Appendix T Draft Environmental Management Plan

Enviser Ref: 1480

October 2025

Environmental Management Plan (DRAFT)

Central & Southern Blocks - Taharoa

Taharoa Ironsands Ltd

Contents

1 Introduction

This document is a draft version, prepared in support of an application for all necessary approvals for ironsand mining operations at Taharoa C Block under the Fast-track Approvals Act 2024 ("FTAA"). This document must be updated and refined to incorporate the specific requirements of resource consents, authorisations and permits issued under the FTAA[1]. This document must also be updated to suit changes in site operations and methods.

This draft environmental management plan (EMP) has been collated by Enviser Limited with technical input and content provided by the following consultants:

- Air quality (dust) - Pattle Delamore Partners
- Coastal processes and noise - Tonkin + Taylor
- Hydrology and hydrogeology - Williamson Water Associates
- Terrestrial, aquatic and marine ecology – SLR Consulting
- Geotechnical engineering - Baseline Geotechnical
- Waves, currents and sediment plumes - MetOcean Solutions
- Archaeology - Clough & Associates
- Marine Mammals - Cawthron Institute

1.1 Purpose

The purpose of this draft Environmental Management Plan (EMP) is to document the practices required to minimise environmental effects and ensure compliance with performance standards for the ironsand mining operations at the Taharoa Ironsands mine (the Site). This document provides an overarching environmental management framework for operational activities and includes a series of subject-specific chapters and management plans to manage risks at specific locations on the site where there are sensitive receptors, or to manage adverse effects on a specific species or habitat type.

The conditions of the resource consents authorised under the FTAA require an EMP to be prepared and implemented, and certified by the Waikato Regional Council. There must be component chapters addressing the following matters:

- Natural inland wetlands
- Lake Taharoa lake level and water management
- Dust
- Pests
- Erosion and sediment control
- Site rehabilitation
- Conceptual site closure

Various management plans are attached to the EMP, as set out Section 1.2 below. Of these, the Lizard Management Plan and Archaeological Management Plan are documents prepared under the Wildlife Act 1953 and Heritage New zealand Pouhere Taonga Act 2014 respectively. As they are not

[1] This includes requirements set by conditions on resource consents issued under the Resource Management Act 1991, Archaeological Authority issued under the Heritage New Zealand Pouhere Taonga Act 2014, and Wildlife Permit issued under the Wildlife Act 1953.

RMA documents, the consents of the resource consents do not require that these plans are certified by the Waikato Regional Council.

The objectives of the EMP[2], and which relate to the above chapters, are set by the resource consent conditions for activities authorised under the FTAA, and the information which must be included in the EMP is also prescribed in the consent conditions.

The objectives of the EMP are to:

a) Avoid, remedy or mitigate the identified actual and/or potential adverse effects of mining operations at the site and once mining has concluded, in accordance with the monitoring and reporting requirements set out in the conditions of consent.
b) Set out the practices and procedures to be adopted to address the potential adverse effects of mining activities on ecological and indigenous biodiversity values at the site.
c) Set out the practices and procedures to be adopted to ensure compliance with the conditions of consents held for activities in the Coastal Marine Area (CMA).

To achieve the EMP objectives set out above, this document includes[3]:

a) Details regarding site roles and responsibilities relating to environmental management.
b) A risk register of effects being managed through the EMP.
c) An overview of the construction, implementation, operational, monitoring, maintenance and contingency procedures to be followed during mining activities on land and activities authorised in the Coastal Marine Area (CMA).
d) Identification and storage of hazardous substances kept on site, and measures for preventing and responding to spills on site, including methodology for disposal of any contaminated materials.
e) Summaries of ecological and other baseline surveys undertaken on site, against which the results of future surveys can be assessed.
f) The component plans, which may be prepared as a chapter of the EMP or attached as appendices.
g) Plan review and reporting mechanisms, both overall and specific to each of the management plans that form a component of the EMP.
h) Performance measures, actions, methods, trigger levels and monitoring programmes designed to achieve the EMP objectives, including incorporating matauranga Maori and cultural health indicators.

