Appendix I – Visual Impact Assessment (Onshore Environmental Consultants 2018)

ONSHORE ENVIRONMENTAL

Visual Impact Assessment

Greenbushes Lithium Mine Expansion

Prepared for Talison Lithium
28 September 2018

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1 Introduction

1.1 Background

Talison Lithium Australia Pty Ltd (Talison) propose to undertake an expansion of the Greenbushes Lithium Mine (Greenbushes) in order to increase the production of lithium mineral concentrate to meet the increasing global demand for lithium products. Greenbushes is located directly south and immediately adjacent to the town of Greenbushes, 250 km south of Perth in Western Australia (Figure 1).

The expansion will increase production at the mine from the current 4.7 million tonne per annum (Mtpa) to 9.5 Mtpa of spodumene ore to produce up to 2.3 Mtpa of lithium mineral concentrate. Talison propose to expand the operational boundary (Active Mining Area) to the south, with a smaller extension to the north and increase the current (approved) area of 1,591 hectares (ha) to a 1,989 ha Mine Development Envelope (MDE). This represents a 398 ha increase to the current approved extent of the mine. The site layout is shown in Figure 2.

Onshore Environmental was commissioned by Talison to conduct a Visual Impact Assessment (VIA) to provide additional information as part of the environmental impact assessment and approvals required for the project.

Figure 1: Location Plan

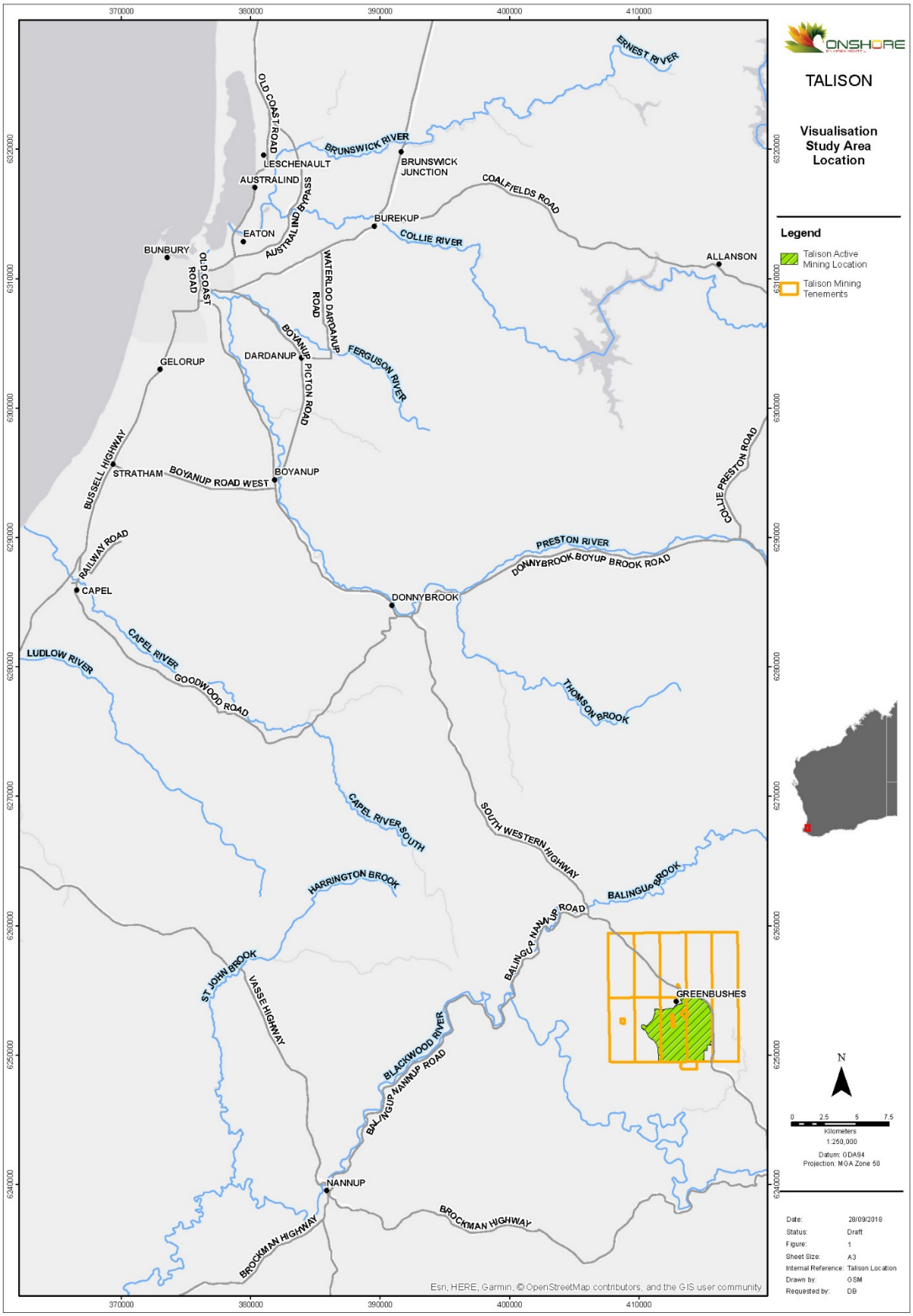
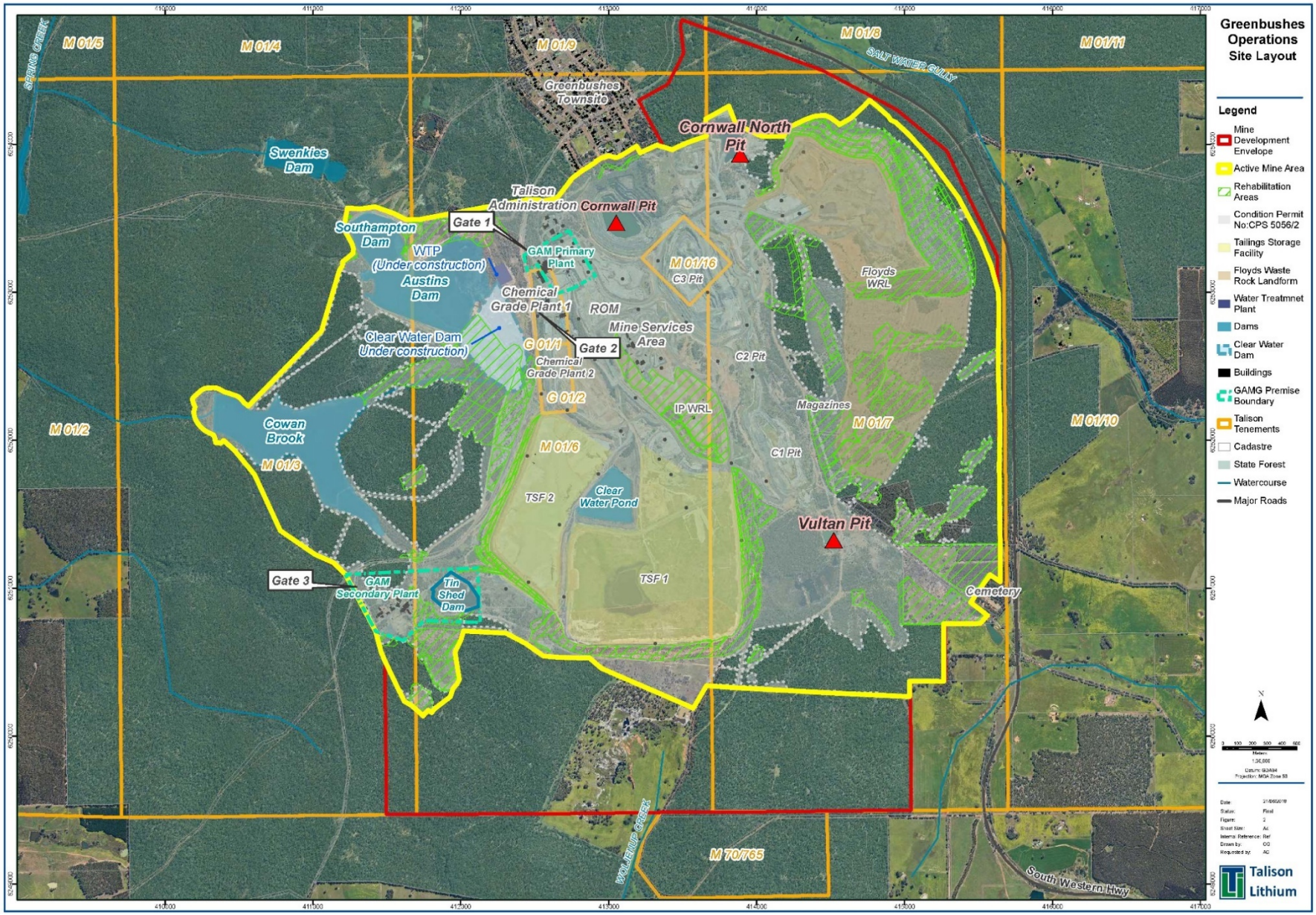


Figure 2: Site Layout



1.2 Legislative Context

1.2.1 Australia - Federal

Under Section 528 of the *Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act 1999)*, the term 'Environment' is defined as (Austlii 2018):

(a) Ecosystems and their constituent parts, including people and communities; and

(b) Natural and physical resources; and

(c) The qualities and characteristics of locations, places and areas; and

(d) Heritage values of places; and

(e) The social economic and cultural aspects of a thing mentioned in paragraph (a), (b) or (c).

Under this definition, impacts to visual amenity can be considered an 'environmental' impact, as it falls under the definition in (c).

1.2.2 Western Australia – State

When a proposal is assessed under the Part IV of the *Environmental Protection Act 1986 (EP Act 1986)*, the Environmental Protection Authority (EPA) may consider a proposal's impacts under its guidance framework for environmental factors. The '*Statement of Environmental Principles, Factors and Objectives*' released by the EPA in June 2018, states that 'environmental factors are those parts of the environment that may be impacted by an aspect of a proposal or scheme'. The EPA has 13 environmental factors, organised into five themes which include 'Sea, Land, Water, Air and People' and has identified an environmental objective for each environmental factor (EPA 2018).

The environmental factors and objectives relevant to landscape and visual impacts are shown in Table 1.

Table 1: Relevant EPA Environmental Factors and Objectives

Theme	Factor	Objective
Land	Landforms	To maintain the variety and integrity of significant physical landforms so that environmental values are protected.
Air	Air Quality	To maintain air quality and minimise emissions so that environmental values are protected.
People	Social Surroundings	To protect social surroundings from significant harm.
	Human Health	To protect human health from significant harm.

There are also a number of State policies that highlight the need for visual impact assessment to be considered during the planning phase of developments with the most important being the '*Western Australian State Planning Framework'* (DPLH & WAPC 2018).

