Government of Western Australia
Department of Water and Environmental Regulation

Amendment Report

Application for Licence Amendment

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

Licence Number	L4680/1988/13
Licence Holder	FMR Investments Pty Ltd
ACN	009 411 349
File Number	APP-0028360
Premises	Greenfields Processing Site - Gunga West In-pit Tailings Storage Facility Mining Tenements: M15/1836, L15/356, and M15/1272, Part of mining tenements M15/1833 and M15/26, and Lots 102 and 103 on Plan 40395 COOLGARDIE WA 6429
Date of Report	1 September 2025
Decision	Revised licence granted

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1. Decision summary

Licence L4680/1988/13 is held by FMR Investments Pty Ltd (Licence Holder) for the Greenfields Processing Site - Gunga West In-pit Tailings Storage Facility (the Premises), located at Part mining tenement M15/1836 and Lot 102 on Plan 40393, Great Eastern Highway, COOLGARDIE WA 6429.

This Amendment Report documents the assessment of potential risks to the environment and public health from proposed changes to the emissions and discharges during the operation of the Premises. As a result of this assessment, Revised Licence L4680/1988/13 has been granted.

2. Scope of assessment

2.1 Regulatory framework

In completing the assessment documented in this Amendment Report, the department has considered and given due regard to its Regulatory Framework and relevant policy documents which are available at https://dwer.wa.gov.au/regulatory-documents.

2.2 Overview of premises and amendment summary

The Licence Holder operates the Greenfields toll milling facility, approximately 4km north-east of Coolgardie in the Goldfields region of Western Australia. The premises is regulated under licence L4680/1988/13 and has been approved for Category 5 activities under Part V Division 3 of the *Environmental Protection Act 1986* (EP Act). The milling facility uses a three-stage crushing system with a three-ball circuit, a gravity concentrator and a carbon in leach process to toll treat gold ore from external sources. Tailings from the mill are currently disposed into two above ground tailing storage facilities (TSF's), TSF 3 and 4, located approximately 200m east of the processing plant. Adjacent to TSF 3, TSF's 1 and 2 have been decommissioned and have not received any tailings for over seven years.

On 2 April 2025, the Licence Holder submitted an application to the department to amend Licence L4680/1988/13 under section 59 and 59B of the *Environmental Protection Act 1986* (EP Act). The application is for the operation of the Gunga West In-Pit TSF located approximately 3 km north-east of the processing plant and just south of the Great Eastern Highway. The additional TSF capacity provided by the in-pit TSF will allow tailings to thoroughly dry and condense into TSF 3 and 4. The licence holder proposes to operate a pipeline system along the existing access road to connect the processing plant to the Gunga West In-Pit TSF for the transport of tailings and return water. The operation of five groundwater monitoring bores surrounding the pit is also proposed.

The construction of the Gunga West In-Pit TSF, pipeline system and decant infrastructure and five groundwater monitoring bores are completed under the Works Approval W6900/2024/1. The Gunga TSF Bore Installation Report was submitted to the department on 24 August 2024. The Gunga TSF Infrastructure Environmental Compliance Report (ECR) was submitted to the department on 6 March 2025 and Time Limited Operations (TLO) commenced in accordance with Condition 9 of the W6900/2024/1. The tailings deposition commenced at the end of April or early May once TSF3 Cell C is at capacity.

The following amendments are being sought:

- to allow the operation of the Gunga In-Pit TSF pipeline, decant infrastructure and groundwater monitoring bores.

The premises relate to the category 5 and assessed design capacity under Schedule 1 of the *Environmental Protection Regulations 1987* (EP Regulations) which are defined in Licence L4680/1988/13. The infrastructure, equipment and associated activities are outlined on the works

approval W6900/2024/1 and have been considered in accordance with Guideline: Risk Assessments (DWER 2020).

2.2.1 Proposed premises boundary and occupier status

The proposed amendment will involve a change to the existing Prescribed Premises boundary as shown in Figure 1. The amendment will result in the addition of Mining tenements, Miscellaneous Licence L15/356 (expiry 08/09/2037), Mining Leases M15/26 (expiry 20/03/2025), M15/1272 (expiry 07/06/2041) and Mining Lease M15/1833 (expiry 16/07/2038) are granted in accordance with the *Mining Act 1978*. The registered holder is FMR Investments Pty Ltd. A renewal application for M15/26 was submitted to the Department of Mines, Petroleum and Exploration (DMPE) (Former DEMIRS) on 18 March 2025.