1.2 Report Structure

This report sets out activities occurring at the Site, summarises performance standards required to be met to ensure adverse effects are avoided, remedied or mitigated, and includes details about procedures to be implemented to ensure compliance with performance standards and consent requirements.

To address the above the EMP is structured as follows:

- Section 2 Describes the roles and responsibilities at TIL for environmental management
- Section 3 Describes the Site
- Section 4 Describes mining activities at the Site

[2] Condition 14 of the General Conditions, Schedule 1
[3] The requirements of the EMP are set out in Condition 15 of the General Conditions, Schedule 1

- Section 5 Contains a summary of the environmental risk assessment
- Section 6 - Dust
- Section 7 - Hazardous substances
- Section 8 - Erosion and sediment control
- Section 9 - Marine activities
- Section 10 – Archaeology
- Section 11 - Noise
- Section 12 - Ecology
- Section 13 – Marine Mammals
- Section 14 - Harvest procedures (pine forest)
- Section 15 - Complaints and how they are managed
- Section 16 – Documentation
- Section 17 – EMP review
- Section 18 - Consultation with parties during preparation of the EMP.

All authorisations discussed in the EMP will be appended to the EMP if granted as part of the FTAA process (Appendices G, H and I).

Appended to this EMP are the following management plans:

- Archaeology Management Plan (Appendix B) – not to be certified by Waikato Regional Council
- Draft Natural Inland Wetland and Buffer Management Plan (Appendix C)
- Draft Lake level and Water Management Plan (Appendix D)
- Harvest and Earthworks Management Plan for Taharoa Forest (Appendix E)
- Lizard Management Plan (Appendix F) – not to be certified by Waikato Regional Council.

1.3 Statutory requirements

To operate the mine a suite of resource consents (issued under the FTAA) are required. Upon consents and permits being granted, they will be summarised in **Table 1-1** and appended to the EMP. Cross referencing to relevant sections of the EMP which explains how the performance standards in the authorisations will be achieved will also included in Table 1-1.

Table 1-1: Relevant consent conditions to EMP

Consent or Authority	Details	Section in EMP

1.4 Updating the EMP

This EMP is a 'live' and controlled document that will be continuously reviewed and updated throughout the life of the mine. TIL will update the EMP and management plans appended to the EMP to ensure that best management practices are implemented across the site, incorporating feedback and expertise provided by key stakeholders, and that the EMP remains relevant for the mining operations, methods and mining location. TIL, with advice from the appropriate subject matter experts, is responsible for updating the EMP as required. **Table 1-2** below presents a document control register to track the changes made to the document.

Table 1-2: Document control register

Date	Page/s Amended	Nature of Change	Approved By

2 Roles and responsibilities

It is the responsibility of TIL to ensure that the staff responsible for implementing this plan understand and can implement the requirements of this EMP. TIL is also responsible for ensuring any contractors working on the site understand and can implement the requirements of the EMP during their work. **Table 2-1** details the personnel at TIL responsible for implementing this EMP.

Table 2-1: Roles and responsibilities register

Role	Responsibility	Contact
Managing Director		
Mine Manager		
Health Safety and Environment Manager		
Technical Experts		
Air quality	Technical advice as needed	TBA
Erosion and sediment control	Technical advice as needed	TBA
Avifauna (incl bats)	Technical advice as needed	TBA
Herpetologist	Technical advice as needed	TBA
Aquatic Ecology	Technical advice as needed	TBA
Marine Ecology	Technical advice as needed	TBA
Noise	Technical advice as needed	TBA
Archaeology	Technical advice as needed	TBA
Harvest management	Technical advice as needed	TBA

3 Site description

The Taharoa Ironsand mine is located on the West coast of the North Island, just south of the Kawhia Harbour. The mine is located within the Taharoa C Block, between the Taharoa Lakes and the coast, with the village of Taharoa lying just beyond the eastern boundary of the mine (**Figure 3-1**). Aaruka Marae is located within the Taharoa Village, Te Kooraha Marae lies to the north of the mine site.