The Western Australian Planning Commission's (WAPC) '*State Planning Policy No. 2: Environment and Natural Resource Policy'* for Western Australia (WAPC 2003) states that the objective for planning is to:

- *'Identify and safeguard landscapes with high geological, geomorphological or ecological values, as well as those of aesthetic, cultural or historical value to the community, and encourage the restoration of those that are degraded';*

- *'Consider the level or capacity of the landscape to absorb new activities and incorporate appropriate planning and building design and siting criteria to ensure that new development is consistent and sensitive to the character and quality of the landscape';*
- *'Consider the need for a landscape, cultural or visual impact assessment for land use or development proposals that may have a significant impact on sensitive landscapes'.*

The WAPC also encourages proponents to develop appropriate management strategies that can contribute to the maintenance and enhancement of high value landscapes. DPLH & WAPC 2012 highlights the need to:

- '*Safeguard and enhance significant natural landscape assets and cultural heritage values*'; and
- '*Protect and manage the region's cultural heritage, arts including indigenous significant places, and landscapes of significance*'.

1.3 Scope and Objectives

The Department of Planning, Lands and Heritage (DPLH) '*Visual Landscape Planning in Western Australia: A Manual for Evaluation, Assessment, Siting and Design'* (DPLH 2007) has been used to develop the visual impact assessment methodology. The principal objectives to conduct the evaluation and assessment include:

1. Describe the existing visual landscape character.
2. Describe the proposed development.
3. Describe and evaluate the potential visual impacts.
4. Develop visual management measures.
5. Provide recommendations and monitoring requirements.

These objectives are considered in line with DPLH 2007.

2 Existing Visual Landscape Character

2.1 Landscape Characteristics

The Greenbushes region is recognised as the longest continuously operated mining area in WA, with the discovery of tin occurring in 1886, and subsequent mining commencing in 1888 (Talison 2011). Open cut mining of tantalum commenced in the 1940's, in 1983 open cut hard rock mining of spodumene being the lithium bearing mineral commenced at the mine site. The mine is located directly south of the town of Greenbushes and west of the South West Highway and lies directly east of Maranup Ford Road.

The Greenbushes mine is located at a high point of the Darling Plateau which rises to approximately 320m Australian Height Datum (320m AHD). The Plateau is characterised as an expansive undulating landscape with green forest vegetation and occasional rocky outcrops and peaks. The open cut mine occurs within the Hester Subsystem and consists of undulating ridges and hill crests formed on laterite and gneiss which typically slope downwards off the main plateau into the surrounding Lowden Valleys System.

The Mine Development Envelope (MDE) occurs within the Yilgarn Plateau Province and intersects the Darling Plateau system. The system is described as a lateritic plateau with duplex sandy gravels, loamy gravels and wet soils and a Jarrah marri wandoo forest and woodland. A review of soil landscape mapping of the south west of Western Australia revealed that the soils within the MDE are mostly loamy gravels, sandy gravels and loamy earths (DAFWA 2004). The soil landscapes which occur within the MDE are described in Figure 3.

Onshore Environmental (2018) mapped and described a total of nine vegetation types from three broad landforms occurring within the MDE. Extensive field assessment confirmed vegetation types were not aligned with Threatened Ecological Communities (TECs) or Priority Ecological Communities (PECs). Furthermore, vegetation within the MDE was well represented regionally, and well reserved. The vegetation types and their extent are described and illustrated in Figure 4.

The mine site is predominately located within State Forest 20, and surrounded by State forest, agricultural properties, rural townsite of Greenbushes and plantations. The current approved operational boundary (Active Mining Area) is 1591 hectares (ha), the expansion will require a small increase to the north and an increase to the south extending the Mine Development Area (MDE) to 1989 ha or an increase of 398ha to the Active Mining Area. "Approximately 66% of the MDE has already been disturbed as a result of the extensive history of mining within the area, as well as forestry, water storage and supply, surrounding agriculture activities and edge effects from the town of Greenbushes". (GHD,2018).

Figure 3: Soil Landscape Mapping

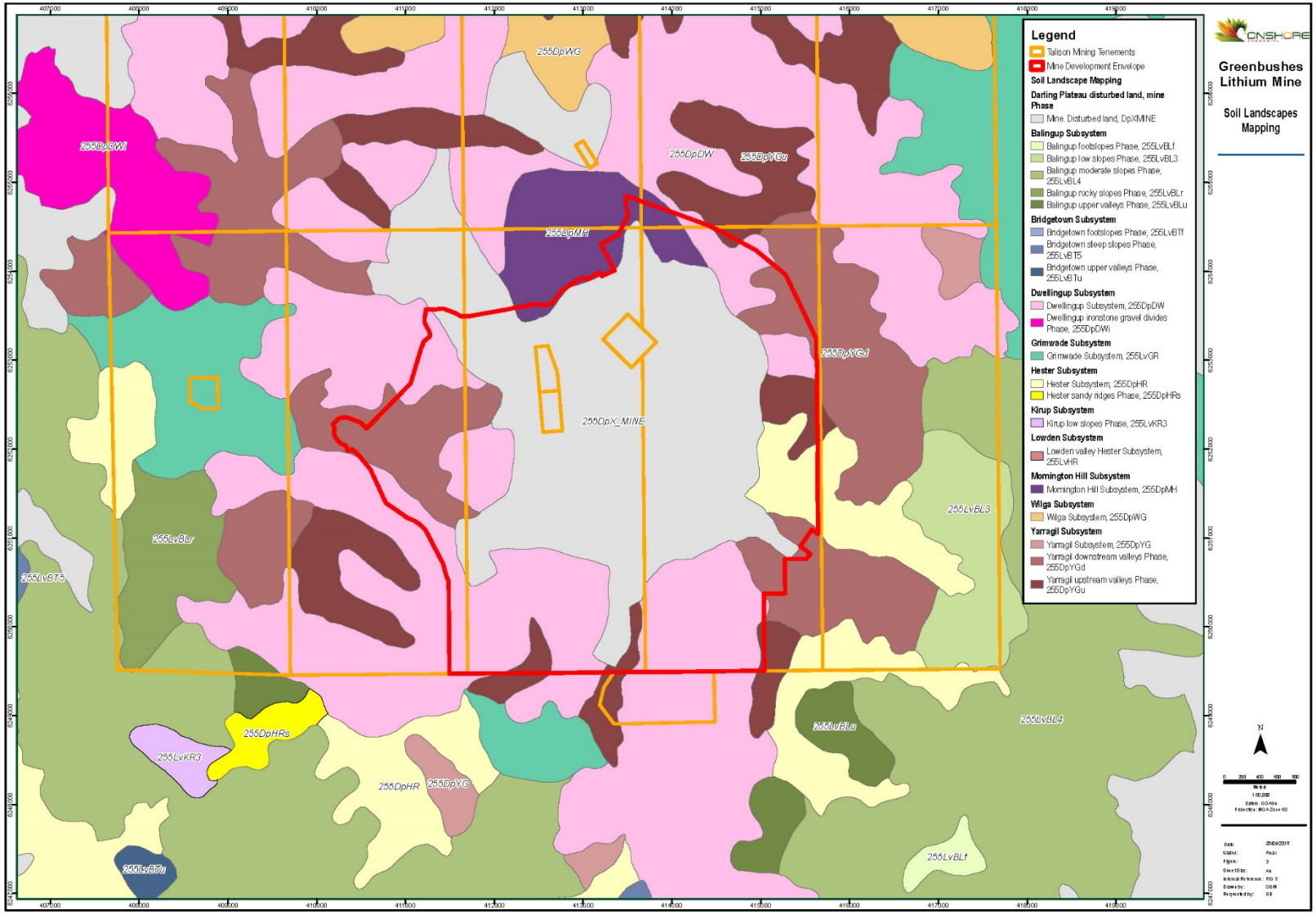


Figure 4: Vegetation Types

2.2 Socio-Economic Setting

2.2.1 Land Uses and Social Value

The MDE is located within part of the State Forest 20 and private property (rural). A large proportion of the MDE is already cleared as a result of historical mining in the area and present mining of the Greenbushes deposit. The current primary land use within the MDE is for mining, agriculture, conservation and forestry (State Forest) and water catchment. Transport of lithium mineral concentrate occurs by truck, via public roads rated to accept B-double trucks.

The Project area occurs at the boundary of the South West Boojarah #2 Native Title Claim area (WC2006/004), and the Wagyl Kaip (WC1998/070) and Southern Noongar (WC1996/109) Native Title Claim areas. The Blackwood River (ID 20434) has been recognised as a site of mythological significance in association with Waugal beliefs. The Blackwood River site occurs within mining tenements M01/2, M01/4, M01/5, M01/10 and L01/1. Talison has conducted Aboriginal Heritage Survey's and consulted with Traditional Owners of the land. Survey's completed did not identify any Aboriginal heritage sites or places as defined by section 5 of the AH Act within the MDE.

2.2.2 Demography and Economy

The Mine is located within the Shire of Bridgetown/Greenbushes immediately south of the town of Greenbushes, 10 km north-west of Bridgetown and 10 km south east of Balingup. The Shire of Bridgetown/Greenbushes has a population of 4,661 (ABS 2017). Industries with the highest number of employees include health care and social assistance (11.7%), mining (10.7%) and agriculture, forestry and fishing (10%). The wider Warren Blackwood region has a population of 39,813 (ABS, 2017). Top employing industries in the region include accommodation, agriculture, education and retail.

3 Description of Proposed Development

Talison propose to undertake an expansion of the mine to increase the production of lithium mineral concentrate from the Greenbushes deposit.

The Key Characteristics of the Proposal are:

- Expansion of the open pit.
- New Run of Mine (ROM).
- Additional processing infrastructure.
- Establishment of a new Mine Service Area.
- Establishment of a new site magazine and batching facility.
- Expansion of the Waste Rock Landform (WRL).
- Additional Tailings Storage Facility (TSF).
- Additional supporting infrastructure including access tracks, pipelines, power supply bypass roads.