Hampton Location Lot 103 on Plan 40395, owned by Northern Star Resources Limited has also been included in the amended Prescribed Premises boundary. FMR have an existing Special Lease for Lot 103 on Plan 40395, a Pipeline and Water Monitoring Bore Access Agreement (dated 1 August 2024, 419661v8). This agreement includes the construction, operation and maintenance of the Gunga TSF pipelines and TSF monitoring bores.

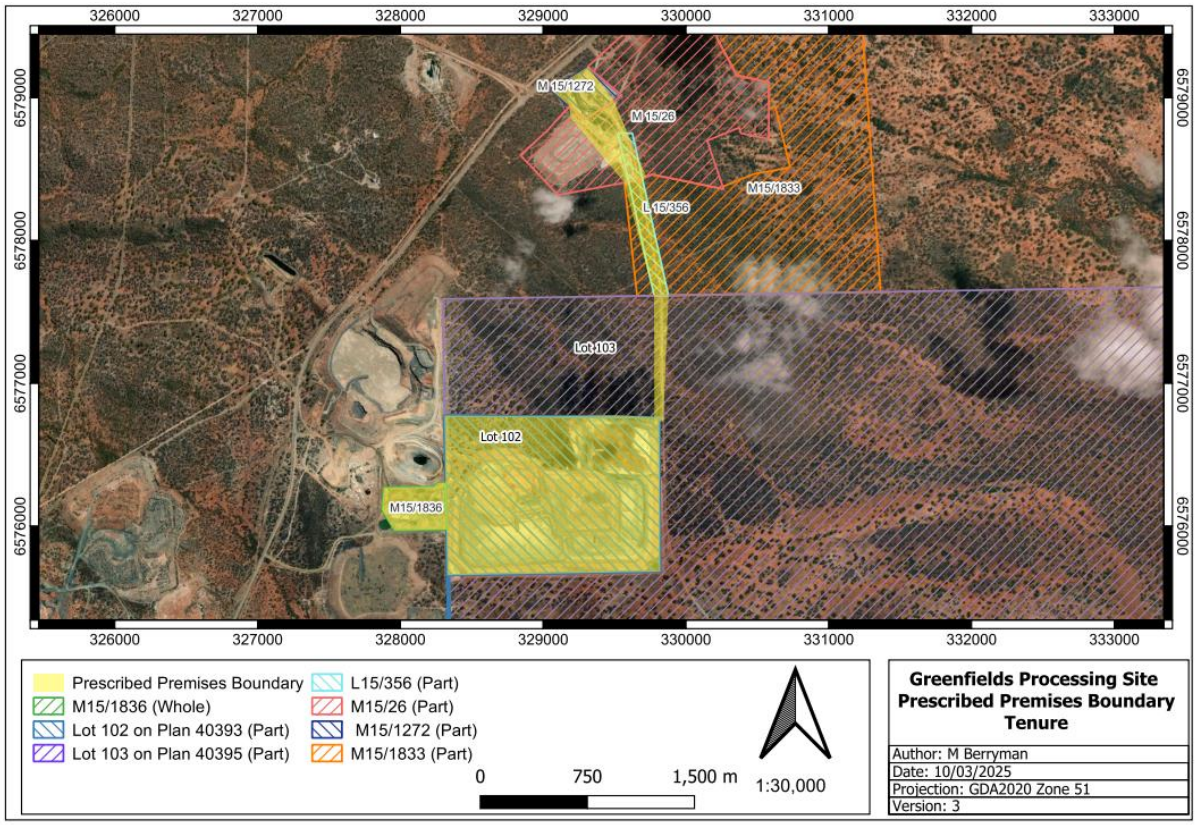

Figure 1: Premises Boundary

2.2.2 Infrastructure and operation of the Gunga West In-Pit TSF

Gold tailings generated at the Greenfields processing plant will be deposited into the Gunga West in-pit TSF. The pit is approximately 60 metres deep and has a surface area of 4.8 hectares. Tailings deposition will occur subaerially or sub-aqueously via a single discharge point at the northern side of the pit with tailings flowing in a southerly direction.