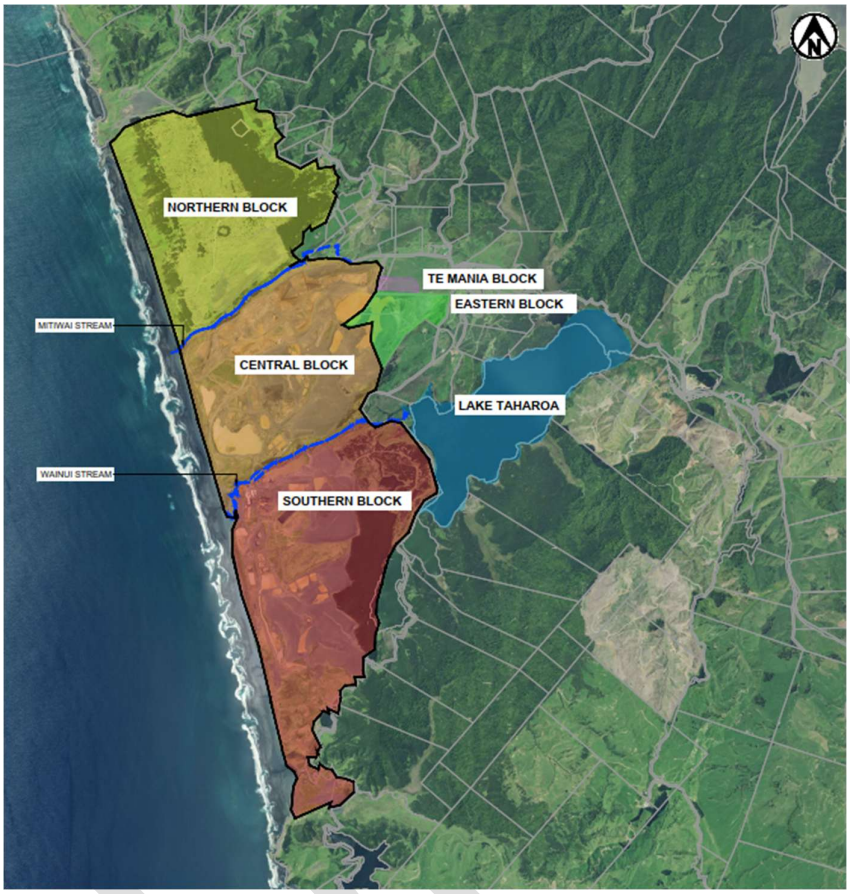

Figure 3-1: Taharoa Mine location (source: substantive FTAA application, October 2025). The black line is the Taharoa C boundary.

The current areas being mined are the Southern and Central Blocks, occupying approximately 700ha of land within the Taharoa C boundary. The majority of this area being actively mined or used for tailings placement.