Although all key characteristics of the proposal have been evaluated, the VIA only focuses on the characteristics that have the potential to impact visual landscapes and visual amenity. These include:

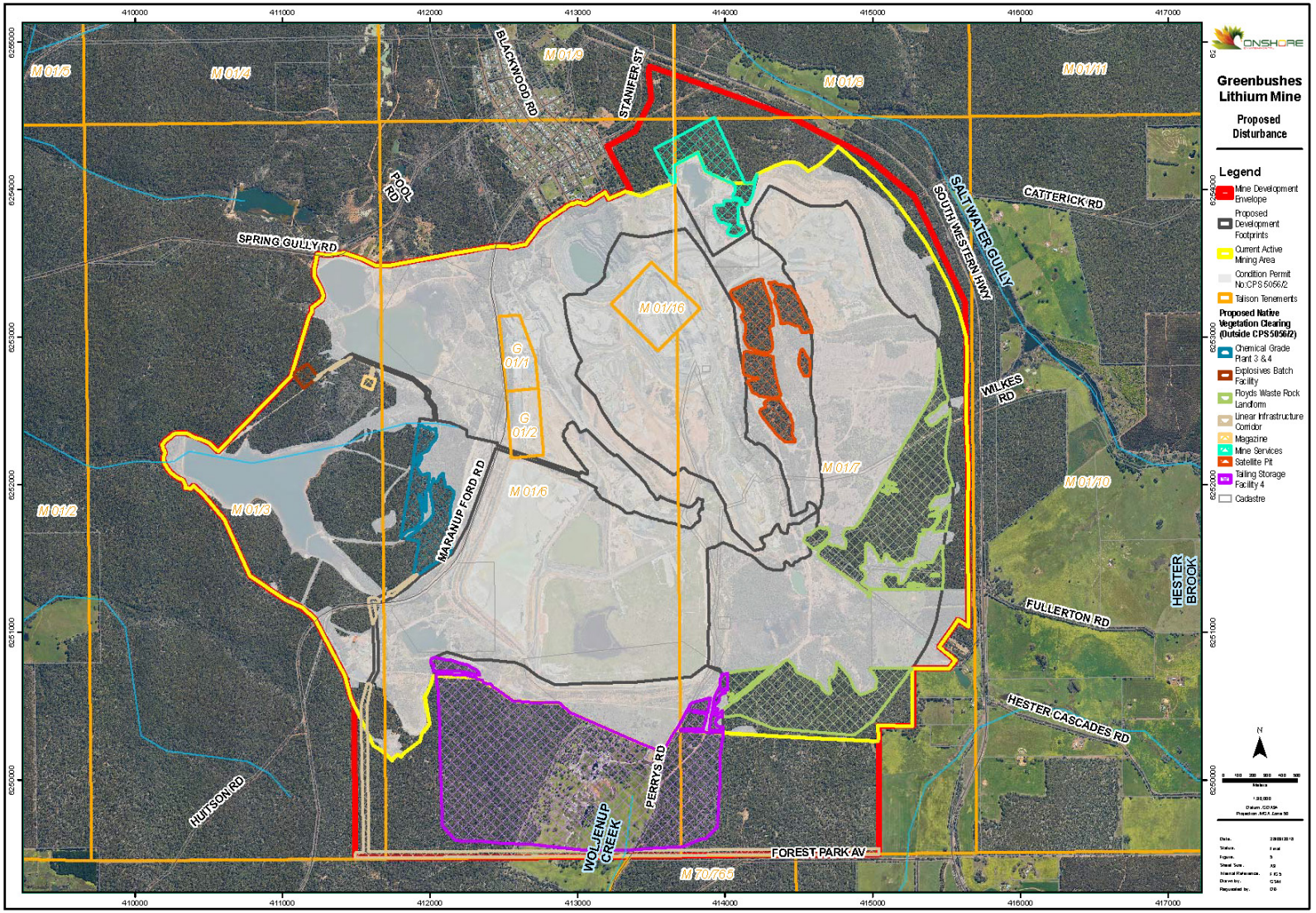
- Floyds Waste Rock Landform.
- Tailing Storage Facility 4.
- Mine Services Area.

The remaining key characteristics of the proposal will not impact visual landscapes and amenity due to their physical setting west of the ridgeline where receptors to these characteristics are absent. In addition, the existing mine characteristics, including the open pit, and surrounding state forest act as a buffer to the development areas.

The proposed characteristics and disturbance area are illustrated in

Figure ***5***.

Figure 5: Proposed Layout and Disturbance Area



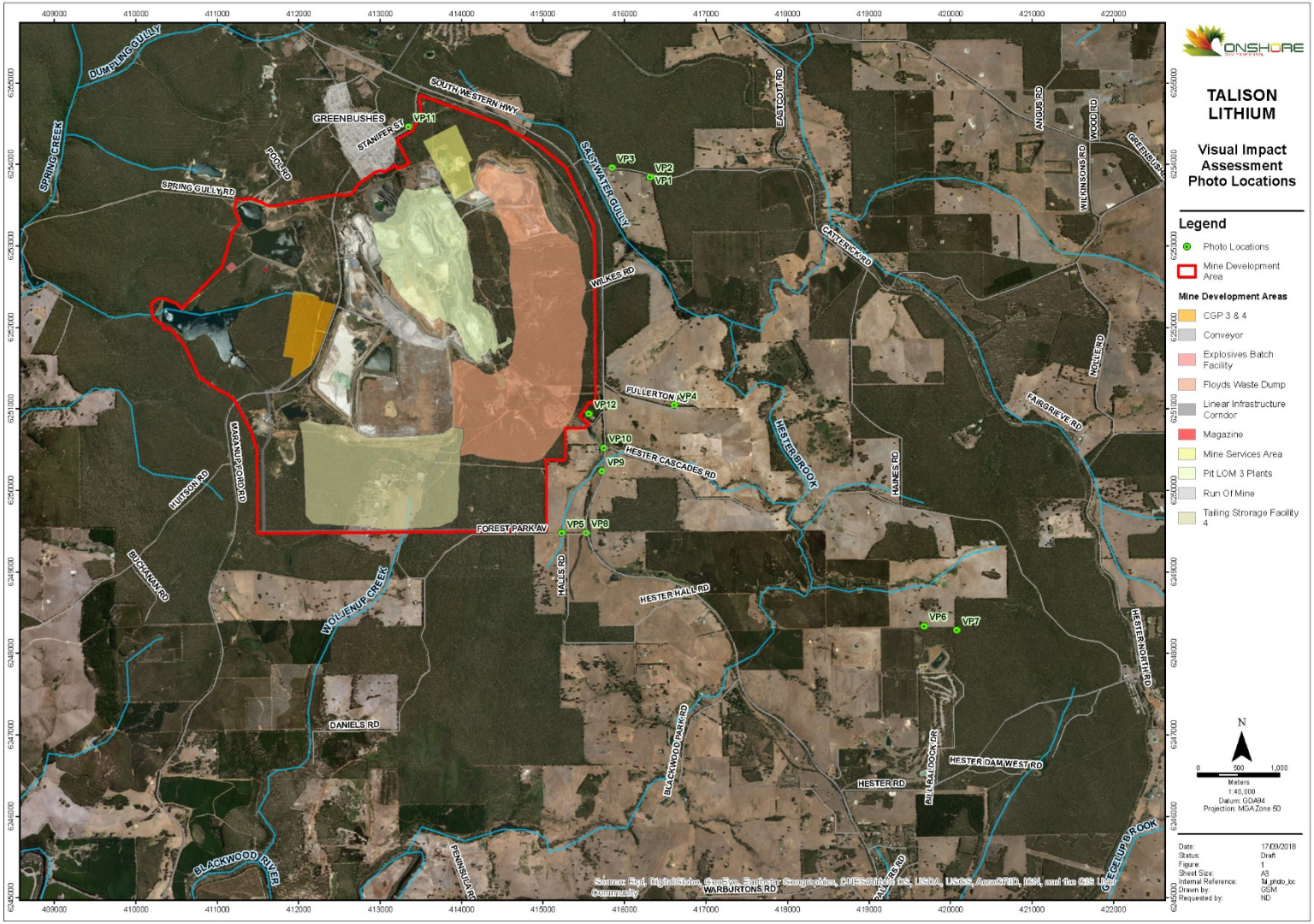
3.1 Evaluation of the Potential Visual Impacts

The methodology to evaluate visual impacts from the proposed mine expansion consists of a desktop and field evaluation and combines both qualitative and quantitative methods to determine the likely impacts to local receptors. The desktop evaluation was integral to understand the current and predicted landscapes and how they might impact the likely receptors. Much of the desktop evaluation was achieved using visual modelling of the post construction operations and developing an understanding on how it will interact with the landscape.

The field survey quantified many of the findings from the desktop evaluation and gave an opportunity to understand visual characteristics from viewpoints that would commonly be experienced by the receptors. The data collected from the evaluations was used in Section 5 to formalise the predicted risks associated with the development on visual amenity and landscapes.

Figure 6 illustrates the identified receptors that have the potential to be impacted by the mining development. It should be noted that most of the receptors are located to the east of the development, coinciding with the elevated risks associated with the Floyds WRL on road users and residential areas. To the west and south, existing mine characteristics and state forest acts as a buffer with the closest receptors remaining unaffected.

Figure 6: Map Receptors



3.2 Desktop Evaluation

3.2.1 Digital Visualisation

To obtain the reference images to allow a correct transfer to the individual locations photos the following procedure was developed.

A regional digital elevation model (DEM) was developed utilising the publicly available Landgate contour dataset using GIS software. The extent of this was determined by encompassing all the photo locations and the project area. Project specific data supplied by Talison was then made into individual DEM datasets for each year of development. This data was then merged with the regional data to form a single dataset for each specific target year. The data was then analysed within a 3D visualisation software. Each photo location was placed within the environments based upon the geotag information with the relevant height of the image taken into consideration. The base image was then rotated to conform with the supplied direction to ensure correct heading. Where available LIDAR data was also placed into the 3D environment. This allowed for fine adjustment using such structures as trees, walls, houses, to ensure correct alignment with the base images. Indicative stockpiles where then created on each individual image based upon the relevant year.

3.2.2 Viewpoint Selection

Viewpoint sites are areas where the proposed development may be visible and have the potential to impact receptors including; private property, motorists, tourist attractions, recreational spaces and public areas. They are based on data from the desktop assessment and are later verified during the field assessment.

Several sources were used to identify and choose viewpoint sites during the desktop assessment including;

- Consultation with Talison's Stakeholder Engagement Officer
- Places data set.
- Tourist maps.
- Tourist information centre.

The desktop assessment considered a number of site aspects and how significant such aspects were within a landscape context (Table 2).

Table 2: Site Aspects and Significance

Aspect	Significance
Water features	Water features within the Australia landscape are often associated with places of cultural, environmental and economic significance. Within the Greenbushes area water features such as, pools, dams, rivers and streams are often used for industry (agricultural and mining), as tourist attractions or for recreational spaces.
Hills and rises	Elevated positions within the landscapes offer significant views over both agricultural and forest settings. Although there are no public lookout points within the Greenbushes area the undulated landscape offers a greater experience when passing through or taking part in recreational activities such as bushwalking or riding.

Aspect	Significance
Towns and homesteads	Towns and homesteads all have varying visual amenities and visual landscapes that often alter over time depending on local activities and developments. Towns have higher levels of potential viewers and therefore are often considered as having a higher level of significance. Although homesteads have fewer potential viewers, they often have vast outlooks across uninterrupted landscapes.
Vantage points	Vantage points and lookouts can be formally or informally created, usually in elevated and accessible positions. Formal lookouts are usually demarcated with signage and attract tourists whilst informal vantage points are often appreciated on a local level.
Public roads	Public roads generally have diverse changing landscapes and receive large amounts of viewer traffic. The significance of visual impact on road users may differ depending on the reasons for using the road and how familiar they are with the road. For example landscape continuation and vast outlooks may be more significant to tourist than it would for transporters. In addition amenity that causes distraction to motorists is considered of high significance.