High density polyethylene (HDPE) pipelines will transport tailings and decant water. Pipelines nominal diameter will measure 200mm for tailings and 160mm for return water. Tailings pipelines will run along the existing access road on tenement L15/356 and Lot 103 on Plan 40395 and will follow the northern boundary of Lot 102 on Plan 40395 and TSF's 1 and 2 to the processing plant.

Return water pipes will follow a very similar route but will also connect the return water pond to the processing plant where the return water will be reused. All pipelines will be contained within earthen bunded corridors and will be fit with isolation valves or flow and leak detection sensors. Inspections will take place twice daily when active to reduce any environmental impact in case of rupture. The access road will provide an entry point to access the pipeline.

The groundwater monitoring bores surrounding the West Gunga in-pit TSF were constructed to monitor water quality and any mounding associated with seepage. Construction of the five proposed bores will be undertaken in accordance with *Water Quality Protection Guideline no 4* (Water and Rivers Commission 2000) and *The Minimum Construction Requirements for Water Bores in Australia* (National Uniform Drillers Licensing Committee 2020). While it is expected that groundwater conditions will be similar to those at TSF 3 and 4 near the toll milling facility, the lack of groundwater monitoring data surrounding the TSF, means that a baseline will need establishing. Further details are provided in section 3.3.

Day to day operations and any emergencies of the Gunga West in-pit TSF will be managed in accordance with the CMW Operations Manual provided with the application supporting documentation. This document is to be reviewed annually to ensure it remains current and accurate.

2.2.3 Geochemical characteristics of tailings

In 2012, an evaluation of the base metal content in tailings from Greenfields Mill was conducted. According to the findings referenced in the 2023 CMW Design Report:

Major ions identified include Calcium (Ca), Chloride (Cl), Potassium (K), Magnesium (Mg), Sodium (Na), and Sulphate (SO_4). Detected metals include Aluminium (Al), Arsenic (As), Cadmium (Cd), Copper (Cu), Chromium (Cr), Iron (Fe), Mercury (Hg), Manganese (Mn), Nickel (Ni), Lead (Pb), Antimony (Sb), Selenium (Se), and Zinc (Zn).

Minor element enrichments were found to be insignificant. All tailing types were classified as non-acid forming (NAF), with a low potential for net acid production (NAPP).

The tailings' properties are expected to remain consistent with those outlined in the decision report of the original Works Approval W6900/2024/1. Table 1 shows the pH, Total Dissolved solids (TDS) and Cyanide results (CN) from tailings and process return water samples.

Table 1: Results of tailings and process return water testing during the 2012 analysis

Parameter	pH	TDS (mg/L)	WAD CN (mg/L)	Total CN (mg/L)	Free CN (mg/L)
Tailings Discharge Water	9.1	154,000	52	170	42
Process Return Water	7.1	173,000	11	210	19

2.2.4 Freeboard

The following considerations were made regarding freeboard criteria and requirements for a category 3 ‘Low’ consequence category TSF based on the Department of Mines, Petroleum and Exploration (DMPE) (2013), *Code of practice: tailings storage facilities in Western Australia* guide:

- The proposed TSF has been designed such that a 1% AEP, 72-hour duration storm event can be temporarily stored on top of the facility. The design, however, assumes correct operational controls are adhered to and that water is continually removed from the facility, such that minimum freeboard allowances are maintained;
- Provision of a minimum of 0.5 m total freeboard comprising minimum operational freeboard (vertical height between the tailings beach and embankment crest) of 0.3 m and

a minimum beach freeboard of 0.2 m plus an allowance for the 1% AEP 72 hour event of 0.2 m; and

- Freeboard nomenclature is illustrated on Figure 2.