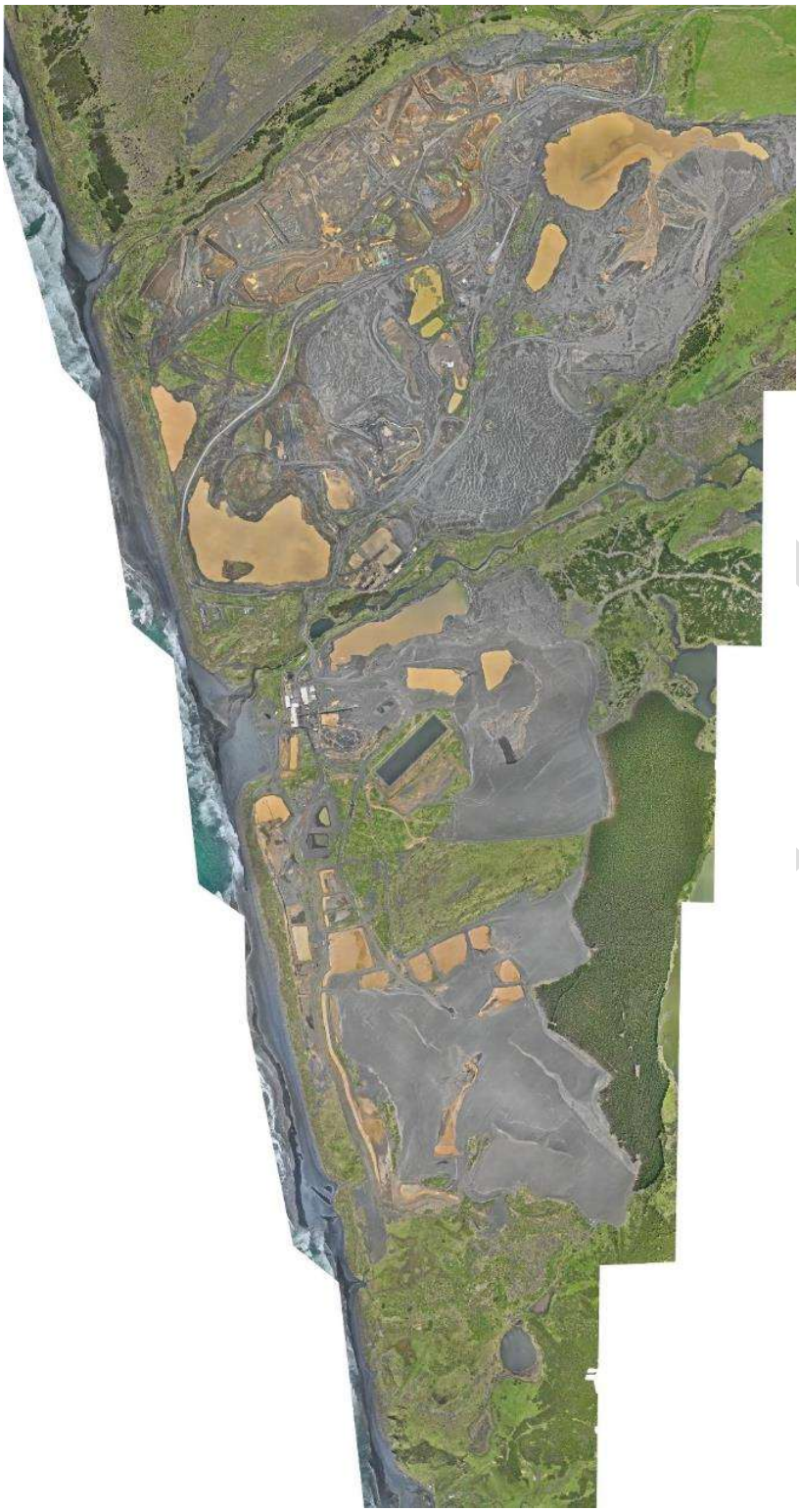

Figure 3-2: TIL site operations (November 2023)

4 Project description

TIL operates the ironsand mine and associated export port at Taharoa. Whilst the way TIL mines, processes, and exports the ironsand varies to suit the deposit being extracted at the time, a broad summary of the operation is set out below:

Land preparation prior to mining

- Harvesting of pine trees with commercial value and slash removal (in the Taharoa forest only)
- Vegetation (i.e. scrub and smaller trees,) are removed from with earthwork machinery, and may be stockpiled for mulching and reuse in rehabilitation areas activities across the site
- Native species are transplanted to the on site nursery for use in rehabilitation projects
- The topsoil and any overburden (i.e. silts and clays) are stripped and stockpiled for reuse in rehabilitation activities and landform recontouring.

Mining of raw product (known as 'head feed')

- Ironsand is extracted using various methods and equipment depending on ground conditions and groundwater level.
- The Dry Mining Unit (DMU) associated water supply and transfer pipelines are established
- Earthmoving machinery such as excavators, bulldozers and trucks are used to push or load ironsand into the DMU
- The DMU mixes water with the sand to form a slurry, that slurry is then piped to the processing plant
- In some instances, a mobile rougher plant (MRP) may be used to undertake preliminary refinement prior to the slurry being pumped to the main processing facility
- If mining occurs below the water table, a pond is created for a dredge which floats in the pond.
    - The associated pipework and other infrastructure is established
    - The dredge extracts sand from the base of the pit (as a slurry) and pumps it directly to the processing plant.