Ten viewpoints were selected during the desktop assessment and visited in the field. These are listed in Table 3, as well as the GPS location of each viewpoint and the validation reason as to why it was chosen. A field assessment allows the assessor to be exposed to views of the landscape that the general public are also likely to be exposed to and is the easiest method of determining whether the viewpoints chosen are appropriate.

Table 3: Viewpoint Site Details

Viewpoint #	Viewpoint Characteristic	Validation	GPS Coordinates (WGS84)
VP1	Catterick Road	Residential property within proximity to Floyds WRL development.	33.852, 116.095
VP2	Catterick Road	Residential property within proximity to Floyds WRL development.	33.852, 116.095
VP3	Catterick Road	Residential property within proximity to Floyds WRL development.	33.851, 116.090
VP4	Fullerton Road	Private property within proximity to Floyds WRL development.	33.878, 116.098
VP5	Forrest Park Avenue	Private property within proximity to Floyds WRL development.	33.891, 116.083
VP6	Rear of Waste Water Treatment Plant	Accessed by public for recreational and wood collecting activities. Distant views of mining activities.	33.902, 116.131
VP7	Bike Trail	Frequently used by recreational cyclists and bushwalkers.	33.903, 116.136
VP8	SW Highway	High frequency road in proximity to Floyds WRL.	33.918, 116.117
VP9	SW Highway	Residential property and high frequency road in proximity to Floyds WRL.	33.885, 116.089
VP10	SW Highway	Residential property and high frequency road in proximity to Floyds WRL.	33.882, 116.089
VP11	Stannifer Road Mine Service Area	High frequency road used to access Greenbushes town.	33.847, 116.063

Viewpoint #	Viewpoint Characteristic	Validation	GPS Coordinates (WGS84)
VP12	Town Cemetery / Historic Site	Periodic use for Funerals & by Relatives and Tourists.	33.878, 116.089

3.2.3 Risk Evaluation

A risk assessment was undertaken to determine the impact of the proposed development from each viewpoint. Desktop and field-based data was used to assess the impacts and develop mitigation and management measures. Factors considered in the determination of impact significance included:

- **Type** i.e. direct (impacts that arise directly from the project), indirect (impacts that occur as a result of direct project impacts), induced (impacts arising from other activities that are not part of the project, but that occur as a consequence of the project) or cumulative (impacts that arise as a result of all pressures on a receptor or resource from all sources including the project and third parties).
- **Routine and non-routine** i.e. routine impacts are from planned activities and non-routine impacts are from unplanned activities or unforeseen events.
- **Extent** i.e. project footprint (impact limited to direct area of project activities), local (impact limited to the immediate vicinity of the project) or regional (impact extends a significant distance from the operations >5kms).
- **Duration** i.e. short term (impacts that arise over a short duration), medium term (impacts that arise for a longer period than short term impacts but do not last for the life of the project), long term (impacts that arise over the operational life of the mine but are reversible when the project finishes) and permanent (impacts that arise from irreversible changes such as alteration of the landscape).
- **Sensitivity of Resource/Receptor** i.e. the extent to which a resource/receptor will be affected by an impact, expressed as low, medium or high.
- **Value of a Resource/Receptor** i.e. the intrinsic value of a resource or receptor.

The risk matrix, consequence and likelihood definitions are shown in Table 4,

Table ***5*** and

Table ***6*** respectively. The risk assessment is provided in

Appendix 1.

Table 4: Risk Matrix

		Consequences				
		Insignificant	Minor	Moderate	Major	Extreme
Likelihood	Rare	Low	Low	Moderate	Moderate	High
	Unlikely	Low	Low	Moderate	High	High
	Possible	Low	Low	Moderate	High	Extreme
	Likely	Low	Moderate	High	Extreme	Extreme
	Almost Certain	Moderate	Moderate	High	Extreme	Extreme

Table 5: Consequence Definitions

Factor	Insignificant 1	Minor 2	Moderate 3	Major 4	Extreme 5
Landforms	Post mining landforms are consistent with their surroundings.	Post mining landforms are generally consistent with their surroundings with minor variations in elevation, profile and vegetation.	Post mining landforms are generally consistent with their surroundings but show distinguishable variation in elevation, profile and vegetation.	Post mining landforms are inconsistent with their surroundings with notable differences in elevation, profile and vegetation.	Post mining landforms are inconsistent with their surroundings, represented by significant differences in elevation, profile and vegetation.
	Post mining landforms are stable.	Post mining landforms are stable but may experience minor erosion, such as rilling.	Post mining landforms are generally stable, but may experience moderate erosion, such as limited gullying.	Post mining landforms are unstable, with significant erosion, such as tunnelling and gullying, and subsidence.	Post mining landforms fail (e.g. TSF embankment failure), with extensive ongoing management issues.
	No significant change in landforms.	Minor, reversible alteration to landforms visible to receptors from within the project footprint.	Significant and/or irreversible alteration to landforms visible to receptors within the local area.	Significant and/or permanent alteration to landforms visible to receptors within a regional extent.	Significant, permanent alteration to landforms visible to receptors within a regional extent.
Amenity	Minimal, short term and infrequent loss of amenity within the project area.	Minimal and short term, but frequent, loss of amenity within the local area.	Medium term and frequent low-level decreases in amenity within a local area.	Medium term, low level decline in amenity within a regional area.	Long term, mid-level decline in amenity over a regional area.
	No significant impact on aesthetics.	Infrequent, perceptible changes in aesthetics within the project footprint that do not affect the health and well-being of people.	Infrequent, perceptible changes in aesthetics within the local area that do not affect the health and well-being of people.	Frequent, perceptible changes in aesthetics within local area that affect the health and well-being of people.	Frequent, perceptible changes in aesthetics within the regional area that affect the health and well-being of people.
	No lasting visual impact on the local environment.	Minor short-term visual impact on the local environment.	Moderate short to medium term impact on the local environment.	Major medium to long term impact on the regional environment.	Extreme long-term impact on the regional environment.

Table 6: Likelihood Definitions

Category	Definition
Rare	Highly unlikely, but it may occur in exceptional circumstances.
Unlikely	Not expected, but there's a slight possibility it may occur at some time.
Possible	The event might occur at some time as there is a history of occurrence at similar projects.
Likely	There is a strong possibility the event will occur as there is a history of frequent occurrence at similar projects.
Almost Certain	Very likely. The event is expected to occur in most circumstances as there is a history of regular occurrence at similar projects.

3.3 Field Evaluation

3.3.1 Survey Criteria

The identified key viewpoints were visited by foot and vehicle on the 7 September 2018. GPS waypoints, field notes and photographs were taken at each site. A qualitative assessment was undertaken in the field by the assessor for each viewpoint site and field notes were taken for each viewpoint which included the criteria and characteristics shown in Table 7 (refer to Section 3.3.2 for field assessment results tables).

Table 7: Field Survey Criteria

Criteria	Characteristic
Location	The location of the viewpoint relative to the surrounding features.
View Direction	The extent of the view from the viewpoint for e.g. foreground and background.
View Elevation	The elevation of the viewpoint in relation to Australian Height Datum (AHD).
Setting	Where the viewpoint is situated.
Viewing Distance	The distance from the viewpoint to the development.
Land System and Vegetation	The dominant land system and approximate vegetation coverage, density and diversity at the viewpoint.
Land use	Major land use of the viewpoint.
Accessibility	Public accessibility of each viewpoint.
Motion	The speed at which a viewer may be travelling past the viewpoint.
Valued landscape characterises	Characteristics identified in the viewpoint that offer a point of interest or value to the landscape.
Experience	Characteristics and overall impression of the viewpoint.
Inherent Risk	Risk of visual impact prior to any mitigation control (as included in Section 6) being administered.

Potential impact was determined as the distance between the site and the proposed development areas. The potential vulnerability of a site was determined based on the function of the proximity of the site to centres of population and the ease of access of the site.

3.3.2 Viewpoint Survey

Viewpoint survey results tables for each site are shown below.

Table 8: VP1

Image Reference	**VP1** **Catterick Road**

Criteria	**Characteristic**	
Location	Latitude: 33.852	Longitude: 116.095
View Direction	239.36	
Viewpoint Elevation	269.30	
Setting	Private property south of Catterick Rd	
Viewing Distance	1.3km	
Land System and Vegetation	Undulated agricultural pastures with few remnant trees. Eucalypt Forest and waste rock landform visible in the background. Approximately 80% of the visible waste rock landform is vegetated offering a balanced transition into the adjacent state forest. The waste rock landform is uniform in nature offers a simple, slightly curved backdrop. There is a small portion (20%) of the waste rock landform that has yet to be rehabilitated which creates a small to medium discordant feature within the landscape. There is a strong contrast in colour to the natural green however the contour remains sinuous.	
Land use	Agricultural land use with multiple dwellings.	
Accessibility	Local traffic used to access private properties.	
Motion	Static	
Valued Landscape Characteristics	Wide open landscapes, rolling pastures and agricultural activities.	
Experience	Neutral experience with minor interruptions to visual landscape imposed by exposed waste rock landform.	
Inherent Visual Risk	High : Almost Certain / Moderate impact due to short to medium term impact on local environment	

Table 9: VP2

Image Reference	**VP2** **Catterick Road**

Criteria	**Characteristic**	
Location	Latitude: 33.852	Longitude: 116.095
View Direction	198.07	
Viewpoint Elevation	269.61	
Setting	Private property south of Catterick Rd	
Viewing Distance	1.3km	
Land System and Vegetation	Undulated agricultural pastures with few remnant trees in the foreground. Agricultural and residential infrastructure exists across the mid line of the viewpoint. In the background Eucalypt Forest breaks the landscape whilst maintaining harmony across the viewpoint.	
Land use	Agricultural land use with multiple dwellings.	
Accessibility	Local traffic used to access private properties.	
Motion	Photo taken from static position however similar views will be expected by local traffic at 50km/hr.	
Valued Landscape Characteristics	Wide open landscape with a contrast between agricultural activities in foreground and vegetated hills in the background.	
Experience	Neutral to positive experience due to relative elevation across tranquil landscapes.	
Inherent Visual Risk	High: Almost Certain / Moderate impact due to short to medium term impact on local environment	