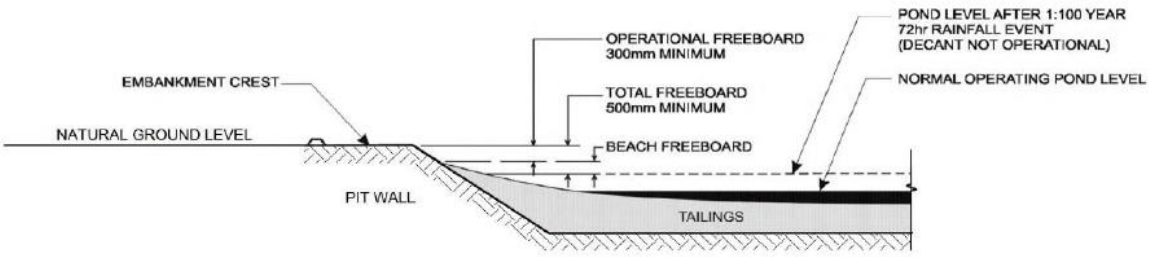

Figure 2: Freeboard Nomenclature

3. Risk assessment

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

To establish a Risk Event there must be an emission, a receptor which may be exposed to that emission through an identified actual or likely pathway, and a potential adverse effect to the receptor from exposure to that emission.

3.1 Source-pathways and receptors

3.1.1 Emissions and controls

The key emissions and associated actual or likely pathway during premises operation which have been considered in this Amendment Report are detailed in

Table 2 below.

Table 2 also details the proposed control measures the Licence Holder has proposed to assist in controlling these emissions, where necessary.

Table 2: Licence Holder controls

Emission	Sources	Potential pathways	Proposed controls (CGS, 2023)
Tailings slurry / return decant water to in-pit TSF	Pipeline leaks or rupture	***Pathway***: Direct Discharge, run-off, infiltration	• Tailings pipelines will be constructed within earthen bunded corridors with scour pits or sumps. • Isolation valves or flow and leak detection sensors will be fitted. • Two daily routine inspections will be undertaken. • Should a pipeline leak or rupture, a shutdown of the affected section follow until the issue has been resolved. • Decant water pump will be no less than 145 tph working capacity.

Emission	Sources	Potential pathways	Proposed controls (CGS, 2023)
	Overtopping of Gunga West In-pit TSF	***Pathway:*** Direct Discharge, run-off, infiltration	• Minimum freeboard of 1m (RL 396.5m AHD) will be applied. This includes an allowance for the temporary storage of the 1:100 years or 1% average exceedance probability storm event. • TSF will be operated in accordance with the Operational Manual (part of the supporting documents supplied with the application form, Appendix E). • Two routine visual inspections per shift will be undertaken to confirm freeboard.
	Tailings seepage to groundwater	***Pathway:*** Vertical infiltration and horizontal migration.	• Installation of groundwater monitoring network will be established to detect seepage • Removal of water within the pit prior to tailings deposition • In line with licence L4680/1988/13, a seepage management plan to be implemented if groundwater exceeds 6-meter below ground level (mbgl). • A monitoring program will include monthly sampling of standing water level, to be increased to fortnightly sampling when groundwater is less than five meters below ground

3.1.2 Receptors

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

Table 3 below provides a summary of potential human and environmental receptors that may be impacted as a result of activities upon or emission and discharges from the prescribed premises *(Guideline: Environmental siting* (DWER 2020)).

Table 3: Sensitive human and environmental receptors and distance from prescribed activity

Human receptors	Distance from prescribed activity
Great Eastern Highway	141 m from the in pit TSF
Environmental receptors	**Distance from prescribed activity**
Native Vegetation *Acacia kempeana* (Witchetty Bush) and *Acacia aneura* (Mulga) are dominant. Floristic composition includes:	Within the prescribed premises boundaries surrounding the in-pit TSF and the associated infrastructure.