Processing

- The slurry from the extraction areas is pumped via a series of pipes and booster pumps to the central processing area.
- The concentrated ore (known as concentrate) is extracted from the headfeed via a process of gravity and magnetic separation, in some instances, the slurry is run through the processing plant multiple times to achieve the required specification for export
- Outputs from this process are the concentrate, the remaining sand (tailings) and water containing silts and clays.
- The concentrate is pumped, as a slurry, to the export facility
- Tailings are pumped, as a slurry, directly to an active tailings placement area on the site or to a storage area for later reuse
- The excess process water (containing silts and clays) are pumped to storage ponds for reuse of the water and settlement of the silts/clays.

Export

- The concentrate is pumped to the export facility where is it dewatered (via cyclone separators) and placed in stockpiles ready for export
- Water extracted from the concentrate is pumped to storage ponds for re-use.

Shiploading

- When a bulk carrier vessel calls, the concentrate is again mixed with water to form a slurry
- The slurry is pumped, via the 12m diameter export pipeline, to the offshore single buoy mooring (SBM) approximately 3.5km offshore
- Flexible pipes connect the vessel to the SBM and the slurry is discharged into the vessel's hold
- Special dewatering systems on the vessel remove water from the concentrate. The water is discharged, via filters, directly to the sea.
- Once loading is completed (2-3 days) the vessel disconnects from the SBM and steams to the import port.

Tailings placement

- Tailings, in a slurry form, are pumped to the previously mined areas
- Mobile stackers are used to direct and place the tailings
- Typically, the tailings are left to dewater via gravity drainage with the runoff water collected in a series of ponds and canals
- These ponds and canals are designed to capture the runoff and allow the sediment to settle.
- The clean water is then pumped back into ponds for reuse in the mine operations (typically for on-mine transport and process water).

Stablisation and/or Rehabilitation

- To date, the mine has been focussing on the establishment of new mine areas and the placement of tailings in previously mined areas
- Once mining has been completed in an area and tailings have been completed, the location is ready for rehabilitation
- Rehabilitation entails the removal of mining infrastructure (i.e. pipework etc) surface contouring (if required) and if required, placement of topsoil, mulch and revegetation
- Revegetation requirements are dependent on the landowner requirements and ecological aspects
- If revegetation is required, it will typically involve:
    - Placement of mulch, topsoil or settled 'slimes' to provide a substrate for plant growth
    - Planting of the required plants, which may include plantation forestry species, native grasses or other grasses for short-term stabilisation needs
    - Revegetation may require more than one phase, specifically if the site is exposed and more hardy plants are needed first to provide shelter for less reliant native species.
- An eco-sourced nursery has been set up on site to provide plants for use in rehabilitation projects, including plants removed from the 4.25 ha wetland area which will be removed in the Southern Block.

Offset Projects

- The creation of a new wetland and ecology habitat in either the Central or the Southern Block to offset wetland loss at the site.

5 Environmental risk assessment

Before any risks can be managed or controlled it is necessary to know the nature, likelihood, and impact of those risks. Risk management involves the identification, assessment, control, monitoring, and reporting of risks for the project. The risk assessment tools used in this assessment are shown in **Appendix A**. **Table 5-1** below identifies the key risks and associated risk ratings for the various elements of the mining operation, prior to mitigation being implemented.

The risk rating for each environmental effect was generated using the risk assessment tool described in Appendix A. Each environmental effect was assessed based on the likelihood of occurrence and the potential impact. Where technical assessment reports were available e.g. noise, ecology, geotechnical and dust, the risk classification provided in the technical reports was used.

In each section, the highest risk identified was selected as the overarching risk classification for that activity.

Table 5-1: Project-specific environmental risks

Environmental effect	Risk Rating:
Dust	LOW - MEDIUM
Hazardous substances	MEDIUM - HIGH
Erosion and sediment control	LOW - MEDIUM
Marine activities	LOW
Archaeology	LOW
Noise	LOW - HIGH
Ecology - Avifauna	LOW
Ecology - Bats	MEDIUM
Ecology - Lizards	LOW
Ecology - Marine Mammals	LOW
Forest harvesting activities	LOW - MEDIUM

The specific environmental risks are discussed in more detail in the following sections.