Table 10: VP3

Image Reference	**VP3** **Catterick Road**

Criteria	**Characteristic**	
Location	Latitude: 33.851	Longitude: 116.090
View Direction	235.98	
Viewpoint Elevation	237.33	
Setting	Private property south of Catterick Road.	
Viewing Distance	1.2km	
Land System and Vegetation	Undulated agricultural pastures with few remnant trees in the foreground. Agricultural and residential infrastructure exists across the mid line of the viewpoint. In the background Eucalypt Forest and revegetated waste rock landforms maintains harmony with the landscape. Where the waste rock landform has not been rehabilitated the landscape is fragmented. Straight lines and earthy red colours contrast with the green vegetation. The size of the interruption is minimal compared to the size of the greater landform.	
Land use	Agriculture land use including residence.	
Accessibility	Access by vehicle is limited to local traffic.	
Motion	The viewpoint was taken from a static position however the residence and vehicle users will experience the landscape either on foot or in cars (<50km/hr).	
Valued Landscape Characteristics	Wide open landscape with a contrast between agricultural activities in foreground and vegetated hills in the background.	
Experience	Largely neutral to positive experience due to relative elevation across rural landscapes. The, current and approved, unrehabilitated waste rock landform would most likely be considered as a negative experience as it draws your attention from the natural onset.	
Inherent Visual Risk	High: likely / Moderate - impact due to short to medium term impact on local environment	

Table 11: VP4

Image Reference	VP4
	Fullerton Road

Criteria	**Characteristic**	
Location	Latitude: 33.878	Longitude: 116.098
View Direction	317.64	
Viewpoint Elevation	263.48	
Viewing Distance	2.8km	
Land System and Vegetation	Mildly undulated agricultural pastures with few remnant trees scattered within. Eucalyptus forest exists along the midline with the waste rock landform slightly visible beyond the tree line. The waste rock landform maintains similar lines to the natural environment and does not impede heavily on the landscape. A very small section of unrehabilitated waste rock landform can be made out in the distance however it is balanced within the landscape.	
Land use	Agricultural land under crop.	
Accessibility	Fullerton Road is accessed by local traffic only to service agricultural lands.	
View Elevation	Neutral with the landscape.	
Motion	The view point has been taken from a static position but it is likely that the landscape will be view by local motorists traveling at approximately 60km/hr.	
Valued Landscape Characteristics	Wide open landscape with a contrast between agricultural activities and neighbouring forest.	
Experience	Neutral experience with distant view and mild undulations.	
Inherent Visual Risk	Moderate: Likely / Minor – infrequent perceptible changes in aesthetics within the project footprint that do not affect the health and well being of people	

Table 12: VP5

Image Reference	**VP5** **Forest Park Ave**

Criteria	**Characteristic**	
Location	Latitude: 33.891	Longitude: 116.083
View Direction	191.21	
Viewpoint Elevation	227.21	
Viewing Distance	0.90km	
Land System and Vegetation	Rolling agricultural pastures boarded by Eucalypt Forest. The landscape is broken by wire fence lines (holding paddock) in the foreground and overhead power lines run the length of the viewing distance.	
Land use	Agricultural land under pasture.	
Accessibility	Local traffic only minimal usage.	
Motion	View point was taken in a static position, but road users would experience the landscape at 50km/hr.	
Valued Landscape Characteristics	Wide open landscape boarded by forest.	
Experience	Neutral experience due to relative elevation across tranquil landscapes.	
Inherent Visual Risk	Moderate: Likely / Minor – infrequent perceptible changes in aesthetics within the project footprint that do not affect the health and well being of people	

Table 13: VP6

Image Reference	**VP6** **Rear of Waste Water Treatment Plant**

Criteria	**Characteristic**	
Location	Latitude: 33.902	Longitude: 116.131
View Direction	289.57	
Viewpoint Elevation	285.47	
View Distance	7.0km	
Land System and Vegetation	Agricultural landscapes rolling into vegetated valley systems. Few remnant trees within the cleared agricultural lands with overburden from historic clearing activities visible. A plantation lies across the mid-section of the view point. The waste rock landform is visible in the background. The unvegetated section is small (10-20% of the horizon) however it offers a stark contrast compared to the revegetated dumps and Eucalypt forest.	
Land use	Agricultural land under pasture.	
Accessibility	Minimal access along firebreak track.	
Motion	Static	
Valued Landscape Characteristics	Rural landscape from elevated position with smooth lines into valley system.	
Experience	Neutral experience due to relative elevation across tranquil landscapes. The current and approved Waste rock landform could be viewed as having a negative impact on the landscape.	
Inherent Visual Risk	Low: Possible / insignificant -No Lasting visual impact on the local environment	

Table 14: VP7

Image Reference	**VP7** **Greenbushes Loop Bike Trail**

Criteria	**Characteristic**	
Location	Latitude: 33.903	Longitude: 116.136
View Direction	318.24	
Viewpoint Elevation	283.43	
View Distance	0.8km	
Land System and Vegetation	Gravel access tracks within Eucalypt forest used as a bike trail. In the background a stark contrast exists where the forest breaks into agricultural land. Fencing infrastructure and gates exist in the mid-section of the viewpoint.	
Land use	Local bike trail, gravel access tracks and agricultural land.	
Accessibility	Low level usage with the area accessible to local traffic and people using the bike track facility.	
Motion	The view point was taken from a static position however it is likely that cyclists will experience the view point at up to 20km/hr.	
Valued Landscape Characteristics	Transition from Eucalypt forest to agricultural lands.	
Experience	The transition between the landscapes (forest to agriculture) could be viewed as aesthetically pleasing and offering a positive experience.	
Inherent Visual Risk	Low : Rare / insignificant -No Lasting visual impact on the local environment	

Table 15: VP8

Image Reference	**VP8**
	South West Highway

Criteria	**Characteristic**	
Location	Latitude: 33.918	Longitude: 116.117
View Direction	350.097	
Viewpoint Elevation	262.33	
View Distance	1.0km	
Land System and Vegetation	Rolling agricultural pastures boarded by Eucalypt Forest. The landscape is broken discontent with the South Western Highway running alongside powerlines.	
Land use	Transport corridor, service corridor and agricultural land use.	
Accessibility	Highly accessible by multiple road users.	
View Elevation	The South Western Highway generally follows low points in the landscape. At this viewpoint the landscape is relatively neutral with minimal visual vantage.	
Motion	Motor vehicles up to 110km/hr.	
Valued Landscape Characteristics	Rural vistas and forests including road reserves.	
Experience	At this view point the landscape give a neutral viewing experience.	
Inherent Visual Risk	Low : Possible / insignificant -No Lasting visual impact on the local environment	

Table 16: VP9

Image Reference	**VP9**
	South West Highway

Criteria	**Characteristic**	
Location	Latitude: 33.885	Longitude: 116.089
View Direction	251.82	
Viewpoint Elevation	212.14	
View Distance	0.6km	
Land System and Vegetation	Sloping agricultural pastures with few remnant trees scattered within. Agricultural and residential infrastructure exists across the mid line of the viewpoint. In the background Eucalypt Forest breaks the landscape.	
Land use	Southwest Highway road users and agricultural lands.	
Accessibility	Highly accessible as the viewpoint is taken from the Southwest Highway verge.	
Motion	Vehicles will be moving between 80-110km/hr.	
Valued Landscape Characteristics	Rural landscapes and forests. As the roadway is at a low point of the landscape the viewpoint does not offer extensive landscape views.	
Experience	Neutral experience with few distractions to road users.	
Inherent Visual Risk	High: Almost Certain / Moderate- Moderate shirt term to medium term impact on the local environment	

Table 17: VP10

Image Reference	**VP 10** **South Western Highway**

Criteria	**Characteristic**	
Location	Latitude: 33.882	Longitude: 116.089
View Direction	206.062	
Viewpoint Elevation	218.97	
View Distance	0.5km	
Land System and Vegetation	Rural residence set alongside South Western Highway overlooking paddocks to the north and west with large remnant trees across the foreground and background. Little to no undulation of paddocks. There is a large dam north west within viewing distance of the residence.	
Land use	Southwest Highway road users and agricultural lands.	
Accessibility	Although cars can view the residence from the South Western Highway, the view scape from the road is limited due to trees surrounding the residence which screen the paddocks to the north and west. Residential access is frequent.	
View Elevation	The residence sits relatively low on where there is little undulation across the landscape. The viewing distance is approximately 0.5km to the stand of Eucalypts which boarder the paddock north of the residence.	
Motion	The photo was taken from a static position (residents' perspective) however motorists would experience the viewpoint at speeds of up to 110km/hr.	
Valued Landscape Characteristics	Rural landscapes and forests. As the residence is at a low point of the landscape the viewpoint does not offer extensive landscape views.	
Experience	Neutral experience from residence due to limited elevation, few distractions to road users.	
Inherent Visual Risk	High: Almost Certain / Moderate- Moderate shirt term to medium term impact on the local environment	

Table 18: VP11

Image Reference	**VP11** **Stannifer Road Mine Service Area**

Criteria	**Characteristic**	
Location	Latitude: 33.847	Location
View Direction	140.90	View Direction
Viewpoint Elevation	336.9	
View Distance	0.080 km	
Land System and Vegetation	Eucalypt forest adjacent to Stannifer Road. Large Eucalypt trees with consistent understory. A service corridor exists which breaks the visual landscape.	
Land use	Eucalypt forest, service corridor.	
Accessibility	The viewpoint is from Stannifer Road which is the main access way to Greenbushes from the South Western Highway. It is easily and regularly accessed by Greenbushes residents.	
View Elevation	The viewpoint is at a flat high point of the landscape. Views are limited to the lack of undulation and large trees screening extended views.	
Motion	Motorists would view this landscape at approximately 60km/hr.	
Valued Landscape Characteristics	Forest characteristics with mature eucalypt trees.	
Experience	The experience is neutral with limited views. The forest has a positive impression however the busy road and service corridor can mute the visual experience.	
Inherent Visual Risk	Low : Possible / insignificant -No Lasting visual impact on the local environment	

Table 19: VP12

Image Reference	**VP12** **Town of Greenbushes Local Cemetery & Historic Site**

Criteria	**Characteristic**	
Location	Latitude: 33.878	Longitude: 116.089
View Direction	237.52	
Viewpoint Elevation	232.43	
View Distance	0.05km	
Land System and Vegetation	Historic sites surrounded by mature eucalypt trees. Within the historic site there are several grave sites and small – medium trees and shrubs. Although the eucalypt trees are mature the stand has low density and little understorey.	
Land use	Town of Greenbushes local cemetery and a historic site	
Accessibility	Easily accessible however intermittent use .	
View Elevation	No elevation and limited views.	
Motion	Static.	
Valued Landscape Characteristics	Historic value surrounded by established trees.	
Experience	Neutral to positive experience with the historic sites melding into the forest background.	
Inherent Visual Risk	High: Likely /Moderate – Moderate short to medium term impact on the environment	

4 Visual Impact Assessment

It is expected that from the proposed increased footprint the mine will become a more dominant feature in the landscape when viewed from surrounding areas particularly at the identified receptor locations.