• *Eucalyptus loxophleba* (York gum) • *Eucalyptus salmonophloia* (Salmon gum)	
Groundwater	The premises is located within the Goldfields Proclaimed Groundwater Area and is therefore subject to the *Rights in Water and Irrigation Act 1914*. Groundwater occurs within fracture rock aquifers and is low in volume. Groundwater in the region is saline to hypersaline (>150,000 mg/L) with a highly variable pH, neutral to acidic. There are no groundwater bores registered within 2.5 km downgradient of the TSF. The following baseline Standing Water Level (SWL) data (mbgl) are for the Gunga In-Pit TSF monitoring bores (MB): MB01 (26.5 mbgl), MB02 (26.5 mbgl), MB03 (39.6 mbgl), MB04 (40.9 mbgl), and MB05 (65.4 mbgl).
Surface water	Brown Lake is an ephemeral Salt Lake located 5 km to the east of the premises boundary. Surface water typically drains to the east-southeast, towards Brown Lake. Two ephemeral drainage lines intersect the pit and the tailings and return water pipeline system.
Conservation significant fauna • *Leipoa ocellata* (Malleefowl) listed as 'Vulnerable' under the *Biodiversity Conservation Act 2016* (BC Act) • *Falco peregrinus* (Peregrine Falcon) listed as species otherwise in need of special protection (other specially protected species) under the BC Act • *Nyctophilus major tor* (Central long-eared bat) listed as Priority 3 species under the BC Act.	Five Malleefowl mounds are located within the premises with one found 6 metres east of the pipeline infrastructure. The mounds are likely to be inactive and vary in age from 5 to 200 years. Peregrine Falcon's may be visitors at the premises. Central long-eared bat may be visitors at the premises. **Given the distance to these receptors, impacts from the prescribed activity emissions are not expected and therefore this receptor has been screened out.**
Cultural receptors	**Distance from prescribed activity**
Aboriginal heritage sites	Four registered Aboriginal heritage places 1.8 km or more south-west of the premises. **Given the distance to these receptors, impacts from the prescribed activity emissions are not expected and therefore this receptor has been screened out.**
National Heritage Place - Goldfields Water Supply Scheme WA (Mundaring to Kalgoorlie – Place ID 106007)	Approximately 220 m from the Gunga west in-pit TSF. The remaining elements include the former steam powered pump stations, reservoirs tanks and pipelines.

3.2 Risk ratings

Risk ratings have been assessed in accordance with the *Guideline: Risk Assessments* (DWER 2020) for those emission sources which are proposed to change and takes into account potential source-pathway and receptor linkages as identified in Section 3.1. Where linkages are incomplete they have not been considered further in the risk assessment.

Where the Licence Holder has proposed mitigation measures/controls (as detailed in Section 3.1), these have been considered when determining the final risk rating. Where the Delegated Officer considers the Licence Holder's proposed controls to be critical to maintaining an acceptable level of risk, these will be incorporated into the licence as regulatory controls.

Additional regulatory controls may be imposed where the Licence Holder's controls are not deemed sufficient. Where this is the case the need for additional controls will be documented and justified in Table 4.

The Revised Licence L4680/1988/13 that accompanies this Amendment Report authorises emissions associated with the operation of the Premises i.e. to allow the operation of the Gunga In-Pit TSF pipeline, decant infrastructure and groundwater monitoring bores.

The conditions in the Revised Licence have been determined in accordance with *Guidance Statement: Setting Conditions* (DER 2015).

Table 4. Risk assessment of potential emissions and discharges from the Premises during operation

Risk Event					Risk rating[1] C = consequence L = likelihood	Licence Holder's controls sufficient?	Conditions[2] of licence	Justification for additional regulatory controls
Source/Activities	**Potential emission**	**Potential pathways and impact**	**Receptors**	**Licence Holder's controls**				
Operation								
Category 5: Deposition of tailings into Gunga West in-Pit								
Tailings pipeline/ Decant return pipeline leaks or rupture	Tailings slurry / return decant water to in-pit TSF	***Pathway***: Direct Discharge and run-off, infiltration ***Impact***: Contaminated soil contaminating storm water runoff / direct deposition on surrounding vegetation.	Native Vegetation Surface water lines Groundwater	Refer to Section 3.1	C = Moderate L = Possible **Medium Risk**	Y	Condition 3: Containment infrastructure requirements	The Delegated Officer considers the applicant's proposed controls sufficient to reduce the risk associated with pipeline leaks / rupture. Applicant's controls have been conditioned within the licence in accordance with DWER *Guideline: Risk Assessment.*
Overtopping of Gunga West In-pit TSF		***Pathway:*** Vertical infiltration and horizontal migration ***Impact***: Groundwater mounding with potential surface expression of hypersaline groundwater	Native vegetation (soil health) Groundwater aquifer	Refer to Section 3.1	C= Moderate L= Unlikely **Medium Risk**	Y	Condition 4: Freeboard requirements Condition 6: Inspection of Infrastructure	The Delegated Officer considers the applicant's proposed controls of freeboard, the removal of the decant water and the visual inspection frequency sufficient to reduce the risk of direct discharge of tailings and return decant effluent to land. Applicant's controls have been conditioned within the works approval in accordance with DWER *Guideline: Risk Assessments.*

