyl Substances (PFAS) contaminated wastes within existing Class III landfill cells on the Premises.
Category/ Categories/ Cat.	categories of Prescribed Premises as set out in Schedule 1 of the EP Regulations
CEO	means Chief Executive Officer. CEO for the purposes of notification means: Director General Department Administering the *Environmental Protection Act 1986* Locked Bag 33 Cloisters Square PERTH WA 6850 info-der@dwer.wa.gov.au
CS Act	*Contaminated Sites Act 2003* (WA)
Delegated Officer	an officer under section 20 of the EP Act
DWER	Department of Water and Environmental Regulation
EMRC	Eastern Metropolitan Regional Council
EPA	Environmental Protection Authority
EP Act	*Environmental Protection Act 1986* (WA)
EP Regulations	*Environmental Protection Regulations 1987* (WA)
Existing Licence	The Licence issued under Part V, Division 3 of the EP Act and in force prior to the commencement of and during this Review
Licensee	Eastern Metropolitan Regional Council
MS	Ministerial Statement
Occupier	has the same meaning given to that term under the EP Act.

PFAS	Perfluoroalkyl and Polyfluoroalkyl Substances
Prescribed Premises	has the same meaning given to that term under the EP Act.
Premises	refers to the premises to which this Amendment Notice applies, as specified at the front of this Notice.
Risk Event	as described in *Guidance Statement: Risk Assessment*

Amendment Notice

This amendment is made pursuant to section 59 of the *Environmental Protection Act 1986* (EP Act) to amend the Exiting Licence L8889/2015/1 issued under the EP Act for a prescribed premises as set out below. This notice of amendment is given under section 59B(9) of the EP Act.

This notice is limited only to an amendment for Category 64 in relation to the proposed acceptance, handling and landfilling (disposal) of Perfluoroalkyl and Polyfluoroalkyl Substances (PFAS) contaminated solid wastes. No changes to the aspects of the Existing Licence relating to Category 12, 62, 65 and 67A have been requested by the Licensee.

The following guidance statements have informed the decision made on this amendment

- *Guidance Statement: Regulatory Principles (July 2015a);*
- *Guidance Statement: Decision Making (February 2017a);*
- *Guidance Statement: Risk Assessment (February 2017b);*
- *Guidance Statement: Land Use Planning (February 2017);*
- *Guidance Statement: Environmental Siting (November 2016); and*
- *Guidance Statement: Setting Conditions (October 2015b).*

Application details

Table 2 lists the documents submitted during the assessment process. Historical information submitted by the Licensee in respect of the Existing Licence has also been considered as part of this Review – refer to Appendix 1 for a list of key documents related to this Amendment Notice.

Table 2: Documents and information submitted as part of the Application

	Document/information description	Date received
1	Licence Application Form – 6 June 2017 (EMRC)	7 June 2017
2	Licence Amendment – Supporting Documentation: Strategen Environmental Consultants Pty Ltd, June 2017. *Red Hill Waste Management Facility Licence Amendment Supporting Document. Prepared for Eastern Metropolitan Regional Council.*	
3	Rationale for the basis of the existing groundwater monitoring network within the proposed area: MS Groundwater Management Pty Ltd (MSGM), July 2017. *Acceptance and Disposal of Perflurooctane sulfonate (PFOS) and Perfluorooctanoic acid (PFOA) contaminated wastes*. *A report to Eastern Metropolitan Regional Council.*	20 July 2017

Document/information description		Date received
4	Additional information on the bore geological and well construction logs for the proposed groundwater monitoring sites; provided by email from Sandra Evans - Manager, Environmental Operations (Waste Services)	8 August 2017

Amendment description

On the 7 June 2017 the Eastern Metropolitan Regional Council (EMRC) (Licensee) submitted an Application to amend the Existing Licence seeking Part V approval for the acceptance, handling and landfilling (disposal) of PFAS contaminated wastes within existing Class III landfill cells on the Premises; namely within Farm Stage 1 and 2 and the Stage 15 landfill cell. The Existing Licence currently permits the operation of Class III and IV landfills within the Premises.

Refer to Figure 1 in Attachment 1 for the Site Plan depicting current Class III landfill cells.

The Licensee is not proposing any changes to the design or throughput capacity of the existing landfill cells which are proposed to be used.

Background on the management of PFAS contaminated solid wastes

PFAS are a family of manufactured chemicals which do not occur naturally in the environment. Perfluorooctane sulfonate (PFOS) and perfluorooctanoic acid (PFOA) are two of the most well-known PFAS and are contaminants of emerging concern in Australia and internationally. PFOS and PFOA are known to be persistent, bio-accumulative and toxic and, due to their persistence in the environment and moderate solubility, can be transported long distances in water and air, and transfer between different media (for example soil, sediment, surface water and groundwater). They have been identified in the environment at a number of known and suspected contaminated sites in Western Australia (DER, January 2017c).

In accordance with the DWER *Interim Guideline on the Assessment and Management of Perfluoroalkyl and Polyfluoroalkyl Substances (PFAS)* (DER, January 2017c), Landfill operators licensed under Part V of the EP Act intending to accept PFAS contaminated waste must apply to DWER for an amendment to their licence to allow this waste to be accepted/disposed.

Interim leachable concentration (ASLP) and concentration limit (CL) values for the classification of PFAS contaminated solid wastes are specified in the aforementioned DWER *Interim PFAS Guideline* (DER, January 2017c) as is criteria relating to the siting of the landfill; the guideline states that landfills accepting PFAS containing wastes must not be located:

- on very high or high vulnerability aquifers;
- within 1000m of a surface water body that supports an aquatic environment (including groundwater dependent ecosystems); or
- within 1000m of a surface water drain that is connected to groundwater and/or discharges directly into an aquatic environment (including groundwater dependent ecosystems) or a water body that supports fish species that may be caught and consumed.

Proposed waste acceptance, handling and disposal

The Application indicates that EMRC propose to accept PFOS, PFOA and perfluorohexane sulfonate (PFHxS) contaminated solid wastes for disposal which meet the interim Class III criteria presented in Table 6 of the *Interim Guideline on the Assessment and Management of Perfluoroalkyl and Polyfluoroalkyl Substances (PFAS)* (DER, January 2017c).

EMRC have proposed the following waste acceptance procedures relating to PFAS contaminated solid wastes:

- The waste consigner or generator is to ensure that wastes have been characterised in

accordance with the *Landfill Waste Classification and Waste Definitions 1996 (As amended December 2009)* and includes the analysis of PFOS + PFHxS, and PFOA concentrations and any other potential contaminants which may be present in the material. The pH of the PFAS wastes is also required to be between 3.5 and 10 to be acceptable for disposal in the Class III cells;

- Evidence of waste characterisation is to be provided to the ERMC for assessment. If the waste can be accepted for disposal then EMRC will issue the waste consigner/generator with a 'Waste Acceptance Approval', which must be presented at the Weighbridge;
- Waste materials are then weighed at the weighbridge prior to disposal.
- As per existing waste placement procedures, contaminated materials are to be offloaded by direct tipping into the receiving landfill cell, within which leachate control systems are in place. Material is then moved and worked within the cells.
- All Class III waste is compacted and covered daily to prevent contaminated material mobilising as surface generated dust.

The Application indicates that EMRC currently have a comprehensive set of supplementary notes to aid its customers in following the correct waste disposal application procedures. EMRC also provide information on the correct sampling techniques and the importance of laboratory analysis to be performed within specific holding times. These supplementary notes are to be revised to provide for the testing and classification of PFAS in order for EMRC to determine the acceptability of the material for disposal within its Class III cells.

Surface water and groundwater monitoring

Red Hill Waste Management Facility is located on the divide of three surface water catchments; Christmas Tree Creek which enters Jane Brook, Susannah Brook and Strelley Brook.

The Application indicates that appropriate contouring is maintained in the active landfill cells at all times so that direct rainfall is retained and diverted to the existing leachate collection ponds. The Existing Licence also includes regulatory controls which require the Licensee to ensure that stormwater is diverted from filled areas of the site to dedicated stormwater drains.

DWER notes that the Existing Licence does not currently include requirements to monitor surface water or groundwater.

As outlined in the Section '*Legislative context – Part IV of the EP Act'* (in this Notice) the premises is currently subject to several Ministerial Statements (MS) under Part IV of the EP Act, of which there are requirements relating to surface water and groundwater management and monitoring for the site. EMRC has historically provided a summary of the results obtained from these ongoing monitoring programs within the annual monitoring reports provided in accordance with condition G3 of the Existing Licence.

<u>Current and proposed surface water monitoring program:</u>

EMRC currently monitor twelve (12) surface water monitoring stations (on and off-site) bi-annually in April and October, with the exception of creek lines which are monitored when flowing during the winter and spring months. EMRC also engages suitably qualified biologists to undertake yearly macroinvertebrate study in stream systems surrounding the facility.

Analytical results are interpreted against historical trends and any anomalies or exceedances are subject to further investigation. EMRC have also derived voluntary water discharge quality criteria for the premises; this criterion was developed in consultation with the former Department of Environment (DoE) and Swan River Trust. Criteria are based upon the *Australian and New Zealand Guidelines for Fresh and Marine Water Quality* (ANZECC, 2000), and the *Swan Canning Clean-up Program Action Plan* (Swan River Trust, 1999).

EMRC propose to carry-out additional surface water sampling for PFAS at several existing on- and off-site surface water monitoring sites (CTC1, CTC2, S7, and FSP1); refer to Figure 2 in Attachment 1 which depicts the location of the proposed sampling points. The proposed sites comprise a mixture of stormwater collection/holding points and surface water systems (Christmas Tree Creek). Note: EMRC originally proposed to monitor 'FSP2', as depicted in Figure 2, as part of the proposed surface water monitoring program however, further rationalisation was provided by EMRC to remove this monitoring point – refer to Appendix 3 (Licensee comments on draft Amendment Notice).

Analytical results are to be assessed against the interim screening levels, as specified in Table 4 of the *Interim Guideline on the Assessment and Management of Perfluoroalkyl and Polyfluoroalkyl Substances (PFAS)* (DER, January 2017c).

Consistent with existing reporting protocols, analytical results will be reported annually to DWER in the Annual Monitoring Report.

Current and proposed groundwater monitoring program:

Groundwater at the premises is currently monitored on a quarterly basis and analysed for a range or inorganic and organic parameters. Information provided in the Application indicates that there are currently 47 bores that are monitored around the facility.