The visible section of Floyds WRL will increase as the height of the WRL increases to the final approved height of 330 m AHD and the landform extends to the south were existing revegetation activities blend into the landscapes. The visual impacts associated with the WRL extensions are likely to be of medium to high risk prior to mitigation measures.

The TSF landforms will be elevated and as they increase in height will become progressively visible from surrounding areas; however it is unlikely that the TSF will pose a visual risk because there are limited receptors to this amenity. The new TSF area is located within the surrounding State Forrest amongst Talison owned properties, the area cannot be access by general public and is not located on an open public thoroughfare.

4.1 Viewshed Analysis

The photographs and GPS points taken at each viewpoint in the field assessment were used in computer modelling whereby the site infrastructure footprint was superimposed on the photograph, in order to understand the full extent of the visual impact. This gave a simulated view of what the development would look like from each viewpoint. The computer model was oriented within the modelling software so that the viewer location corresponds with the location of the viewpoint photograph. This modelling is based on infrastructure GIS data provided by Talison at the time of impact assessment. Using the Viewshed Analysis an inherent risk during the construction phase was visualised and assessed. Comments regarding potential visual risk have been included in this analysis and can be interpreted in conjunction with the formalised risk assessment. The Viewshed analysis data photos are shown in the Plates below.

Plate 1: VP1

Current Viewpoint – VP1

2022 Predicted Viewpoint

2032 Predicted Viewpoint

Plate 2: VP2

Current Viewpoint – VP2

2022 Predicted Viewpoint

2032 Predicted Viewpoint

Plate 3: VP3

Current Viewpoint – VP3

2022 Predicted Viewpoint

2032 Predicted Viewpoint

Plate 4: VP4

Current Viewpoint – VP4

2022 Predicted Viewpoint

2032 Predicted Viewpoint

Plate 5: VP5

Current Viewpoint – VP5

2022 Predicted Viewpoint

2032 Predicted Viewpoint

Plate 6: VP6

Current Viewpoint – VP6

2022 Predicted Viewpoint

2032 Predicted Viewpoint

Plate 7: VP8

Current Viewpoint – VP8

2022 Predicted Viewpoint

2032 Predicted Viewpoint

Plate 8: VP9

Current Viewpoint – VP9

2022 Predicted Viewpoint

2032 Predicted Viewpoint

Plate 9: VP10

Current Viewpoint – VP10

2022 Predicted Viewpoint

2032 Predicted Viewpoint

Plate 10: VP12

Current Viewpoint – VP12

2022 Predicted Viewpoint

2032 Predicted Viewpoint

4.2 Risk Assessment

A formalised Visual Impact Risk Assessment was compiled in order to determine the risks associated with visual impacts prior to, during and after the construction phase of the expansion project (

Appendix 1). Operational aspects including the open pit, ROM, TSF, mine service areas, WRLs, tracks and powerlines and associated infrastructure were all considered. The risks were assessed against the likelihood and consequences to local receptors as described in Section 3.2.3. It should also be noted that visual receptors will change from "Prior to Construction" to "During Construction" phases. Receptors to the south, that are of high risk of visual impacts by TSF 4 and Floyds southern extension , will be acquired by Talison to eliminate likelihood of these risks on receptors.

4.2.1 Prior to Construction

The existing mining operation has limited visual impact to the landscape due to the screening effects of the surrounding State Forest and topography. The most prominent feature of the Mine is Floyds WRL, as the landform is elevated in the landscape and can be seen from sections of the South Western Highway and from rural properties located along the eastern side of the landform. Current rehabilitation efforts have reduced the visual impacts significantly with only the active dumping area at the top of Floyds WRL creating a discontent at a distance.

The risk assessment indicates that the potential visual impact of current mining operations on local receptors is a low to moderate risk. The highest potential visual impact is associated with the Floyds WRL where active dumping areas can impose on residence and motorists at various vantage points along the eastern side of operation. Visual impacts from Floyds WRL are most noticeable along Catterick Road (VP1, VP2, VP3) and can be viewed with negligible impacts along the South Western Highway (VP8). No impacts were noticed at all other receptors identified, evaluated and assessed.

4.2.2 During Construction

During the construction phase of the development potentially high visual risks have been associated with the new TSF and extensions to Floyds WRL. Without management measures being implemented, these visual impacts are likely to have a significant consequence on receptors such as residences and road users. Expansions of the Floyds WRL may be noticeable from VP1, VP2, VP3, VP4, VP6, VP8, VP9, VP10 and VP 12 during the by the construction phase. The year 2022 has been chosen as an indicative year for the construction phase (refer to Section 5.1).

Talison have identified management measures that will either reduce the likelihood of receptors being exposed to the impact or reduce the consequences of the visual impact. These controls include; the acquisition of land to eliminate the risk of impact to receptors, progressive rehabilitation, community consultation and management of night operations. More details on these management strategies have been provided in Section 5.

4.2.3 After Construction

Once the construction phase is complete, Talison will continue to progress towards meeting closure objectives which will continue to see the risks associated with these potential visual impacts decline. It is expected that the final TSF design will have moderate visual impacts however receptors will be minimal to none. In addition, once the Floyds WRL has been completely rehabilitated it is expected that the visual impact to receptors will be low. The final landform will blend into the landscape with a level of congruency. Extensions of the Floyds WRL may be noticeable from VP1, VP2, VP3, VP4, VP6, VP8, VP9, VP10 and VP 12 after the construction phase. The year 2032 has been chosen as an indicative year for the end of the construction phase (refer to Section 5.1).

5 Visual Management Actions

Having identified that the proposed mining activities will pose a potential visual impact risk to some receptors including road users, residents and the local public, Talison has identified key visual management measures to mitigate these potential risks overtime. These mitigation measures include extensive mine closure planning, progressive rehabilitation, community consultation and night work limitations as explained in more detail below.

5.1 Mine Closure Planning

Visual amenity considerations are included within the Mine Closure Plan for the Mine which has been approved by DMIRS. An updated Mine Closure Plan and new Mining Proposal will be submitted for the expanded Mine which will include consideration of visual amenity based on the findings in this report. As part of the updated Mine Closure Plan; Talison will:

- Update the Greenbushes Operations Closure Plan 2016 (as required under the *Mining Act 1978* and in accordance with the DMIRS '*Guidelines for Preparing Mine Closure Plans*' May 2015) which will include closure objectives and completion criteria related to rehabilitation. The updated plan will be submitted to DMIRS together with a Mining Proposal application for the expansion.
- Continue to liaise with relevant government agencies including Department of Biodiversity, Conservation and Attractions (DBCA), DMIRS and Department of Water and Environment Regulation (DWER) regarding Closure Planning and Rehabilitation of the Mine.
- Continue implementation of the Mine Closure Plan and rehabilitation strategies which include: Progressive rehabilitation of Floyds WRL slopes and TSF batters.
- Progressive rehabilitation of disturbed areas where possible. Areas active for the duration of mining activity will be rehabilitated at the end of life.

5.2 Progressive Rehabilitation

Achieving an optimum level of visual amenity is one of the key drivers of Talison's rehabilitation activities at the site. Talison has improved the surrounding environment of the mine through an ongoing rehabilitation program of historical mining areas which remained from late 19th, and early 20th century mining activities. The progressive rehabilitation program undertaken by Talison has reduced the area of disturbance associated within the mining operation and will continue to do so as opportunities in the mine development process present themselves, which is typically at the completion of activities in local mine areas and features. The objective of rehabilitation is to establish a self-sustaining heathy community with selected attributes compatible with surrounding Jarrah/Marri forest, and landforms that blend with the mine's undulating scarp location.

Talison will:

- Undertake progressive rehabilitation of bunds and embankments wherever possible to mitigate visual impacts. Where practical every 10m lift will be rehabilitated when it reaches design location
- Contour landforms during rehabilitation via ripping on the contour and inclusion of logs and rocks to prevent sheet flow from landforms and create fauna habitat.
- Ensure rehabilitation aims to blend the shape and vegetative cover of landforms with the surrounding landscape where possible through profiling of the landforms and use of a local provenance seed mix based on the surrounding vegetation community; and

- Ensure seed mixes include a fast-growing Acacia species component to provide a fast-growing cover which matures within five years and is then replaced by longer living, but slower establishing understorey species.

Figure 7: Rehabilitation of Floyds Waste Rock Landform

5.2.1 Working example: Rehabilitation on Floyds Waste Rock Landform

Preparation activities on the eastern embankment commenced in 2010 (left). Photo monitoring during 2018 demonstrates rehabilitation success and ability to blend mining landscapes into the existing setting (right).

5.3 Community Consultation

The mine through its years of operation has established stakeholder engagement program. Relevant stakeholders are consulted in relation to plans and changes at the operation as required including those related to visual amenity and mitigation measures.

The key stakeholders for the Talison Greenbushes Operation are considered to include:

- Shire of Bridgetown-Greenbushes
- Greenbushes and North Greenbushes Communities
- Grow Greenbushes (Rate Payers and Residents Association)
- Neighbouring rural landholders
- Bridgetown Community
- Balingup Community
- South west towns along the key transport route
- South West Boojarah and Wagyl Kaip Native Title Groups via the South West Aboriginal Land and Sea Council
- Department of Biodiversity Conservation and Attractions (DBCA)
- Department of Mines, Industry Regulation and Safety (DMIRS)
- Department of Water and Environmental Regulation (EPA Services, Regulatory Services) (DWER)
- Main Roads Western Australia (MRWA)
- Department of the Environment and Energy (Federal) (DoEE)
- Blackwood Basin Group (BBG)