6 Dust

6.1 Environmental risk assessment

The mine site is exposed, experiences strong winds and has ground conditions that are susceptible to dust generation (particularly the silts and clay) when disturbed. Sensitive receptors exist beyond the site boundaries, predominantly on the eastern side towards Taharoa Village. There are also sensitive receptors (residential dwellings) just beyond the north eastern corner of the mine. The majority of these sensitive receptors are more than 500m distant from the central and southern block mine boundary. Three residential dwellings are located within 500m of the site, with the closest approximately 70m from the mine boundary.

Pattle Delamore Partners (PDP) have assessed the dust generation potential and concluded the key dust generating activities or aspects of the site and operations are:

- Site roads
- Active mining areas
- Active tailings disposal areas
- Inactive mining areas
- Overburden/clay removal (including stockpiling).

For the purposes of this chapter and dust management at the site, dust is considered to be airborne (or suspended) fugitive particles. The near-surface wind-driven transport of sands (saltation) is also addressed in this chapter as it can contribute to dust generation and can reduce the effectiveness of dust mitigation measures.

The purpose of this chapter is to set out the sources of dust and outline the proposed monitoring and management for the mining operations to ensure that any adverse effects of dust generated from the site are managed appropriately, as required by consent conditions.

The site experiences strong winds from a range of directions as shown in Table 6-1 (prepared by PDP) which sets out the direction, frequency and strength of the winds measured on site.

Table 6-1: Wind speed frequency distribution from Port Taharoa (2022-2024). *Source: PDP Air Quality Assessment Report, August 2025, Table 4.*

Direction	Frequency (%)					Total (%)
	0.5 – 1.5 m/s	1.5 – 3 m/s	3 – 5 m/s	5 – 7.5 m/s	> 7.5 m/s	
North	0.2	0.6	1.5	1.6	0.5	4.4
North Northeast	0.1	0.4	1.0	1.2	0.5	3.2
Northeast	0.3	1.5	3.7	2.8	1.1	9.4
East Northeast	0.3	5.0	9.8	3.1	1.3	19.5
East	0.8	4.4	2.8	0.7	0.1	8.8
East Southeast	0.3	0.6	0.2	0.1	0.0	1.2

Direction	Frequency (%)					Total (%)
	0.5 – 1.5 m/s	1.5 – 3 m/s	3 – 5 m/s	5 – 7.5 m/s	> 7.5 m/s	
Southeast	0.3	0.4	0.1	0.0	0.0	0.8
South Southeast	0.2	0.6	0.6	0.2	0.0	1.6
South	0.1	0.7	1.2	1.0	0.9	3.9
South Southwest	0.1	0.8	2.6	3.6	4.5	11.6
Southwest	0.1	1.2	2.7	3.4	5.4	12.8
West Southwest	0.1	0.9	1.5	1.4	2.2	6.1
West	0.1	1.1	1.4	1.3	1.3	5.2
West Northwest	0.0	0.7	1.4	0.8	0.3	3.2
Northwest	0.1	0.4	1.7	0.8	0.2	3.2
North Northwest	0.1	0.3	0.7	0.7	0.1	1.9
Calms (< 0.5 m/s)						0
Missing or Incomplete						3.2

PDP undertook calculations to determine the likely airborne transport distances of ironsand and clay/finer silica sand particles on the site (Table 6-2).

Table 6-2: Calculated airborne transport distances for various particles

Particle	Transport distance in average winds	Transport distance in very strong wind
Ironsand	5m	50m
Clay and fine silica sand	120m	250m

Based on the distance to sensitive receptors, the calculated transport distances and the windspeeds on site, the environmental risk assessment of dust at the site is generally judged as **LOW** to **MEDIUM** without any mitigation. The greatest risk is for mining operations in close proximity to the sensitive receptors (i.e. within 300m of residential dwellings). This applies to a relatively small area of the site on the northern and eastern parts of the Central Block. In these areas, there could be a higher risk of dust being transported to sensitive receptors and additional controls may be needed.

The greatest risk is posed by mining activities that expose, or involve the excavation and handling of the silts and clays on site. Additionally, near-surface sand transport across areas of exposed clays/silts can also dislodge those finer particles, generating dust. Specific controls are proposed for both the handling and excavation of the silts/clays and for areas with exposed clays/silts that are not being worked.