Results of the ongoing groundwater water monitoring program are subject to a Tier 1 screening risk assessment and assessed against the following criteria:

- *Australian and New Zealand Guidelines for Fresh and Marine Water Quality – Fresh Water* (ANZECC, 2000);
- *Australian and New Zealand Guidelines for Fresh and Marine Water Quality – Long term Irrigation Wate*r (ANZECC, 2000); and
- *Contaminated Sites Ground and Surface Water Chemical Screening Guidelines* (DoH, 2014).

EMRC propose to carry-out additional groundwater sampling for PFAS at several existing on-site groundwater monitoring sites. Figure 3 and 4 in Attachment 1 depicts the location of the proposed sampling points for the Farm Stage 1 and 2 and for Stage 15. Supporting information provided with the Application (MSGM, July 2017) provides a detailed rationale for the adequacy of the proposed groundwater monitoring network as summarised below:

- bore logs and historical standing water level results indicates that there is a regional groundwater table, largely within weathered granite or within the extensive saprolite grits often semi-confined by pallid zone clays;
- ephemeral perched groundwater is also present over the winter and post-winter period, associated with shallow lateritic sediments mainly on low lying areas which have developed above pallid zone clays;
- groundwater flow in the regional groundwater table is expected to be associated with saprolite grits where these were present or through fracture systems within the weathered granites and/or dolerites;
- depth to groundwater level within the site ranges from 284 to 240m (Australian Height Datum (AHD); being 4-25m below ground surface;
- flow direction on-site is complex with a groundwater divide extending from bore FMB8 south-west to bore SP38D (see Figure 5 – Attachment 1 for groundwater contours); north of the divide, groundwater flows northwest to west-northwest, and to the south of the divide groundwater flows southwest to southerly with moderate hydraulic gradients.
- Farm Stage 1 and 2 are located north of the groundwater divide with groundwater flows to the north-west and west-north-west (Figure 5 – Attachment 1). Bores SP44D,

FMB5, FMB6, FMB7 and FMB8 are proposed to be used;

  - FMB7 and FMB8 are considered to be situated north-east of the divide and therefore water quality is considered to be representative of background water quality;
  - FMB5 and FMB6 are directly down-gradient of the cells; and
  - SP44D is up and cross gradient of the cells.

- Stage 15 is located to the south of the groundwater divide with groundwater flows to the south-west and southerly (Figure 5 – Attachment 1). Bores SP4D, SP5D, SP36D, SP37D, SP38D and SP42D are proposed to be used;
  - SP38D is considered to be up-gradient of the site;
  - SP36D, SP37D and SP4D are directly down-gradient;
  - SP42D is down to cross gradient; and
  - SP5D is further down gradient and located outside of the premises boundary within Lot 82 on Diagram 18309 Parkerville (land is owned by EMRC).

Anyaltical results are to be assessed against the interim screening levels, as specified in Table 4 of the *Interim Guideline on the Assessment and Management of Perfluoroalkyl and Polyfluoroalkyl Substances (PFAS)* (DER, January 2017c).

Consistent with existing reporting protocols, analytical results will be reported annually to DWER in the Annual Monitoring and Compliance Report.

Key findings:

Surface water monitoring: the **Delegated Officer** considers the proposed monitoring network to be adequate for targeted PFAS analysis. Given existing controls relating to retaining direct captured rainfall within landfill areas and diverting to existing leachate collection ponds, it is unlikely that surface water run-off would occur from active landfill areas.

Groundwater monitoring: the **Delegated Officer** considers that the proposed monitoring network around Farm Stage 1 and 2 appears to be adequate for targeted PFAS analysis. However, for Stage 15 there appears to be a gap in monitoring infrastructure along the central-western boundary and south-western corner. Flow contours across Stage 15 indicate a south-westerly to southerly flow across the site. EMRC have not proposed to install any additional monitoring infrastructure in these areas nor have they provided rationale for not including monitoring points in these locations.

Licence Review

DWER is currently undertaking a review of the Licence in accordance with DWER's risk-based regulatory framework. The review will involve the examination of all existing operations to ensure that controls are commensurate to the associated public health and/or environmental risk and to ensure that appropriate of regulatory controls are in place.

The review will also consider regulatory requirements imposed through Ministerial Statements issued under Part IV of the EP Act to assess potential duplication. Existing requirements imposed under Part IV such as groundwater and surface water monitoring will also be reviewed to determine if additional licence conditions are need on the Part V licence, consistent with those imposed under Part IV.

The review is a separate process to this Amendment Notice.

Legislative context – Part IV of the EP Act

The premises is currently subject to three Ministerial Statements (MS) under Part IV of the EP Act. In regulating the premises under Part V, Division 3 of EP Act, DWER will seek to avoid duplication of requirements imposed under Part IV. Pursuant to section 59B(7) of the EP Act, DWER will also not amend a Part V licence that is contrary to, or otherwise than in accordance with, an implementation agreement or decision.

A summary of the respective MS's is provided below while a detailed summary is presented in Appendix 2.

- MS 274 (15 July 1992) – Relates to the Red Hill Waste Management Facility Extension;
- MS 462 (21 November 1997) – Relates to the establishment of Class IV waste disposal cells at the existing Red Hill Waste Management Facility; and
- MS 976 (9 July 2014) – Relates to the proposal to construct and operate a resource recovery facility within the existing Red Hill Waste Management Facility, for the processing of waste to produce energy, using either anaerobic digestion or gasification technology.

MS 274 and 462 are the main Statements that relate to the construction, operation and post closure management of waste handling and landfilling aspects at the Red Hill Waste Management Facility. The proposed licence amendment does not propose to alter or duplicate requirements covered under these existing Statements.

Legislative context – *Contaminated Sites Act 2003*

The premises is classified as '*Contaminated - remediation required'* under the *Contaminated Sites Act 2003*. The reasons for classifications state that groundwater beneath the southern portion of the site has been impacted by landfill leachate and contains metals and nutrients.

Amendment history

Table 3 provides the amendment history for L8889/2015/1

Table 3: Licence amendments for L8889/2015/1

Instrument	Issued	Amendment
L8889/2015/1	17/03/2016	Construction of a green-waste processing hardstand pad and associated relocation of existing green-waste processing operations.
L8889/2015/1	06/09/2017	Amendment Notice 1 – approval to accept and bury PFAS contaminated solid waste in existing Class III landfill cells (Farm Stage 1 and 2 and Stage 15)

Location and receptors

Table 4 below lists the relevant sensitive land uses in the vicinity of the Prescribed Premises which may be receptors relevant to the proposed amendment.

Table 4: Receptors and distance from activity boundary

Residential and sensitive premises	Distance from Prescribed Premises
Semi-rural residential areas and farms	Immediately to north and north-east of the Premises; multiple Lots ranging from approximately 350m to 1.5km from Farm Stage 1/2 landfill operations and 750m from the Stage 15 landfill operation. Immediately to the east of the Premises (Lot 12); Barbarich Estate comprising of multiple Lots ranging approximately from 800m from Farm Stage 1/2 and 1km from Stage 15. To the south and south-east of the Premises; multiple Lots ranging from approximately 750m from Stage 15 and 1.3km from Farm Stage 1/2. Lots are separated from the Premises by a vegetation buffer (approx. 260m to 400m wide) located on Lot 82 on Diagram 18309 and Lot 501 on Plan 40105, Parkerville (owned by EMRC), followed by a drainage/public recreation reserve (approx. 50m-125m wide) on Lot 62 on Plan 23731 and Lot 15403 on Plan 40033, Parkerville (vested in the Shire of Mundaring).

Table 5 below lists the relevant environmental receptors in the vicinity of the Prescribed Premises which may be receptors relevant to the proposed amendment.

Table 5: Environmental receptors and distance from activity boundary

Environmental receptors	Distance from Prescribed Premises
John Forrest National Park Lot 11664 on Plan 217947, Red Hil – Crown Reserve 7537	Located immediately to the south of the Lot 11 and 2 of the Premises and to the south-west from the remainder of the Premises.
Threatened / Priority Fauna – Mammals and Birds	Priority Fauna P4 (mammals) – mapped as being observed within Lot 1 of the Premises in previously landfilled areas currently subject to rehabilitation. Fauna Survey date 29/10/2014 Priority Fauna P4 (mammals) – mapped as being observed within Lot 1 of the Premises in previously landfilled areas currently subject to rehabilitation. Fauna Survey date 18/05/2012 Birds (Schedule 5 – Migratory birds protected under an international agreement); mapped as being observed within Lot 2 of the Premises in previously landfilled areas currently subject to rehabilitation. Fauna Survey dates 29/10/2014 and 04/11/2015 Birds (Schedule 3 – Fauna that is rare or is likely to become extinct as vulnerable fauna); mapped as being observed within Lot 2 of the Premises in previously landfilled areas currently subject to rehabilitation. Fauna Survey dates 29/10/2014 and 04/11/2015.
Designated Area – Surface Water Area	The entire Premises and surrounding land is mapped as proclaimed surface water area under the *Rights in Water Irrigation Act 1914* named the “Swan River System”.
Susannah Brook (Significant Stream)	Approximately 1km to the north of the Premises and 1.2km from Stage 1/2 operations. Multiple related drainage lines (classed as minor, perennial watercourses) also run north-south of Susannah Brook; the closest is located approximately 250m north of Farm Stage 1/2 with Lot 51 (1157) Toodyay Road, Gidgegannup.
Christmas Tree Creek (Watercourse - minor, perennial)	Approximately 370m to the south of the Premises and 680m from the Stage 15 site. Christmas Treek Creek eventually discharges to Jane Brook.

Table 6 below summaries the hydrogeology and groundwater characteristics for the Premises as reported in the supporting information provided with the Application (MSGM, July 2017 and Strategen Environmental Consultants Pty Ltd, June 2017).