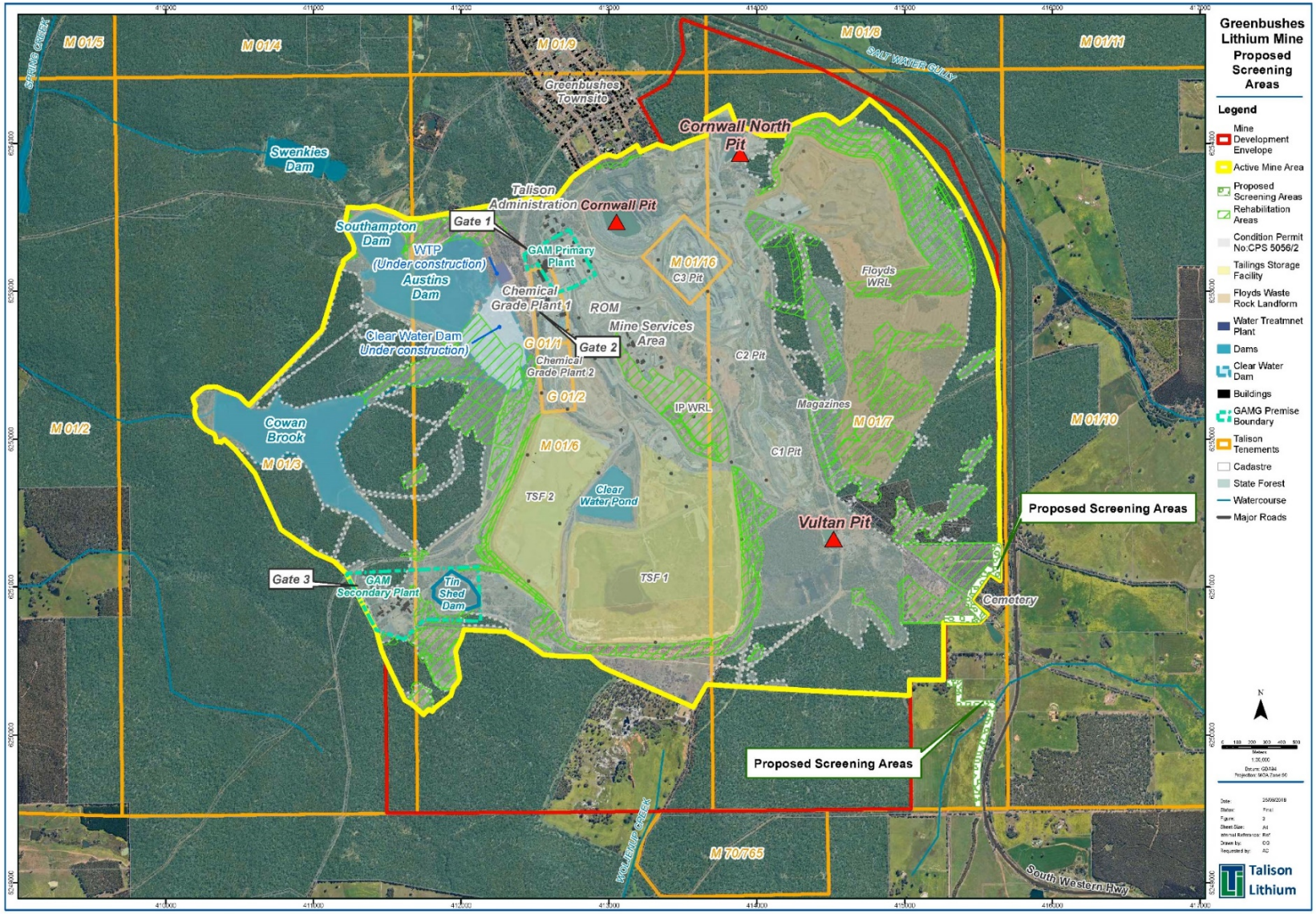
The mine has an established reputation with stakeholders and will continue to engage under Talison's Stakeholder Engagement Plan. The formal plan has been developed and implemented outlines the engagement activities proposed to be undertaken with identified stakeholders and assigns responsibility and timing for the key engagement activities. Relevant stakeholders are consulted in relation to plans and changes at the operation which include visual amenity and progress towards mitigating visual impacts associated with mine development.

Talison will keep surrounding communities informed of the activities that will impact visual amenity and landscapes at Grow Greenbushes meetings (formerly known as the Greenbushes Rate Payers and Residents Association) and by contributing to local publications including the Warren Blackwood Times, Donnybrook-Balingup Mail, Preston Press and the Greenbushes-Balingup Newsletter. In addition, Talison maintains an open communication channel with key government stakeholders, local landholders and the community via community liaison office. Annual reports inform and update government agencies on activities and compliance at the operation. The Grow Greenbushes meetings are also used to advise the community of the proposed changes at the Mine and obtain feedback on any issues or concerns that the community may have. Talison has appointed a Stakeholder Engagement Officer to plan and manage the stakeholder consultation for the expansion. This includes both formal and informal opportunities for stakeholders to make comment and discuss visual amenity and mitigation strategies with Talison. The Stakeholder Engagement Plan outlines the engagement activities proposed to be undertaken with identified stakeholders and assigns responsibility and timing for the key engagement activities along with the key engagement methods.

5.4 Screening

Based on the outcomes of the VIA, Talison will commit to screening around the cemetery and other properties as outlined in figure 8. The establishment of the screens will commence in 2019 and be managed by the company to ensure appropriate mitigation strategy for visual amenity. The screening will be placed on the Talison property so the screening can maintained and managed as part of the site procedures. This will complement and support the progressive rehabilitation schedule which will limit exposure of high rock faces to view points and ensure adherence to the mitigation strategy.

Figure 8: Proposed visual screening to be established by Talison



5.5 Night Operations

Lighting requirements, for waste dumping at Floyds WRL, and construction of TSF 4 (if undertaken during night periods) may cause light overspill to surrounding receptors in close proximity. Talison has developed a Light Management Plan to ensure activities are appropriately managed to limit light overspill. Light spillage from processing areas, and mining and haulage within the pit is expected to be minimal as these areas occur lower in the topographic profile and are shielded by the surrounding forest and other landforms.

6 References

Austlii. 2018. *Environment Protection and Biodiversity Conservation Act 1999.* URL: http://www8.austlii.edu.au/cgi-bin/viewdoc/au/legis/cth/consol_act/epabca1999588/s528.html

Australian Bureau of Statistics. 2017. *Bridgetown-Greenbushes Census Statistics.* URL: http://quickstats.censusdata.abs.gov.au/census_services/getproduct/census/2016/quickstat/LGA50840

Department of Agriculture and Food Western Australia (DAFWA). 2004. *Soil-Landscape Mapping in South-Western Australia: An Overview of Methodology and Outputs.* URL: https://researchlibrary.agric.wa.gov.au/rmtr/263/

Department of Mines, Industry Regulation and Safety (DMIRS) and Environmental Protection Authority (EPA). 2015. *Guidelines for Preparing Mine Closure Plans.* URL: http://www.dmp.wa.gov.au/Documents/Environment/ENV-MEB-121.pdf

Department of Planning, Lands and Heritage (DPLH). 2007. *Visual Landscape Planning in Western Australia: A Manual for Evaluation, Assessment, Siting and Design.* URL: https://www.planning.wa.gov.au/publications/1205.aspx

Department of Planning, Lands and Heritage (DPLH) and Western Australian Planning Commission (WAPC).https://www.planning.wa.gov.au/publications/6661.aspx

Department of Planning, Lands and Heritage (DPLH) and Western Australian Planning Commission (WAPC). 2018. *Western Australian State Planning Framework.* URL: https://www.planning.wa.gov.au/State-planning-framework.aspx

Environmental Protection Authority (EPA). 2018. *Statement of Environmental Principles, Factors and Objectives June 2018*. URL: http://www.epa.wa.gov.au/sites/default/files/Policies_and_Guidance/Statement%20of%20Environmental%20Principles%2C%20factors%20and%20objectives_29062018.pdf

Onshore Environmental. 2018. *Detailed Flora and Vegetation Survey, Greenbushes Mining Operations.* An unpublished report prepared for Talison Lithium by Onshore Environmental July 2018.

Western Australian Planning Commission (WAPC). 2003. *Statement of Planning Policy No. 2: Environment and Natural Resources Policy.* URL: https://www.planning.wa.gov.au/dop_pub_pdf/SPP_2_0.pdf

7 Appendices

Appendix 1: Risk Assessment

Viewpoint Receptor	Potential Impact	Inherent Likelihood on Receptor Prior to Development	Inherent Consequence on Receptor	Inherent Risk Prior to Development	Controls and/or Management Measures During Delopment	Residual Likelihood on Receptor	Residual Consequence on Receptor	Residual Risk
VP1 - Catterick Road	Waste Rock Landform	Almost Certain	Moderate	High	Natural drainage contours will be maintained where possible. Land disturbance will be kept to the minimum necessary for development of the project and will remain within the development envelope. Vehicles and mining equipment will keep to designated tracks and roads. Vegetation and topsoil will be left in situ for as long as possible. Clearing of vegetation will be done progressively over the project life. All disturbance operations will be supervised. Constructed landforms designed to be no higher than surrounding hills as per agreement with Traditional Owners. Mine Closure Plan will be developed and updated for the project. Progressive rehabilitation of disturbed areas. Stakeholder consultation will continue to be undertaken. The Waste Rock Landform will be designed, constructed and rehabilitated to create a safe, stable, non-polluting landform. Disturbed areas will be ripped on the contour where appropriate to remove compaction, improve soil structure and improve infiltration capacity. Mine closure planning is fully integrated with operational mine planning throughout the life of the project ensuring orderly, cost-effective and timely mine completion. Water applied to bare surfaces on as need basis to minimise wind erosion. During high winds, topsoil stripping and spreading activities will be restricted if dust cannot be adequately controlled. Dust will be managed by watering unsealed roads with a water cart or fixed sprays. Light shed from night activities will be monitored minimised where possible.	Likely	Minor	Moderate
VP2 - Catterick Road	Waste Rock Landform	Almost Certain	Moderate	High	Natural drainage contours will be maintained where possible. Land disturbance will be kept to the minimum necessary for development of the project and will remain within the development envelope. Vehicles and mining equipment will keep to designated tracks and roads. Vegetation and topsoil will be left in situ for as long as possible. Clearing of vegetation will be done progressively over the project life. All disturbance operations will be supervised. Constructed landforms designed to be no higher than surrounding hills as per agreement with Traditional Owners. Mine Closure Plan will be developed and updated for the project. Progressive rehabilitation of disturbed areas. Stakeholder consultation will continue to be undertaken. The Waste Rock Landform will be designed, constructed and rehabilitated to create a safe, stable, non-polluting landform. Disturbed areas will be ripped on the contour where appropriate to remove compaction, improve soil structure and improve infiltration capacity. Mine closure planning is fully integrated with operational mine planning throughout the life of the project ensuring orderly, cost-effective and timely mine completion. Water applied to bare surfaces on as need basis to minimise wind erosion. During high winds, topsoil stripping and spreading activities will be restricted if dust cannot be adequately controlled. Dust will be managed by watering unsealed roads with a water cart or fixed sprays. Light shed from night activities will be monitored minimised where possible.	Likely	Minor	Moderate
VP3 - Catterick Road	Waste Rock Landform	Almost Certain	Minor	Moderate	Natural drainage contours will be maintained where possible. Land disturbance will be kept to the minimum necessary for development of the project and will remain within the development envelope. Vehicles and mining equipment will keep to designated tracks and roads. Vegetation and topsoil will be left in situ for as long as possible. Clearing of vegetation will be done progressively over the project life. All disturbance operations will be supervised. Constructed landforms designed to be no higher than surrounding hills as per agreement with Traditional Owners. Mine Closure Plan will be developed and updated for the project. Progressive rehabilitation of disturbed areas. Stakeholder consultation will continue to be undertaken. The Waste Rock Landform will be designed, constructed and rehabilitated to create a safe, stable, non-polluting landform. Disturbed areas will be ripped on the contour where appropriate to remove compaction, improve soil structure and improve infiltration capacity. Mine closure planning is fully integrated with operational mine planning throughout the life of the project ensuring orderly, cost-effective and timely mine completion. Water applied to bare surfaces on as need basis to minimise wind erosion. During high winds, topsoil stripping and spreading activities will be restricted if dust cannot be adequately controlled. Dust will be managed by watering unsealed roads with a water cart or fixed sprays. Light shed from night activities will be monitored minimised where possible.	Possible	Minor	Low