The risks are described in further detail in **Tables 6-3**.

Table 6-3: Environmental risk assessment for DUST

Operational element	Risk Rating (< 300m to sensitive receiver)	Risk Rating(> 300m to sensitive receiver)
Vehicle movements on access roads	LOW	LOW
Active mining areas	MEDIUM	LOW
Active tailings disposal areas	LOW	LOW
Incative mining areas	MEDIUM	LOW
On-site stockpiling of silts and clays	LOW	LOW
Overburden (silts/clays) removal	MEDIUM	LOW

6.2 Performance standards

The discharge of dust from activities at the site, is permitted by the Waikato Regional Plan, provided certain performance standards are met. Activities at the site should comply with the performance standards for dust management which come from:

- National environmental standards for air quality (NESAQ, 2014)
- Regional and district plans prepared under the Resource Management Act 1991

The Waikato Regional Plan (WRP) includes Permitted Activity Rule 6.1.16.1 which authorises the discharges to air, as long as the conditions are complied with. That rule also requires the discharge to comply with the standard conditions placed on activities as set out in Section 6.1.8 of the WRP.

The key compliance points are :

a) There shall be no discharge of contaminants beyond the boundary of the subject property that has adverse effects on human health, or the health of flora and fauna.

b) The discharge shall not result in odour that is objectionable to the extent that it causes an adverse effect at or beyond the boundary of the subject property.

c) There shall be no discharge of particulate matter that is objectionable to the extent that it causes an adverse effect at or beyond the boundary of the subject property.

d) The discharge shall not significantly impair visibility beyond the boundary of the subject property.

e) The discharge shall not cause accelerated corrosion or accelerated deterioration to structures beyond the boundary of the subject property.

6.3 Control measures

Due to the nature of the mining activities, measures are required to manage the risk of dust generation throughout all of the mining activities, including the areas not being actively mined. To ensure the performance standards set out above are achieved, the general approach is to:

- Implement the highest levels of control in areas of the Central Block near sensitive receivers, particularly where clays/silts are being handled or exposed
- Minimise, where practical, the area of dust-generating surfaces
- Utilise windspeed-based triggers to manage dust-generating activities

- Use dust control measures (like application of water, windbreaks, dust suppressing polymers etc) for short-term responses to dusty conditions and activities
- Implement long-term dust control measures (such as revegetation of exposed soil, vegetated buffers and ground stabilisation) to reduce the potential for dust generation and transport, with specific requirements close to the northern and eastern boundary of the Central Block.
- Prioritise the stabilisation of land adjacent to the northern boundary of the Central Block (closest to sensitive receptors) to control dust, once excavation in this area has finished.
- Operate a real-time dust monitoring network linked to dust and windspeed triggers.
- Monitor and report on dust
- Ensure all activities comply with this Dust Management Chapter of the EMP.

6.3.1 Establishment of wind speed triggers

The following will be used to predict the Dust Alert and permitted operational levels. These criteria are consistent with those used effectively at the Eastern Block Mining area at Taharoa. These levels may be adjusted as information about their effectiveness is gathered during implementation.

The windspeeds in the criteria are measured at the Port Taharoa met station on the site. There are currently eight dust monitors at the site, located generally towards the eastern and northern boundaries of the mine, to monitor dust close to sensitive receptors. TIL shall monitor dust discharges for the Central/Southern Block using at least six dust monitors to measure TSP, including one upwind and one downwind of the area, one in proximity to Taharoa school/kura, and one in proximity to the three nearest residential receptors. The remaining two dust monitors are located on the Northern Block. The location of these instruments shall be reviewed in response to changes in site operations in consultation with an air quality expert.

To implement the wind speed triggers the following shall be undertaken:

- Maintain the data link between the real-time MetOne ES dustmonitors and the TIL SCADA system to trigger Alert Levels as described in this Dust Management Chapter.
- Maintain a weekly plan based on forecast weather conditions. Determine the anticipated operating level for each day, based on the weather forecast and plan daily operations accordingly. Review and update the plan in the daily prestart meeting and document in the meeting minutes.