Table 6: Hydrogeology for the Premises

Environmental aspect	Description
Hydrogeology	The geology of the region is characteristic for that of the Yilgarn Craton, being dominated by granitic basement rocks with occasional intrusive dolerite dykes, weathered basement and weathered duplex soils. The latter consist broadly of ferruginous and lateritic gravels or lateritic hardpans, underlain by white and cream clays (referred to generally as the pallid zone) and with saprolite grits (clayey gravels and clays) overlying weathered basement. The thickness of the various duplex soils and weathered zones can vary significantly across sites such as Red Hill. The geology is not consistent with the attributes of a high or very high vulnerability aquifer, with very low permeable features.
Groundwater	There are two distinct water bearing layers underlying the site: • The upper layer comprises of a perched water table associated with shallow lateritic sediments mainly on low lying areas which had developed above pallid zone clays (impermeable layer of kaolinitic clays). Perched aquifers are reported to limited in there lateral extent and ephemeral over/post winter. • The lower layer comprises the regional groundwater table within granite bedrock (fracture systems) or within extensive saprolite grits (porous, weathered bedrock) often semi confined by pallid zone clays. Based on the inferred regional groundwater contours in the bedrock (granite) aquifer the site exhibits a groundwater divide that extends across the northern part of the site (following topography); north of the divide groundwater flows north-west to west-northwest, and to the south of the divide flows are to the south-west to southerly with moderate hydraulic gradients. The base of Farm Stage 1/2 and Stage 15 have been constructed to maintain a three metre separation distance between the base of the landfill and the underlying regional groundwater table. The depth to groundwater varies across the site.

Risk assessment

Table 7 below describes the Risk Events associated with the amendment consistent with the *Guidance Statement: Risk Assessments*. Both tables identify whether the emissions present a material risk to public health or the environment, requiring regulatory controls.

DWER has given consideration to the following aspects in its assessment:

- siting of the landfill;
- landfill controls (design of the existing Class III landfill cells and design of existing leachate management and control systems);
- landfill management practices; and
- proposed groundwater and surface water monitoring program

Table 7: Risk assessment for proposed amendments during operation

Risk Event						Conse-quence rating	Likeli-hood rating	Risk	Reasoning
Source/Activities		Potential emissions	Potential receptors	Potential pathway	Potential adverse impacts				
Cat 64 *Class III putrescible landfill site*	Acceptance and burial of Class III PFAS contaminated solid wastes within Class III cells	**Dust**: associated with waste handling	Semi-rural residential areas and farms – refer to Table 4	Air	Health and amenity impacts to residents	Slight	Possible	Low	The Delegated Officer considers the dust emissions associated with waste handling of PFAS contaminated waste are likely to be localised with minimal on-site impacts and with emissions only potentially occurring at some time, therefore the resultant risk of dust emissions is Low. All Class III waste is compacted and covered daily to prevent contaminated material mobilising as surface generated dust. Appropriate regulatory controls are already in-place on the Existing Licence to ensure appropriate compaction and coverage of waste. The Licensee also implements several dust suppression activities which includes the use of water trucks which can be deployed to control dust emissions during unloading and handling activities.
		Odour	Semi-rural residential areas and farms – refer to Table 4	Air	Amenity impacts to residents	Slight	Unlikely	Low	The Delegated Officer considers that PFAS contaminated wastes, which are likely to be predominantly in the form of soils, are unlikely to be an odorous waste therefore the resultant risk of odour emissions is Low. All Class III waste is compacted and covered daily to prevent contaminated material mobilising as surface generated dust which will also assist in suppressing any localised odour should they arise. Appropriate regulatory controls are already in-place on the Existing Licence to ensure appropriate compaction and coverage of waste.

Risk Event						Conse-quence rating	Likeli-hood rating	Risk	Reasoning
Source/Activities		Potential emissions	Potential receptors	Potential pathway	Potential adverse impacts				
		Waste: landfill leachate	Susannah Brook – refer to Table 5	Surface water run-off	Eutrophication and contamination of waterway which can disrupt ecosystem function	Major	Unlikely	Medium	Existing controls include appropriate contouring being maintained in active landfill cells at all times so that direct rainfall is retained and diverted to existing leachate collection ponds for storage and evaporation. The Existing Licence also includes regulatory controls which require the Licensee to manage stormwater that has come into contact with waste (leachate) to be either; discharged to sewer; drained to lined evaporation ponds; or allowed to drain (infiltrate) through the landfill so that It can be captured and managed through existing leachate control systems for respective landfill cells. EMRC have proposed to carry-out surface water sampling for PFAS at several existing on- and off-site surface water monitoring sites (CTC1, CTC2, S7, and FSP1) as an additional control measure; refer to Figure 2 in Attachment 1 which depicts the location of the proposed sampling points. The proposed sites comprise a mixture of stormwater collection/holding points and surface water systems (Christmas Tree Creek). The Delegated Officer considers that existing and proposed controls are adequate to manage the risk.
				Transported in groundwater		Major	Unlikely	Medium	Refer to the **Detailed Risk Assessment** below for further information.
			Christmas Tree Creek – refer to Table	Surface water run-off	Eutrophication and contamination	Major	Unlikely	Medium	Existing controls include appropriate contouring being maintained in active landfill cells at all times so that direct

Risk Event						Conse-quence rating	Likeli-hood rating	Risk	Reasoning
Source/Activities		Potential emissions	Potential receptors	Potential pathway	Potential adverse impacts				
			5		of waterway which can disrupt ecosystem function				rainfall is retained and diverted to existing leachate collection ponds for storage and evaporation. The Existing Licence also includes regulatory controls which require the Licensee to manage stormwater that has come into contact with waste (leachate) to be either; discharged to sewer; drained to lined evaporation ponds; or allowed to drain (infiltrate) through the landfilled material so that It can be captured and managed through existing leachate control systems for respective landfill cells. EMRC have proposed to carry-out surface water sampling for PFAS at several existing on- and off-site surface water monitoring sites (CTC1, CTC2, S7 and FSP1) as an additional control measure; refer to Figure 2 in Attachment 1 which depicts the location of the proposed sampling points. The proposed sites comprise a mixture of stormwater collection/holding points and surface water systems (Christmas Tree Creek). The Delegated Officer considers that existing and proposed controls are adequate to manage the risk.
				Transported in groundwater		Major	Unlikely	Medium	Refer to the **Detailed Risk Assessment** below for further information.
			Groundwater – refer to Table 6	Seepage	Contamination of waters or deterioration of local/ regional groundwater quality	Major	Unlikely	Medium	Refer to the **Detailed Risk Assessment** below for further information.

Risk Event						Conse-quence rating	Likeli-hood rating	Risk	Reasoning
Source/Activities		Potential emissions	Potential receptors	Potential pathway	Potential adverse impacts				
					Amenity and health impacts to users (potential potable, non-potable water uses)				

Detailed Risk Assessment

Siting of landfill

The Delegated Officer notes the siting guidance outlined in the DWER *Interim PFAS Guideline* (DER, January 2017c) and that multiple drainage lines (classed as 'minor', 'perennial watercourses') run north-south of Susannah Brook, to the north of the Premises; the closest is located approximately 250m north of Farm Stage 1/2 (refer to Table 5). Christmas Tree Creek (classed as a 'watercourse – minor', 'perennial') is also located approximately 370m to the south of the Premises and approximately 680m from the Stage 15 site (refer also to Table 5).

Notwithstanding the presence of drainage lines and Christmas Tree Creek within 1km from the proposed landfill sites, the Delegated Officer considers that deviations from the siting criteria can be supported through a risk assessment process as outlined in Table 7 and below.

Suitability of existing Class III landfill cells for PFAS contaminated solid waste disposal

The existing Class III landfill cells on the Premises include Farm Stage 1 and 2 and the Stage 15 landfill cell. Each of these landfill cells were previously constructed under respective works approvals as summarised below:

Farm Stage 1 – constructed under works approval W4547/2009/1.

- Landfill liner constructed of 500mm of clay compacted to a permeability of $1x10^{-9}$ m/s, overlain by a 2mm HDPE plastic liner. The leachate collection layer, located above the liner system, uses a network of leachate collection pipes draining to two leachate collection sumps. A leakage detection system was also installed below the HDPE liner.

Farm Stage 2 – constructed under works approval W5291/2012/1.

- Liner constructed of 500mm of clay compacted to a hydraulic conductivity of $1x10^{-9}$ m/s, overlain by a geosynthetic clay liner (GCL) and a 2mm HDPE plastic liner. The leachate collection layer (drainage layer), located above the liner system, uses a network of leachate collection pipes draining to two leachate collection sumps. A Separation Geotextile layer separates the drainage layer from waste placement. A leakage detection system was also installed below the GCL.

Stage 15 – works approval W5684/2014/1

- Liner constructed of 2mm HDPE overlying a GCL and 500mm of clay compacted to a hydraulic conductivity of $1x10^{-9}$m/s. The leachate collection layer (drainage layer), located above the liner system, uses a network of leachate collection pipes draining to two leachate collection sumps. A Separation Geotextile layer separates the drainage layer from waste placement. A leakage detection system was also installed below the GCL.

Independent construction quality assurance (CQA) of Farm Stage 2 and Stage 15 was provided to DER following the completion of construction works as part of required compliance documentation for the respective works approvals.

The current leachate ponds, as shown in Figure 2 in Attachment 1, are located west of Farm Stage 2 landfill. Recovered leachate from respective landfill cells is pumped to one of these leachate evaporation ponds. All leachate ponds have been constructed with compacted clay overlain by a HDPE membrane. These ponds also have an electronic leak detection system in place to monitor for leaks.

Key findings: The **Delegated Officer** considers the existing Class III landfill cells have been constructed appropriately for the intended purpose to dispose of Class III contaminated solid wastes and that the existing leachate management system is acceptable.

Technical review of the proposed groundwater monitoring network:

Technical advice was sought from DWER's Contaminated Sites Branch on the adequacy of the proposed groundwater monitoring network and whether it is sufficient to monitor the changes in groundwater conditions and quality with regard to potential discharge of PFAS constituents from the existing Class III landfill cells. The following advice was provided:

- Previous site investigations have found that regional groundwater is present within fractured weathered bedrock at depths of 4-25 mbgl, with ephemeral perched systems in low-lying areas. Groundwater flow occurs within saprolite grit (overlying bedrock) and fractures within the bedrock itself. Groundwater flow directions are complex, variable across the site and generally following topographical features. Groundwater flow is generally to the north-west or west in the vicinity of Stage 1 and Stage 2 cells, and to the south-west or south in the vicinity of the Stage 15 cell. It is not clear from the information provided if groundwater flows are subject to significant seasonal variation.