Risk Event					Risk rating[1] C = consequence L = likelihood	Licence Holder's controls sufficient?	Conditions[2] of licence	Justification for additional regulatory controls
Source/Activities	**Potential emission**	**Potential pathways and impact**	**Receptors**	**Licence Holder's controls**				
Tailings seepage to groundwater		***Pathway:*** Vertical infiltration and horizontal migration ***Impact:*** Subsequent groundwater contamination and groundwater mounding.	Native vegetation (soil health) Groundwater aquifer	Refer to Section 3.1	C= Moderate L= Possible **Medium Risk**	Y	Condition 3: Containment infrastructure requirements Condition 9 Condition 15: Monitoring of ambient groundwater quality Condition 20: Environmental Report requirements	The Delegated Officer considers that the proposed groundwater monitoring will also allow the licence holder to detect any changes in water quality. Groundwater quality in the region is saline to hypersaline therefore not suitable for livestock grazing/or other beneficial use. Groundwater extraction does occur, but its main use is for mining operations. Applicant's controls have been conditioned within the works approval in accordance with DWER *Guideline: Risk Assessments.*

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

Note 2: Proposed Licence Holder's controls are depicted by standard text. **Bold and underline text** depicts additional regulatory controls imposed by department.

4. Consultation

Table 5 provides a summary of the consultation undertaken by the department.

Table 5: Consultation

Consultation method	Comments received	Department response
Application advertised on the department's website on 3 June 2025.	None received.	N/A
Licence Holder was provided with draft amendment on 14 August 2025.	The licence holder requested to add the GIS coordinates and depths of monitoring bores for the Gunga In-Pit TSF to Schedule 3, Table 12. The licence holder provided the additional information requested by the department in relation to distance to groundwater.	Schedule 3, Table 12 of the licence was updated to include the additional information provided by the application in relation to the Gunga In-Pit TSF monitoring bores. Table 3 of the Amendment Report was updated to include the additional information provided by the applicant.

5. Conclusion

Based on the assessment in this Amendment Report, the Delegated Officer has determined that a Revised Licence will be granted, subject to conditions commensurate with the determined controls and necessary for administration and reporting requirements.

5.1 Summary of amendments

Table 6 provides a summary of the proposed amendments and will act as record of implemented changes. All proposed changes have been incorporated into the Revised Licence as part of the amendment process.

Table 6: Summary of licence amendments

Condition no.	Proposed amendments
Cover page	Updated Premises name and included additional land parcels (mining tenements and Lot 103 on Plan 40395) to reflect amended Premises boundary.
3, Table 2	Added new operational conditions for Gunga West In-Pit TSF.
4, Table 3	Added new freeboard condition for Gunga West In-Pit TSF.
6, Table 4	Added new inspection conditions for Gunga West In-Pit TSF and tailings and return water pipelines
15, Table 7	Added monitoring of ambient groundwater quality conditions for new monitoring bores (MB01, MB02, MB03, MB04 and MB05) of Gunga West In-Pit TSF
Schedule 1: Maps 1 and 2	Replaced the maps with the new versions submitted through this amendment.
Schedule 1: Maps 5 and 6	Added two new maps for new prescribed premises boundary coordinate points and Greenfields Processing Site's Tailings/return Water Pipelines.

Schedule 4	Added new table for prescribed premises boundary coordinate points.
Throughout the licence	Amended figure numbers according to the new figures included.

References

1. CMW Geo Sciences (CGS) 2023, *Gunga West Pit TSF Operations Manual FMR Investments Pty Ltd,* Perth, Western Australia.
2. Department of Environment Regulation (DER) 2015, *Guidance Statement: Setting Conditions*, Perth, Western Australia.
3. Department of Water and Environmental Regulation (DWER) 2020, *Guideline: Environmental Siting*, Perth, Western Australia.
4. DWER 2020, *Guideline: Risk Assessments*, Perth, Western Australia.