VP4 - Fullerton Road	Waste Rock Landform	Likely	Minor	Moderate	Natural drainage contours will be maintained where possible. Land disturbance will be kept to the minimum necessary for development of the project and will remain within the development envelope. Vehicles and mining equipment will keep to designated tracks and roads. Vegetation and topsoil will be left in situ for as long as possible. Clearing of vegetation will be done progressively over the project life. All disturbance operations will be supervised. Constructed landforms designed to be no higher than surrounding hills as per agreement with Traditional Owners. Mine Closure Plan will be developed and updated for the project. Progressive rehabilitation of disturbed areas. Stakeholder consultation will continue to be undertaken. The Waste Rock Landform will be designed, constructed and rehabilitated to create a safe, stable, non-polluting landform. Disturbed areas will be ripped on the contour where appropriate to remove compaction, improve soil structure and improve infiltration capacity. Mine closure planning is fully integrated with operational mine planning throughout the life of the project ensuring orderly, cost-effective and timely mine completion. Water applied to bare surfaces on as need basis to minimise wind erosion. During high winds, topsoil stripping and spreading activities will be restricted if dust cannot be adequately controlled. Dust will be managed by watering unsealed roads with a water cart or fixed sprays. Light shed from night activities will be monitored minimised where possible.	Possible	Minor	Low
VP5 - Forrest Park Ave	Waste Rock Landform	Likely	Minor	Moderate	Natural drainage contours will be maintained where possible. Land disturbance will be kept to the minimum necessary for development of the project and will remain within the development envelope. Vehicles and mining equipment will keep to designated tracks and roads. Vegetation and topsoil will be left in situ for as long as possible. Clearing of vegetation will be done progressively over the project life. All disturbance operations will be supervised. Constructed landforms designed to be no higher than surrounding hills as per agreement with Traditional Owners. Mine Closure Plan will be developed and updated for the project. Progressive rehabilitation of disturbed areas. Stakeholder consultation will continue to be undertaken. The Waste Rock Landform will be designed, constructed and rehabilitated to create a safe, stable, non-polluting landform. Disturbed areas will be ripped on the contour where appropriate to remove compaction, improve soil structure and improve infiltration capacity. Mine closure planning is fully integrated with operational mine planning throughout the life of the project ensuring orderly, cost-effective and timely mine completion. Water applied to bare surfaces on as need basis to minimise wind erosion. During high winds, topsoil stripping and spreading activities will be restricted if dust cannot be adequately controlled. Dust will be managed by watering unsealed roads with a water cart or fixed sprays. Light shed from night activities will be monitored minimised where possible.	Possible	Minor	Low
VP6 - Rear of Waste Water Treatment Plant	Waste Rock Landform	Possible	Minor	Low	Natural drainage contours will be maintained where possible. Land disturbance will be kept to the minimum necessary for development of the project and will remain within the development envelope. Vehicles and mining equipment will keep to designated tracks and roads. Vegetation and topsoil will be left in situ for as long as possible. Clearing of vegetation will be done progressively over the project life. All disturbance operations will be supervised. Constructed landforms designed to be no higher than surrounding hills as per agreement with Traditional Owners. Mine Closure Plan will be developed and updated for the project. Progressive rehabilitation of disturbed areas. Stakeholder consultation will continue to be undertaken. The Waste Rock Landform will be designed, constructed and rehabilitated to create a safe, stable, non-polluting landform. Disturbed areas will be ripped on the contour where appropriate to remove compaction, improve soil structure and improve infiltration capacity. Mine closure planning is fully integrated with operational mine planning throughout the life of the project ensuring orderly, cost-effective and timely mine completion. Water applied to bare surfaces on as need basis to minimise wind erosion. During high winds, topsoil stripping and spreading activities will be restricted if dust cannot be adequately controlled. Dust will be managed by watering unsealed roads with a water cart or fixed sprays. Light shed from night activities will be monitored minimised where possible.	Possible	Minor	Low
VP7 - Bike Trail	Waste Rock Landform	Unlikely	Insignificant	Low	Natural drainage contours will be maintained where possible. Land disturbance will be kept to the minimum necessary for development of the project and will remain within the development envelope. Vehicles and mining equipment will keep to designated tracks and roads. Vegetation and topsoil will be left in situ for as long as possible. Clearing of vegetation will be done progressively over the project life. All disturbance operations will be supervised. Constructed landforms designed to be no higher than surrounding hills as per agreement with Traditional Owners. Mine Closure Plan will be developed and updated for the project. Progressive rehabilitation of disturbed areas. Stakeholder consultation will continue to be undertaken. The Waste Rock Landform will be designed, constructed and rehabilitated to create a safe, stable, non-polluting landform. Disturbed areas will be ripped on the contour where appropriate to remove compaction, improve soil structure and improve infiltration capacity. Mine closure planning is fully integrated with operational mine planning throughout the life of the project ensuring orderly, cost-effective and timely mine completion. Water applied to bare surfaces on as need basis to minimise wind erosion. During high winds, topsoil stripping and spreading activities will be restricted if dust cannot be adequately controlled. Dust will be managed by watering unsealed roads with a water cart or fixed sprays. Light shed from night activities will be monitored minimised where possible.	Rare	Insignificant	Low

VP8 - SW Highway	Waste Rock Landform	Possible	Minor	Low	Natural drainage contours will be maintained where possible. Land disturbance will be kept to the minimum necessary for development of the project and will remain within the development envelope. Vehicles and mining equipment will keep to designated tracks and roads. Vegetation and topsoil will be left in situ for as long as possible. Clearing of vegetation will be done progressively over the project life. All disturbance operations will be supervised. Constructed landforms designed to be no higher than surrounding hills as per agreement with Traditional Owners. Mine Closure Plan will be developed and updated for the project. Progressive rehabilitation of disturbed areas. Stakeholder consultation will continue to be undertaken. The Waste Rock Landform will be designed, constructed and rehabilitated to create a safe, stable, non-polluting landform. Disturbed areas will be ripped on the contour where appropriate to remove compaction, improve soil structure and improve infiltration capacity. Mine closure planning is fully integrated with operational mine planning throughout the life of the project ensuring orderly, cost-effective and timely mine completion. Water applied to bare surfaces on as need basis to minimise wind erosion. During high winds, topsoil stripping and spreading activities will be restricted if dust cannot be adequately controlled. Dust will be managed by watering unsealed roads with a water cart or fixed sprays. Light shed from night activities will be monitored minimised where possible.	Rare	Minor	Low
VP9 - SW Highway	Waste Rock Landform	Likely	Major	High	Natural drainage contours will be maintained where possible. Land disturbance will be kept to the minimum necessary for development of the project and will remain within the development envelope. Vehicles and mining equipment will keep to designated tracks and roads. Vegetation and topsoil will be left in situ for as long as possible. Clearing of vegetation will be done progressively over the project life. All disturbance operations will be supervised. Constructed landforms designed to be no higher than surrounding hills as per agreement with Traditional Owners. Mine Closure Plan will be developed and updated for the project. Progressive rehabilitation of disturbed areas. Stakeholder consultation will continue to be undertaken. The Waste Rock Landform will be designed, constructed and rehabilitated to create a safe, stable, non-polluting landform. Disturbed areas will be ripped on the contour where appropriate to remove compaction, improve soil structure and improve infiltration capacity. Mine closure planning is fully integrated with operational mine planning throughout the life of the project ensuring orderly, cost-effective and timely mine completion. Water applied to bare surfaces on as need basis to minimise wind erosion. During high winds, topsoil stripping and spreading activities will be restricted if dust cannot be adequately controlled. Dust will be managed by watering unsealed roads with a water cart or fixed sprays. Light shed from night activities will be monitored minimised where possible.	Likely	Minor	Moderate
VP10 - SW Highway	Waste Rock Landform	Likely	Major	High	Natural drainage contours will be maintained where possible. Land disturbance will be kept to the minimum necessary for development of the project and will remain within the development envelope. Vehicles and mining equipment will keep to designated tracks and roads. Vegetation and topsoil will be left in situ for as long as possible. Clearing of vegetation will be done progressively over the project life. All disturbance operations will be supervised. Constructed landforms designed to be no higher than surrounding hills as per agreement with Traditional Owners. Mine Closure Plan will be developed and updated for the project. Progressive rehabilitation of disturbed areas. Stakeholder consultation will continue to be undertaken. The Waste Rock Landform will be designed, constructed and rehabilitated to create a safe, stable, non-polluting landform. Disturbed areas will be ripped on the contour where appropriate to remove compaction, improve soil structure and improve infiltration capacity. Mine closure planning is fully integrated with operational mine planning throughout the life of the project ensuring orderly, cost-effective and timely mine completion. Water applied to bare surfaces on as need basis to minimise wind erosion. During high winds, topsoil stripping and spreading activities will be restricted if dust cannot be adequately controlled. Dust will be managed by watering unsealed roads with a water cart or fixed sprays. Light shed from night activities will be monitored minimised where possible.	Likely	Minor	Moderate
VP11 - Stannifer Road Mine Service Area	Mine Services Area	Possible	Minor	Low	No visual impact expected.	Possible	Minor	Low

VP12 - Historic Site	Waste Rock Landform	Almost Certain	Moderate	High	Fast growing trees will be planted immediately next to the Historic Site to screen WRL from Historic Site. Natural drainage contours will be maintained where possible. Land disturbance will be kept to the minimum necessary for development of the project and will remain within the development envelope. Vehicles and mining equipment will keep to designated tracks and roads. Vegetation and topsoil will be left in situ for as long as possible. Clearing of vegetation will be done progressively over the project life. All disturbance operations will be supervised. Constructed landforms designed to be no higher than surrounding hills as per agreement with Traditional Owners. Mine Closure Plan will be developed and updated for the project. Progressive rehabilitation of disturbed areas. Stakeholder consultation will continue to be undertaken. The Waste Rock Landform will be designed, constructed and rehabilitated to create a safe, stable, non-polluting landform. Disturbed areas will be ripped on the contour where appropriate to remove compaction, improve soil structure and improve infiltration capacity. Mine closure planning is fully integrated with operational mine planning throughout the life of the project ensuring orderly, cost-effective and timely mine completion. Water applied to bare surfaces on as need basis to minimise wind erosion. During high winds, topsoil stripping and spreading activities will be restricted if dust cannot be adequately controlled. Dust will be managed by watering unsealed roads with a water cart or fixed sprays. Light shed from night activities will be monitored minimised where possible.	Possible	Minor	Low