Farm Stage 1 and Stage 2 cells

- Monitoring wells FMB8 and FMB7 appear suitably located to provide information on up-gradient (background) groundwater conditions to the east, while monitoring well SP44D may also provide information on groundwater quality to the south. However, given the location of SP44D, it is possible that groundwater in this area may be impacted by green-waste processing and soil remediation activities that are understood to occur in the vicinity.
- Monitoring wells FMB5 and FMB6 appear to be suitably located to assess potential impacts to groundwater from discharges from the Stage 1/2 cells.
- Given the scale of the cells (spanning approximately 450m), two down-gradient monitoring wells may not be sufficient to intercept narrow plumes such that would result from the discharge of highly mobile contaminants (e.g. PFAS) from localised liner failures. It is also noted that there are currently no monitoring wells further down-gradient of FMB5 and FMB6 as part of the broader well network that could be sampled occasionally as a precautionary measure.
- Consideration may be given to requiring the installation of additional groundwater monitoring wells to improve the probability of intercepting narrow plumes. Further consideration should also be given to the broader risk profile of the proposal before requiring additional wells. For example, additional wells may not be justified if there is a high degree of confidence in the design and construction of the cell liners, and in the context of relatively low contaminant limits, likely low groundwater flow rates and relative absence of sensitive receptors down-hydraulic gradient of the Stage 1 and Stage 2 cells.

Stage 15 cell

- Monitoring well SP38D appears to be suitably located to assess groundwater quality in the up-gradient vicinity of the Stage 15 cell. However, it is possible that groundwater in this area may be impacted by green-waste processing and soil remediation activities that are understood to occur near SP38D.
- Monitoring wells SP36D, SP37D and SP4D are proposed for assessing water quality down-gradient of the Stage 15 cell. These wells are located in a cluster to the south-east of the cell. Given their close proximity to one another, monitoring of all three wells does not appear warranted.
- There appears to be a significant gap in the monitoring well network to the south and south-west of the cell, which is the prevailing localised groundwater flow direction based on the June 2017 data provided. Consideration may be given to requiring the

installation of additional groundwater monitoring wells in these areas, subject to practical constraints due to the close proximity of existing former landfill cells.

- The monitoring of well SP42D does not appear to be relevant given its location further to the south-east of the cell. Monitoring of SP5D, located approximately 480m south of the cell, is supported to provide a more general indication of groundwater quality migrating off-site to the south towards Christmas Tree Creek, but is unlikely to be useful in assessing discharges specifically from the Stage 15 cell.

Well construction

- The monitoring well construction and geological logs have been provided for six out of the eleven wells proposed to be monitored for PFAS. EMRC submitted additional information on 8 August 2017 relating to well construction and geology, however, the information submitted is incomplete, not in the required format (as per DWER contaminated site assessment guidance).
- Given the lack of information on well construction and geological logs it is difficult to comment on the suitability of the wells for which appropriate bore logs have not been provided. In particular, it is noted that bore logs do not appear to be available for the two main wells (FMB5 and FMB6) nominated to monitor discharge from the Stage 1 and Stage 2 cells.
- Of the bore logs provided, it is noted that the majority of the wells are constructed with long screens spanning the inferred water-bearing zone (i.e. saprolite and granite bedrock). The standing water level in several wells is located significantly higher than the screened interval, suggesting that the aquifer is under variable confining pressure from the overlying kaolinitic clays. As the saprolite is considered to be the main water-bearing zone, wells screened across this zone are considered suitable in assessing potential discharges from landfill cells. However, it is noted that depending on the depth of the cells, a significant thickness of natural in-situ clay resides between the base of the cell and the groundwater-bearing zone, therefore, leachate impacts on groundwater may not be readily observed in groundwater monitoring wells screened at this depth. It is noted that groundwater contamination associated with the historical Class III cell on Lot 11 was contributed to by the deposition of waste at the base of a quarry void which had been excavated down to bedrock (i.e. minimal or no natural clay separation between waste and the water-bearing zone).

Perched aquifer

- It is noted that none of the monitoring wells appear to be screened to assess groundwater quality in the perched aquifer. Whilst it is noted that the perched aquifer is ephemeral and limited in lateral extent, its shallow depth and high transmissivity may mean that it represents a significant potential pathway for episodic contaminant migration. This may not be a significant factor for this application given the construction details of the cells, but may require consideration in the context of stormwater management and leachate management infrastructure.

Groundwater sampling methodology

- No detail is provided in the application documentation relating to groundwater sampling methodology. Monitoring wells appear to be constructed with excessively long screens (10 m+), therefore placing greater importance on the use of ‘low-flow’ sampling methodologies to ensure that sampling targets the water-bearing zone where contaminants are most likely to be detected, and to ensure that samples are not subject to significant dilution.

Key findings:

Based on the aforementioned technical advice and earlier findings relating to the design and construction of landfill cells (page 14), the **Delegated Officer** considers that the proposed monitoring network for Farm Stage 1 and 2 is adequate to monitor changes in groundwater conditions and quality with regard to potential discharge of PFAS constituents from the these Class III cells.

Should routine monitoring detect PFAS above background levels then DWER and EMRC will need to consider requirements to install additional wells to adequately delineate potential groundwater impacts.

In relation to Stage 15 the **Delegated Officer** notes that the technical advice is consistent with previous findings on the groundwater monitoring network (page 7) in that there appears to be a gap in monitoring infrastructure along the central-western boundary and south-western corner.

The **Delegated Officer** concurs that the wells located in cluster to south-east of Stage 15 (SP36D, SP37D and SP4D) may not be warranted. The **Delegated Officer** also concurs that well SP42D does not appear to be relevant given its location further to the south-east of the cell which is considered cross-hydraulic gradient from groundwater flow emanating from the Stage 15 area.

Risk Assessment:

The Delegated Officer has considered the toxicity and persistence of PFAS and determined that based on the siting of the landfill, pathways to groundwater receptors and the potential consequences of leachate emissions containing PFAS impacting on-site and local/ regional groundwater quality, and potential impacts to the ecosystem function from groundwater discharge to Susannah Brook and Christmas Tree Creek as **Major**.

Based on historical investigations it is not clear whether there is connectivity with groundwater and the Susannah Brook. Conversely with Christmas Tree Creek it has been reported that there is some evidence of contamination of discharge to springs and an ephemeral creek to the south-west of Lot 11 (Australian Environmental Auditors Pty Ltd, 2017), therefore there is a potential for related discharges to impact surface water in Christmas Tree Creek (via surface run-off from these sources).

The Delegated Officer has considered the siting of the landfill, the construction and design of existing Class III landfill cells and the proposed management of surface water and groundwater and the associated monitoring network and considers that the likelihood of the consequence occurring to be **Unlikely**.

The overall rating for the risk of leachate emissions from the identified Class III cells during operation is therefore **Medium** and acceptable subject to regulatory controls.

Primary controls limiting leachate emissions to groundwater (and indirectly to surface water) relate to the correct design and construction of landfill cells. DWER's assessment of the design and construction of existing active Class III cells was originally documented in the respective Works Approvals for Farm Stage 1 and 2 and Stage 15 (W4547/2009/1, W5291/2012/1 and W5684/2014/1).

Limited regulatory controls are present on the Existing Licence in relation to leachate management and surface water / groundwater monitoring. As part of the risk-based licence review (page 7), DWER will examine all existing operations to ensure that controls are commensurate to the associated public health and/or environmental risk and to ensure that appropriate of regulatory controls are in place. A comparison of regulatory requirements imposed under Part IV and V of the EP Act will also be considered as part of the review.

Decision

Based on the Detailed Risk Assessment the Delegated Officer has determined to amend the Licence to authorise the acceptance and burial of Class III PFAS contaminated solid wastes. The following amendments are proposed:

- Authorisation to accept/bury Class III PFAS contaminated solid wastes in Class III cells;
- Licensee controls for monitoring surface water and groundwater are to be imposed as conditions in the Licence.
    - Surface water monitoring locations CTC1, CTC2, S7, and FSP1 to be monitored annually;
    - for Farm Stage 1 and 2, groundwater monitoring wells SP44D, FMB5, FMB6, FMB7 and FMB8 to be monitored biannually (every six months); and
    - for Stage 15, monitoring wells SP38D, SP36D, SP37D and SP5D to be monitored biannually. EMRC is also required to install and monitor one additional well along the south-western corner of Stage 15 to complement the existing monitoring network; Bore Id – 'P1' as depicted in Figure 1a below.

Bore Id	Easting	Northing
P1	0415563	6477422

Figure 1a: Proposed new monitoring bore for Class III Stage 15 landfill cell

- Laboratory analysis requirements for surface water and groundwater samples are to be consistent with those outlined in the *Interim Guideline on the Assessment and Management of Perfluoroalkyl and Polyfluoroalkyl Substances (PFAS)* (DER, January 2017c). Once variability and associated risk has been determined then EMRC can seek to refine the analytical suite.

Note: the full risk based review as outlined above will incorporate these amendments into the Revised Licence.

Licensee's comments

The Licensee was provided with the draft Amendment Notice on 22 August 2017. Comments received from the Licensee have been considered by the Delegated Officer as shown in Appendix 3.

Amendment

1. Definitions of the Licence is amended by the insertion of the text shown below:

'AS1726' means the Australian Standard AS1726 Geotechnical site investigations, as amended from time to time;

'AS/NZS 5667.6' means the Australian Standard AS/NZS 5667.6 Water Quality – Sampling – Guidance on sampling of rivers and streams, as amended from time to time;

'AS/NZS 5667.11' means the Australian Standard AS/NZS 5667.11 Water Quality – Sampling – Guidance on sampling of groundwaters, as amended from time to time;

'ASTM D5092-04(2010)e1' means the ASTM International standard for Standard practice for design and installation of groundwater monitoring wells;

'PFAS' means perfluoroalkyl and polyfluoroalkyl substances; PFAS are a family of manufactured chemicals which do not occur naturally in the environment. Perfluorooctane sulfonate (PFOS) and perfluorooctanoic acid (PFOA) are two of the most well-known PFAS and are contaminants of emerging concern in Australia and internationally;

2. Condition G1(a) of the Licence is amended by the deletion of text in strikethrough and insertion of the red text shown in underline below:

G1(a) The licensee shall accept and bury only the following types of waste at the premises:

- *(i) clean fill;*
- *(ii) type 1 inert wastes;*
- *(iii) type 2 inert wastes;*
- *(iv) putrescible wastes;*
- *(v) type 1 special wastes;*
- *(vi) type 2 special wastes; biomedical wastes which do not require incineration and general ward wastes; ~~and~~*
- *(vii) other wastes that comply with the Class III and Class IV criteria in the document titled 'Landfill Waste Classification and Waste Definitions' 1996 (as amended December 2009); and*
- *(viii) PFAS contaminated solid wastes that comply with the Class III waste disposal criteria[1] in the document titled 'Interim Guideline on the Assessment and Management of Perfluoroalkyl and Polyfluoroalkyl Substances (PFAS)' (Department of Environment Regulation, January 2017), as amended from time to time.*

[1]: accepted wastes must also comply with the relevant Class III waste disposal criteria for contaminants other than PFAS contaminated solid wastes in accordance with sub-provision (vii)

3. The Licence is amended by the insertion of the following Condition G3(d) to G3(f):

G3(d) The licensee must undertake surface water monitoring in accordance with the requirements specified in Schedule 3.

G3(e) The licensee must undertake groundwater monitoring in accordance with the requirements specified in Schedule 3.

G3(f) All surface water and groundwater monitoring must be undertaken by laboratories with current NATA accreditation for the analysis specified unless otherwise specified in Schedule 3.

4. The Licence is amended by the insertion of the following Condition W4:

W4 The Licensee must construct the infrastructure detailed in Column 1 of Table 3 in accordance with the construction requirements listed in Column 2 of Table 3 and within the timeframes specified in Column 3 of Table 3.

Table 3: Infrastructure construction requirements

Column 1	***Column 2***	***Column 3***
Infrastructure	***Requirements (Design and Construction)***	***Timeframe***
Construction of a groundwater monitoring well along the south-western corner of Stage 15 at the following coordinates: *Bore Id:* ***P1*** *Easting: 0415563* *Northing: 6477422* *(Zone 50)*	*Well construction: constructed according to the ASTM D5092-04(2010)e1 Standard practice for design and installation of groundwater monitoring wells.* *Well construction details shall be documented to demonstrate compliance with ASTM D5092-04(2010)e1.* *Logging of borehole: a record of the geology encountered during drilling should be described and classified in accordance with the Australian Standard Geotechnical site investigations AS 1726.*	*Must be constructed and operational within three months from the date of this amended licence.*

5. The Licence is amended by the insertion of the following Schedule:

SCHEDULE 3

Surface water monitoring – PFAS Waste Disposal

The Licensee must monitor the locations specified in Column 1 for the parameters specified in Column 2 of Table 4. Emissions must be calculated as an average over the period specified in Column 4, at the frequency specified in Column 5, and in accordance with the method specified in Column 6.

Table 4: Surface water monitoring table

Column 1	***Column 2***	***Column 3***	***Column 4***	***Column 5***	***Column 6***
Location	***Parameter***	***Units***	***Averaging period***	***Frequency***	***Method***
CTC1, CTC2, S7, FSP1 *As depicted in the 'Map of surface water monitoring locations' in this Schedule*	*pH[1]*	*pH units*	*Spot sample*	*Annually*	*AS/NZS 5667.6*
	Temperature[1]	*Degrees C*			
	Electrical conductivity[1]	*µS / cm*			
	Perfluorooctane sulfonate (PFOS)	*µg/L*			
	Perfluorooctanoic acid (PFOA)				
	6:2 Fluorotelomer sulfonate (6:2 FtS)				
	8:2 Fluorotelomer sulfonate (8:2 FtS)				
	Perfluoroheptanoic acid (PFHpA)				
	Perfluorobutane sulfonate (PFBS)				
	Perfluorobutanoic acid (PFBA)				
	Perfluorohexanoic acid (PFHxA)				
	Perfluorohexane sulfonate (PFHxs)				
	Perfluoropentanoic acid (PFPeA)				

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

Groundwater monitoring – PFAS Waste Disposal

The Licensee must monitor the locations specified in Column 1 for the parameters specified in Column 2 of Table 5. Emissions must be calculated as an average over the period specified in Column 4, at the frequency specified in Column 5, and in accordance with the method specified in Column 6.

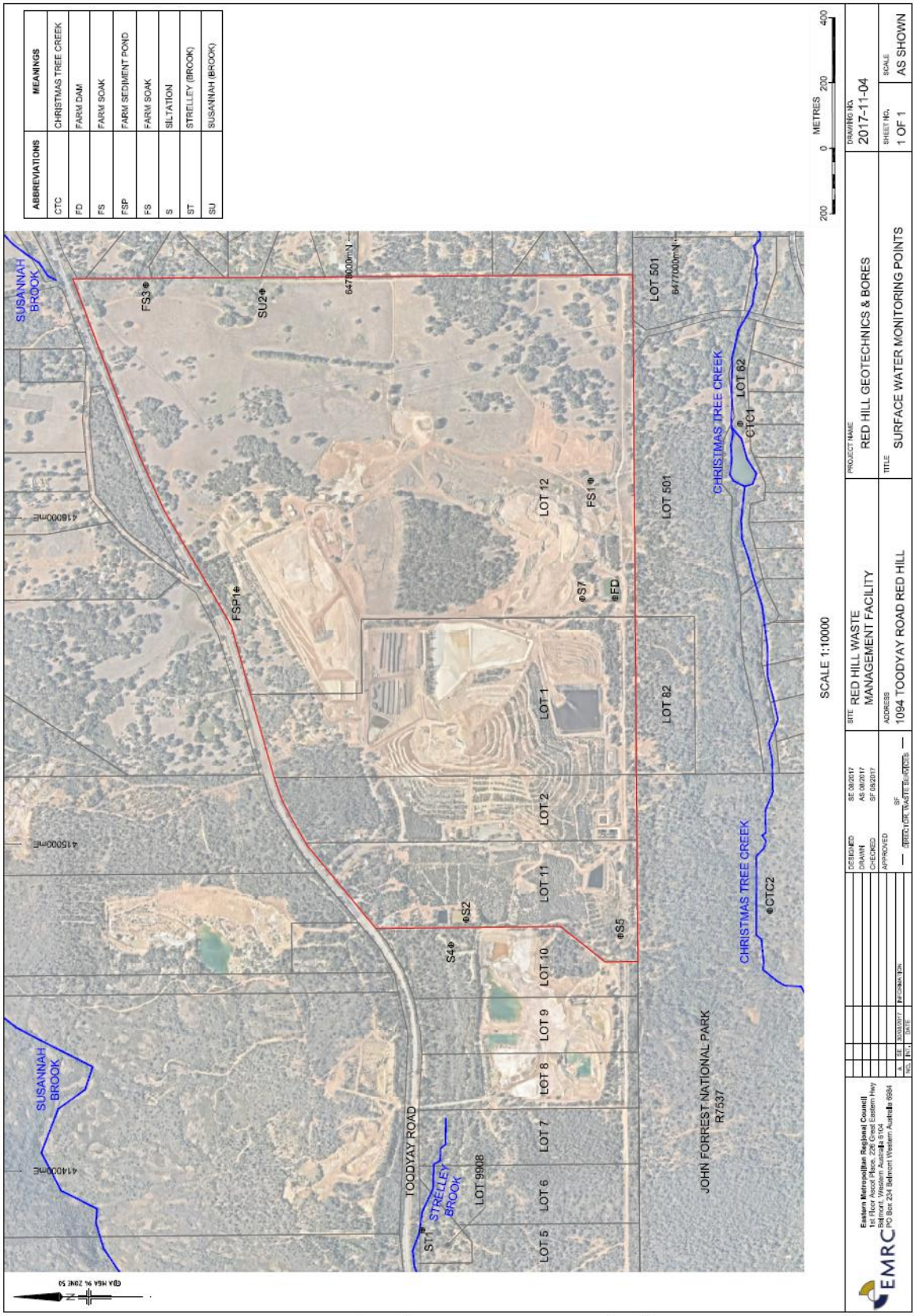
Table 5: Groundwater monitoring table

Column 1	***Column 2***	***Column 3***	***Column 4***	***Column 5***	***Column 6***
Location	***Parameter***	***Units***	***Averaging period***	***Frequency***	***Method***
Farm Stage 1 and 2: SP44D, FMB5, FMB6, FMB7 and FMB8 *Stage 15: SP38D, SP36D, SP37D, SP5D and the new monitoring well (P1) installed in accordance with condition W4* *As depicted in the 'Map of groundwater monitoring locations' in this Schedule*	*Standing water level[1]*	*m(AHD) and m(BGL)*	*Spot sample*	*Six monthly; (at least five months apart)*	*AS/NZS 5667.11*
	pH[1]	*pH units*			
	Electrical conductivity[1]	*µS / cm*			
	Perfluorooctane sulfonate (PFOS)	*µg/L*			
	Perfluorooctanoic acid (PFOA)				
	6:2 Fluorotelomer sulfonate (6:2 FtS)				
	8:2 Fluorotelomer sulfonate (8:2 FtS)				
	Perfluoroheptanoic acid (PFHpA)				
	Perfluorobutane sulfonate (PFBS)				
	Perfluorobutanoic acid (PFBA)				
	Perfluorohexanoic acid (PFHxA)				
	Perfluorohexane sulfonate (PFHxs)				
	Perfluoropentanoic acid (PFPeA)				

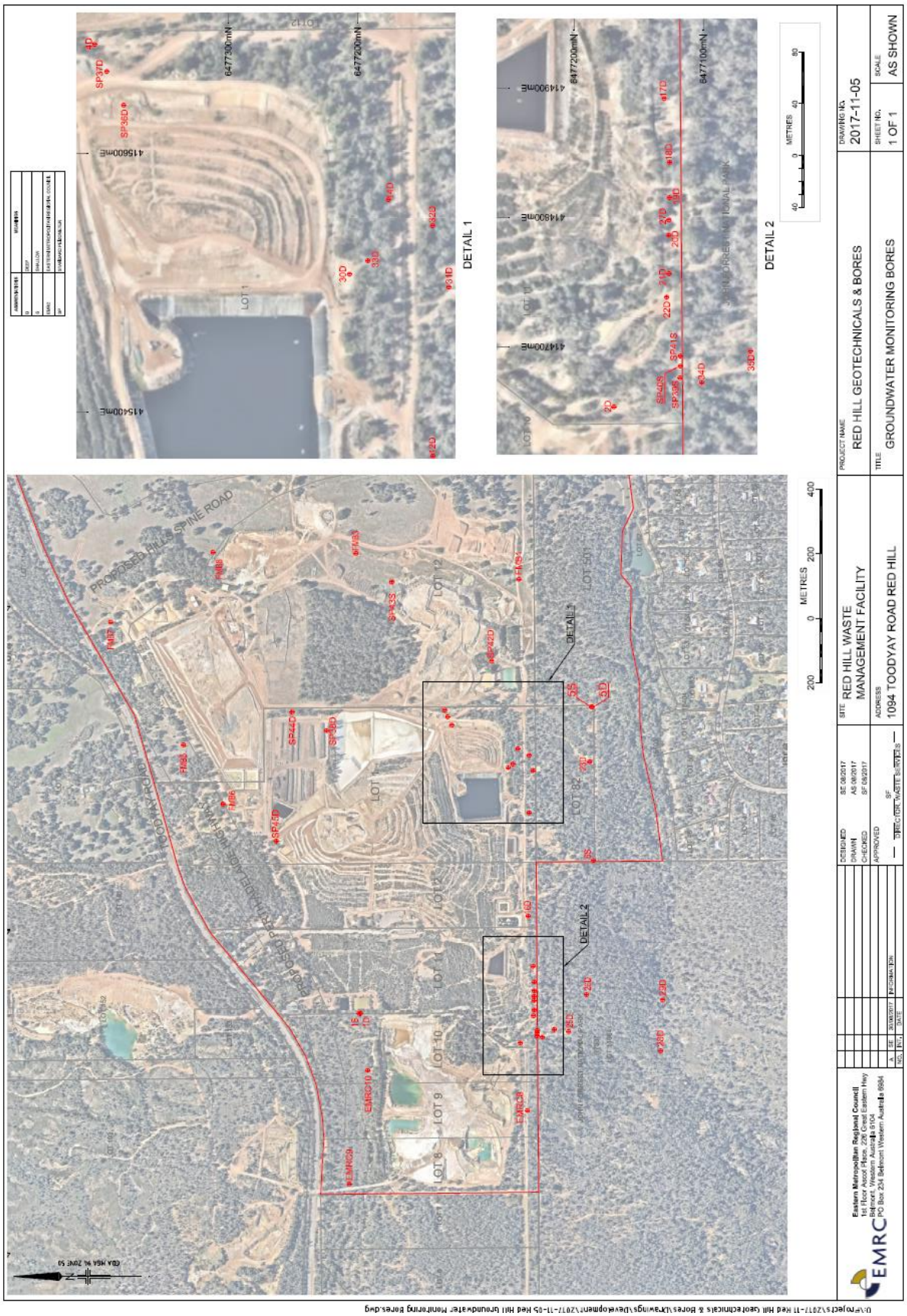
Note 1: In-field non-NATA accredited analysis permitted.

6. The Licence is amended by the insertion of the following maps to Schedule 1:

SCHEDULE 1
Map of surface water monitoring locations (PFAS Waste Disposal) – Farm Stage 1 and 2 and Stage 15



Map of groundwater monitoring locations (PFAS Waste Disposal) – Farm Stage 1 and 2 and Stage 15



Appendix 1: Key documents

	Document title	In text ref	Availability
1	Licence L8889/2015/1 (Eastern Metropolitan Regional Council, Red Hill Waste Management Facility)	L8889/2015/1	accessed at www.dwer.wa.gov.au
2	Works Approval W4547/2009/1 (Construction of Farm Stage 1 landfill)	W4547/2009/1	DWER records (A174429)
3	Works Approval W5291/2012/1 (Construction of Farm Stage 2 landfill)	W5291/2012/1	DWER records (A594342)
4	Works Approval W5684/2014/1 (Construction of Stage 15 landfill)	W5684/2014/1	DWER records (A848365)
5	DER *Guidance Statement: Regulatory Principles* (July 2015)	DER, 2015	accessed at www.dwer.wa.gov.au
6	DER *Guidance Statement: Decision Making* (February 2017)	DER, 2017a	
7	*DER Guidance Statement: Risk Assessments* (February 2017)	DER, 2017b	
8	DER *Guidance Statement: Setting Conditions* (October 2015)	DER, 2015b	
9	DER *Guidance Statement: Environmental Siting* (November 2016)	DER, 2016	
10	Department of Environment Regulation, January 2017. *Interim Guideline on the Assessment and Management of Perfluoroalkyl and Polyfluoroalkyl Substances (PFAS)*.	DER, January 2017c	accessed at www.dwer.wa.gov.au
11	Australian Environmental Auditors Pty Ltd, 31 March 2017. *Interim Auditor Advice No. 2 Red Hill Waste Management Facility, 1094 Toodyay Road, Red Hill WA*.	Australian Environmental Auditors Pty Ltd, 2017	DWER records (A1406680)
12	Strategen Environmental Consultants Pty Ltd, June 2017. Red Hill Waste Management Facility Licence Amendment Supporting Document. Prepared for Eastern Metropolitan Regional Council.	Strategen Environmental Consultants Pty Ltd, June 2017	DWER records (A1445445)
13	MS Groundwater Management Pty Ltd (MSGM), July 2017. Acceptance and Disposal of Perflurooctane sulfonate (PFOS) and Perfluorooctanoic acid (PFOA) contaminated wastes. A report to Eastern Metropolitan Regional Council.	MSGM, July 2017	DWER records (A1484395)

	Document title	In text ref	Availability
14	EMRC March, 2017. *Annual Monitoring and Compliance Report 2016*	EMRC March, 2017	DWER Records (A1401050)

Appendix 2: Summary of relevant Part IV Ministerial Statements

Table 1 – Relevant Part IV Ministerial Statements

Legislation	Number	Approval
Environmental Protection Act 1986 - Part IV	Ministerial Statement 274 – 15 July 1992	Relates to the Red Hill Waste Management Facility Extension. Includes the following conditions: 1. Implementing Proponent Commitments; design and management; vegetation screening; rehabilitation and end-use; community involvement/consultation; fire management; surface water and groundwater management/monitoring and closure of the site; 2. Implementation of the proposal as per assessed designs, specifications and plans submitted to the Environmental Protection Authority (EPA); 3. Pest, fire and disease control; 4. Visual aspects of the site; 5. Management of industrial waste believed to be potentially harzardous in accordance with the 'Procedure – Industrial Waste'; 6. Decommissioning and post-closure management of the site; 7. Requirements to seek approval from the Minister on the transfer of ownership control or management of the site; and 8. Time limit on for proposal implementation. Report and Recommendations of the EPA – Bulletin 569 – EPA identified that the main environmental factors requiring detailed consideration as: - leachate control and groundwater protection; - surface water protection; - transport; and - visual impact
	Ministerial Statement 462 – 21 November 1997	Relates to the establishment of Class IV waste disposal cells at the existing Red Hill Waste Management Facility. Includes the following conditions: 1. Implementing Proponent Commitments; vegetation/flora rehabilitation; surface water and groundwater management/monitoring; community involvement/consultation and closure management; 2. Implementation of the proposal as per

Legislation	Number	Approval
		assessed designs, specifications and plans submitted to the Environmental Protection Authority (EPA); 3. Requirements to seek approval from the Minister on the transfer of ownership control or management of the site; 4. Prepare and implement and Environmental Management System consistent with the AS/NZS ISO 14000 Environmental Management series; 5. Decommissioning and post-closure management of the site; 6. Time limit on for proposal implementation; 7. Performance review – to be submitted to EPA every 6 years following commencement of construction; and 8. Compliance auditing – requirement to submit periodic report in the implementation of the proposal. Report and Recommendations of the EPA – Bulletin 867 – EPA identified that the main environmental factors requiring detailed consideration as: - surface water quality; - groundwater quality; and - buffer zone
	Ministerial Statement 976 – 9 July 2014	Relates to the proposal to construct and operate a resource recovery facility within the existing Red Hill Waste Management Facility, for the processing of waste to produce energy, using either anaerobic digestion or gasification technology. Includes the following conditions: 1. Proposal implementation – limitations on technology to be used and specific requirements of conditions in relation to respective technologies. 2. Contact details – requirements to notify CEO on any change of name, physical and postal address; 3. Time limit on for proposal implementation 4. Compliance reporting – requirements to maintain a compliance assessment plan and submit periodic compliance assessment reports; 5. Public availability of data; 6. Odour – requirements to reduce

Legislation	Number	Approval
		cumulative odour levels from existing operations prior to operation of waste to energy technology; 7. Odour control system – requirement to maintain odour emission from anaerobic digestion facility to specified odour concentration limits; 8. Air quality – requirement to prepare Air Quality Report to the satisfaction of CEO. Requirement also to submit the report with any application for a works approval under Part V of the EP Act; and 9. Gasification technology – specific requirements that specifies that the technology to be implemented is to be consistent with EPA and Waste Authority's strategic advice. Report and Recommendations of the EPA – Report 1487 – EPA identified that the key environmental factors requiring detailed consideration as: - air quality; and - amenity (odour)

Appendix 3: Summary of Licensee comments

The Licensee was provided with the draft Amendment Notice on 22 August 2017 for review and comment.

The Licensee responded on 29 August 2017 indicating that they had reviewed the draft Amendment Notice and was agreeable to addressing the outstanding matters highlighted in the draft Notice; provision of updated surface water and groundwater monitoring network maps and provision of information relating to a new groundwater monitoring well on the south-western corner of Stage 15.

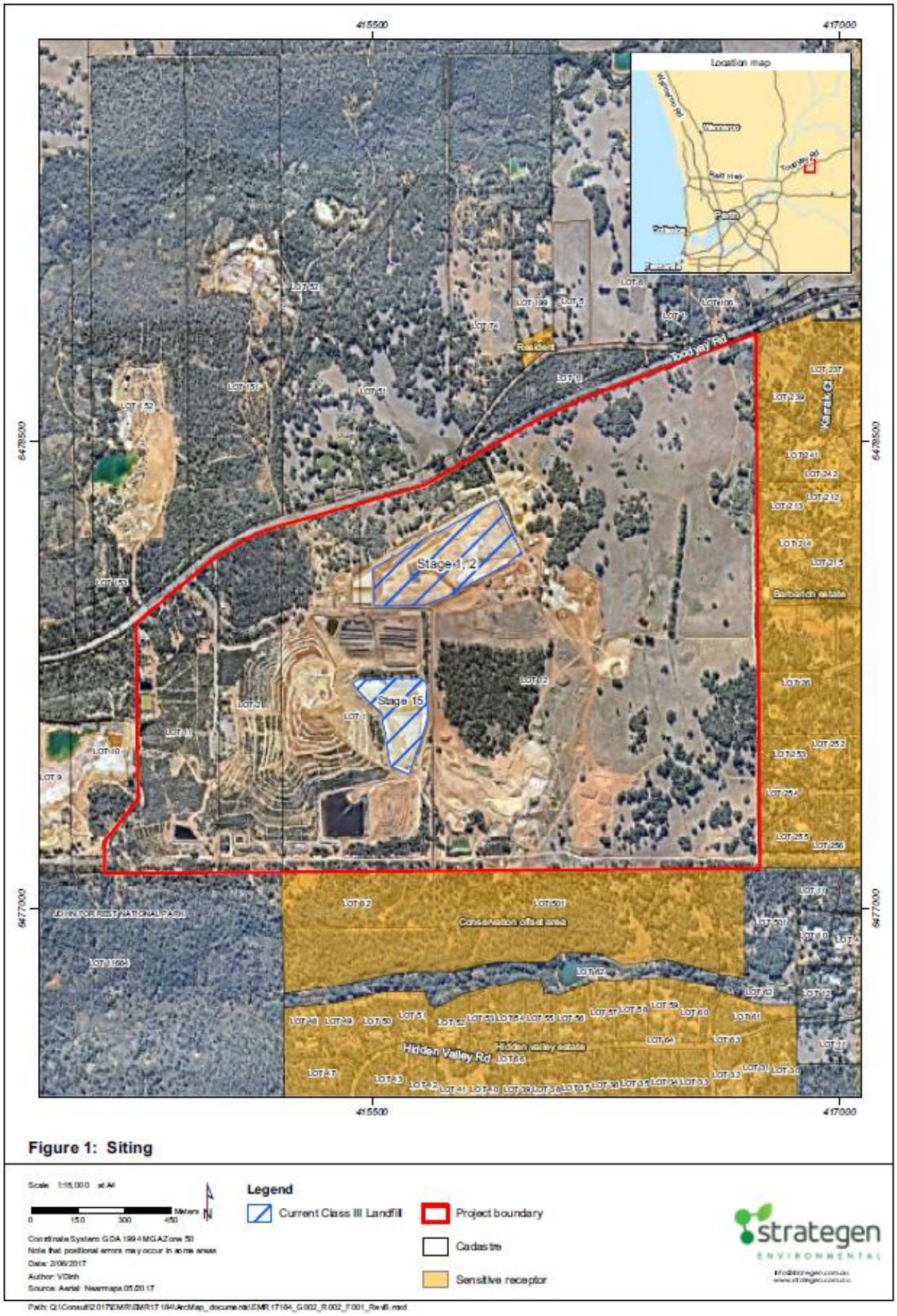
On 1 September 2017 EMRC provided DWER with updated maps for the respective monitoring networks and additional information on the proposed new groundwater monitoring well for Stage 15; the following comments were received. Furthermore on the 5 September 2017 EMRC provided additional information regarding the rationalisation of surface water monitoring points adjacent to Farm Stage 1 and 2.

Condition	Summary of Licensee comment	DWER response
W4 and Schedule 3	The location of the proposed monitoring bore has been looked at by the hydrologist at MSGM and site staff to identify the most suitable location. The nominated location is approximately 20m from the SW corner of the Stage 15 Landfill. The bore could not go to the west of the Stage 15 cell as this area comprises an existing landfill and is also a future landfill area. The proposed location will not be affected by existing or future landfilling operations and is downstream based on current groundwater information. The location can be easily accessed for construction of the bore and future monitoring purposes.	The Delegated Officer has noted the comments and considers the proposed location to be suitable due to on-site practical constraints. Condition W4 has been updated to reflect installation requirements for the proposed location and includes reference to the GPS coordinates (coordinates verified by DWER to be correct).

Condition	Summary of Licensee comment	DWER response
G3(d) and Schedule 3	Request that surface water monitoring point 'FSP2' be removed from the proposed surface water monitoring program. 'FSP2' was excavated earlier this year to increase the capacity of the pond to capture stormwater. Water is not currently monitored at this site because the pond is located in the upper gradient of the Stage 1 and 2 landfill cells and its primary purpose is to capture stormwater (and not surface water from landfill activities in Farm Stage 1 and 2). In addition, 'FSP2' is engineered such that any excess stormwater is diverted towards the cleared farm area towards the north east of Lot 12. Monitoring point 'FSP1', located to the west of 'FSP2', is appropriate to retain as part of the proposed monitoring program. Surface water runs down gradient, running in a north, north westerly direction from the landfill activities in Farm Stage 1 and 2 into FSP1, therefore we recommend surface water continues to be monitored from FSP1 as has been occurring. It is also at a lower elevation than FSP2, so monitoring in this pond would assumedly provide results that would be more indicative of what is happening on-site.	The Delegated Officer has noted the comments and considers it appropriate to remove monitoring point 'FSP2' from the surface water monitoring program. Schedule 3 has been updated to reflect the changes.
Schedule 3	Updated maps for the surface water and groundwater monitoring networks provided.	Updated maps have been incorporated into Schedule 3.

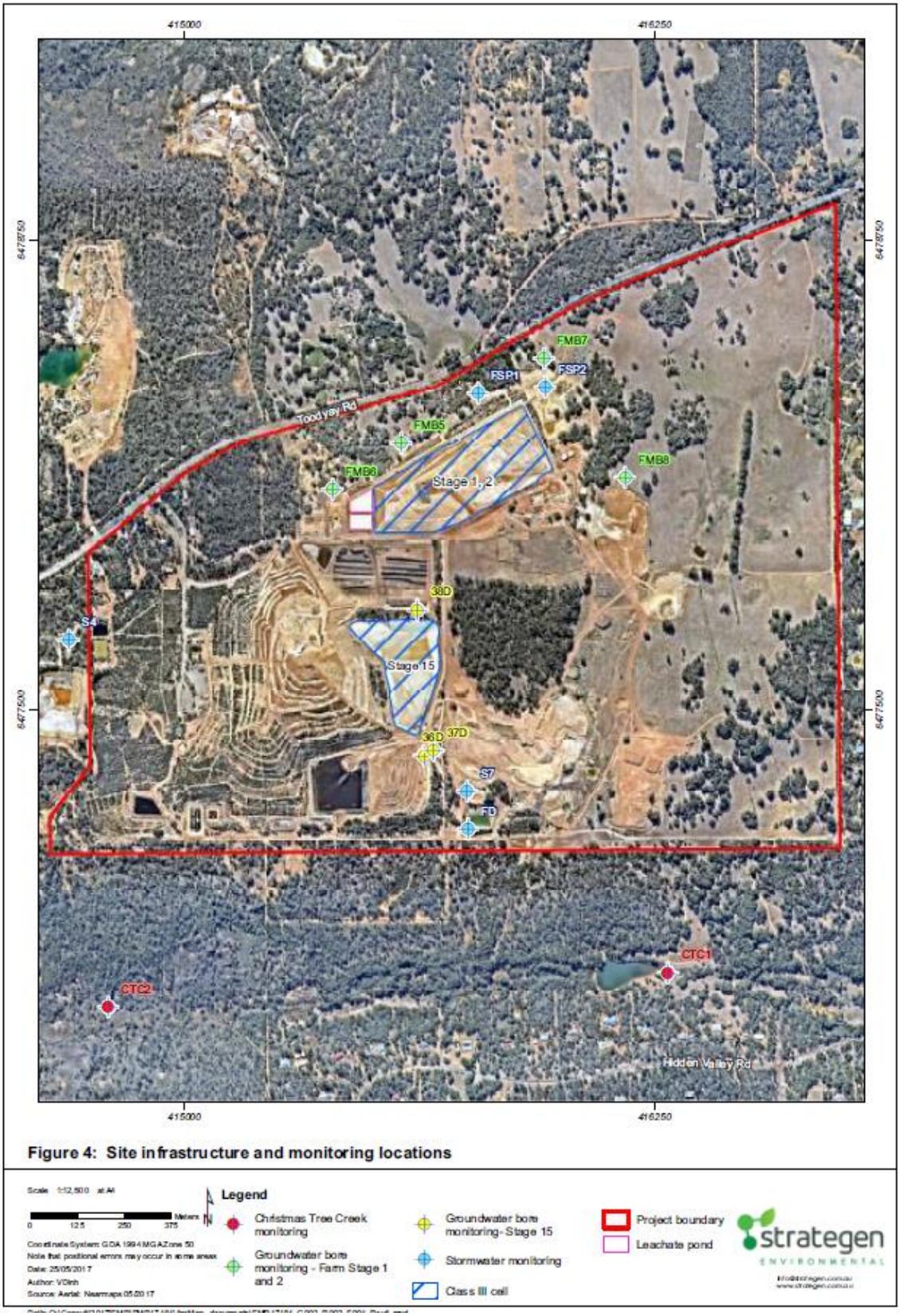
Attachment 1: Site Plans

Figure 1: Current Class III Cells.



(Source: *Figure 1* from Strategen Environmental, June 2017)

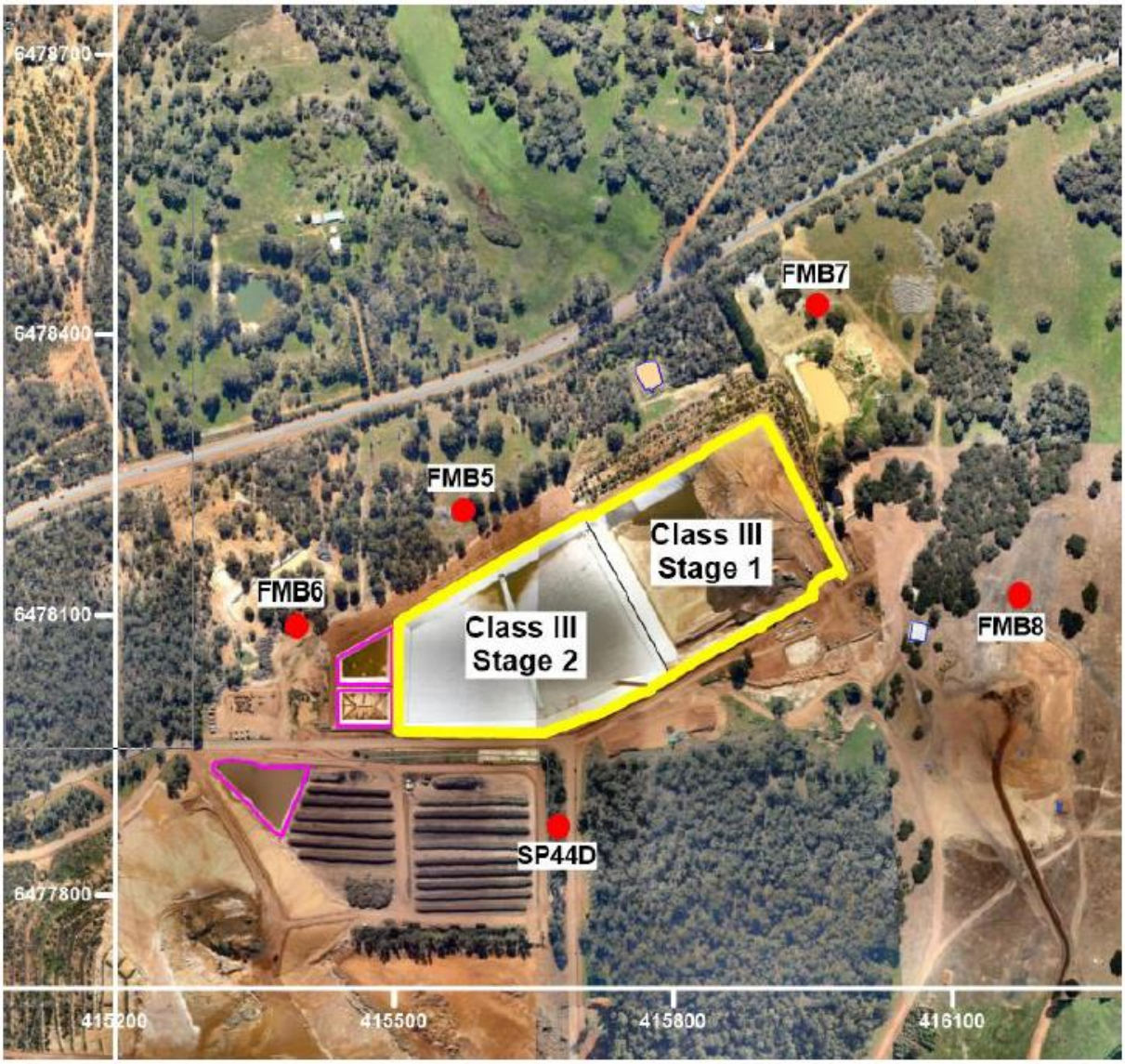
Figure 2: Site Infrastructure and proposed surface water monitoring locations.



Note: the proposed groundwater monitoring network as depicted in Figure 2 has been revised – refer to the Figure 3 and 4, following this Figure.

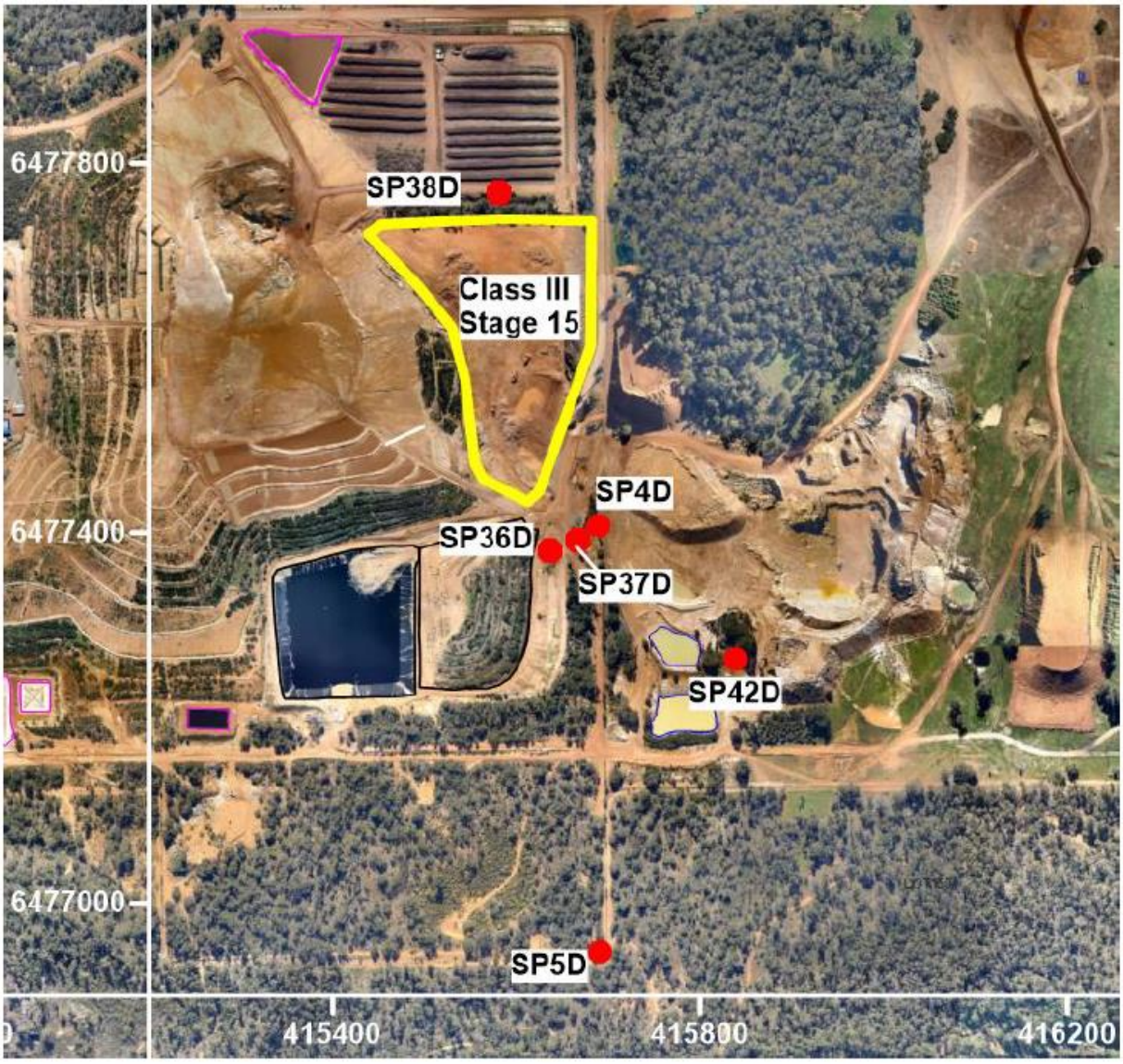
(Source: *Figure 4* from Strategen Environmental, June 2017)

Figure 3: Proposed groundwater monitoring locations for Farm Stage 1 and 2.



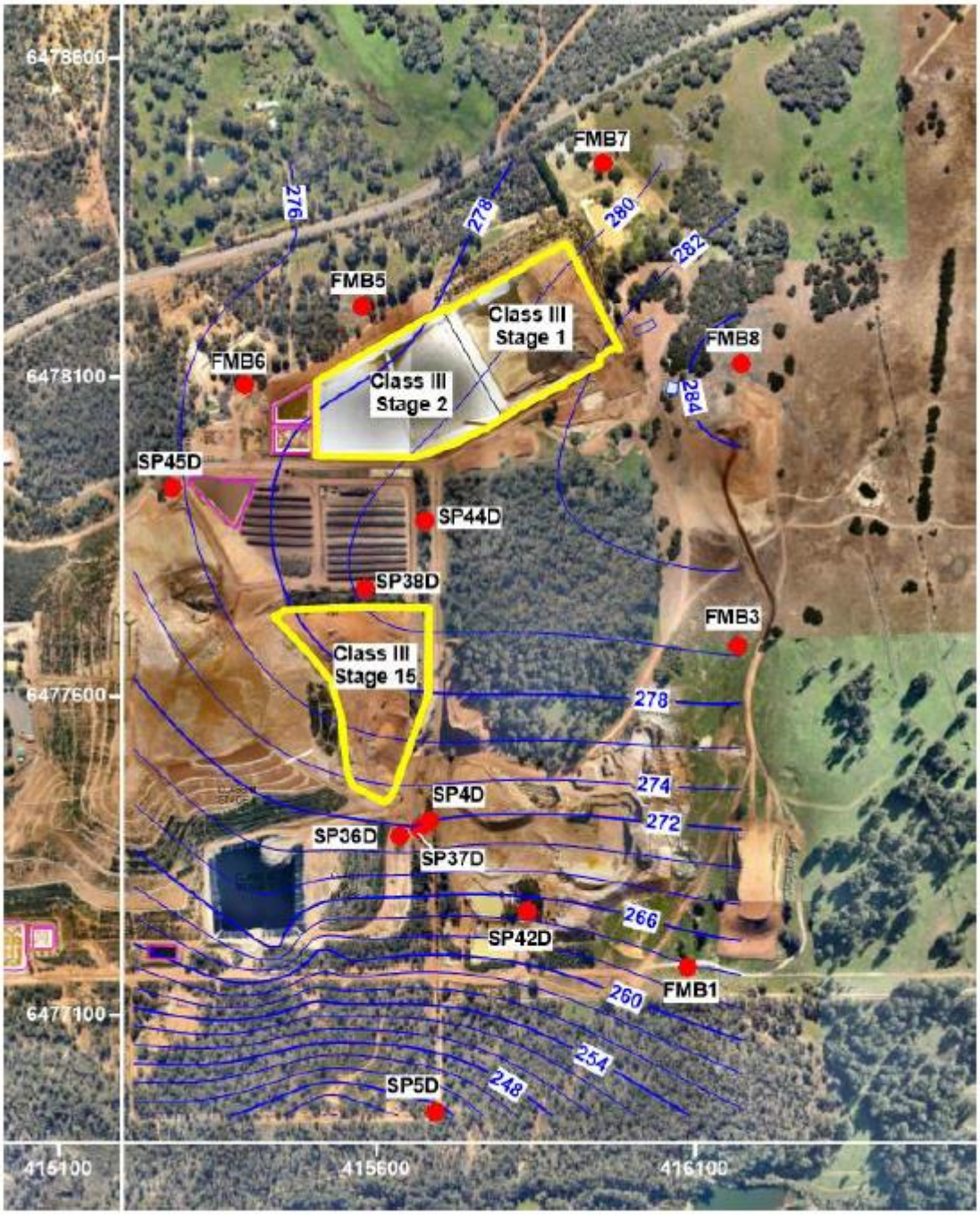
(Source: *Figure* 4 from MSGM, July 2017)

Figure 4: Proposed groundwater monitoring locations for Stage 15.



(Source: *Figure 5* from MSGM, July 2017)

Figure 5: Regional groundwater contours in the regional bedrock (granite) aquifer from June 2017 monitoring event



(Source: *Figure 3* from MSGM, July 2017)