The proposed TSP trigger levels, are set out in the following **Table 6.4**[4]:

[4] 2025, PDP Air Quality Assessment. Table 4: Alert level framework.

Table 6-4: TSP trigger levels for DUST

Alert Level	Wind	Rainfall (last 24 h)	Temperature (°C)	TSP /Averaging Time	Operations
1	<5 m/s <10 m/s >10 m/s	No Yes Raining	>20 °C >20 °C >20 °C	<80 µg/m³ Rolling 24 hour average	Normal
2	<10 m/s	No	>20 °C	<160 µg/m³ 1 hour average	Alerted
3	>10 m/s	No	>20 °C	<240 µg/m³ 1 hour average	Modified
4	>20 m/s	No	>20 °C	>240 µg/m³ 1 hour average	Cease work that has the potential to generate dust or application of water for dust control. Recommence works when the TSP is less than 160 µg/m³ and monitor continually.

All references to wind refer to wind blowing from the W, SW or S directions.

Table 6-5 sets out the dust control measures for each of the activities associated with ironsand mining. As many of the control measures rely on dampening down surfaces, TIL shall have a water cart (or other suitable means of applying dust suppressant) available at all times.

Table 6-5: Control methods for DUST

Trigger level	Within 300m of the northern and eastern boundary of the Central Block	Remainder of site
Level 1 Normal	• Normal operations • Ensure water cart is available if needed • Track roll silt/clay stockpiles whilst winds are low	• Normal operations
Level 2 Alert	• Limit vehicle speeds to <10km/h • Minimise vehicle movements across exposed silt/clay • Apply water to exposed clay/silt surfaces that are trafficked • Limit drop heights when working with silts/clays • Track roll stockpiles and apply water if needed • Inspect every 2 hours to identify dust generation • Monitor SCADA system to allow early identification of a change in alert level	• Minimise vehicle movements across exposed silt/clay • Ensure water cart is available if needed • Commence wetting areas if the wind is forecast to rise
Level 3 High	• Only undertake work if absolutely necessary • Limit vehicle movements to the absolute minimum • Dampen, and keep damp, all areas being actively mined, or all areas with silts/clays exposed	• Limit vehicle speeds to <10km/h • Apply water to exposed clay/silt surfaces that are trafficked and stockpiles of silts/clays • Limit drop heights when working with silts/clays

		• Inspect every 2 hours to identify dust generation • Monitor SCADA system to allow early identification of change in alert level
Level 4 Extreme	• Cease work (aside from placement of tails and application of water to keep areas wet)	• Limit vehicle speeds to <10km/h and minimise vehicle movements • Dampen all areas within the active mining area and roads • Cease removing, transporting and stockpiling silt/clay overburden • Limit drop heights when working with silts/clays • Inspect every 2 hours to identify dust generation • Monitor SCADA system to allow early identification of change in alert level

6.4 Additional operational controls

In addition to the responsive controls associated with the trigger levels, a range of operational controls are implemented, independent of wind speeds, to ensure adverse effects of dust on the environment are minimised as much as possible. These measures aim to reduce the potential to create dust and enable the responsive trigger-based controls to be more effective and efficient. These controls are:

- Silt/clay stockpiles:
  - Minimise the height of stockpiles above surrounding natural ground to minimise wind driven dust.
  - Where practicable, given the moisture content and material stability, shape and compact the surface of stockpiles to reduce dust generation in windy conditions.
  - As far as practicable, do not locate stockpiles within 300m of the northern and eastern boundary of the Central Block.
  - Stabilise permanent or long-term stockpiles (with vegetations, geotextile or other suitable method).
- Roads and accessways
  - Stabilise main accessway with a gravel running surface.
  - Avoid creating regularly trafficked accessways on silt/clay surfaces.
- Exposed silt/clays
  - Minimise the area of exposed silt/clay surfaces
  - Remove (or cover with sand) settled silts/clays that have accumulated as a result of process water ponding or stormwater runoff. This only applies to small informal areas of accumulation, not the tailings or water recycling system.

For the area along the northern boundary of the Central Block, to minimise risks associated with dust at the nearest sensitive receptors adjacent to the site, a priority stabilisation area has been identified and is shown in Figure 6-1 below.

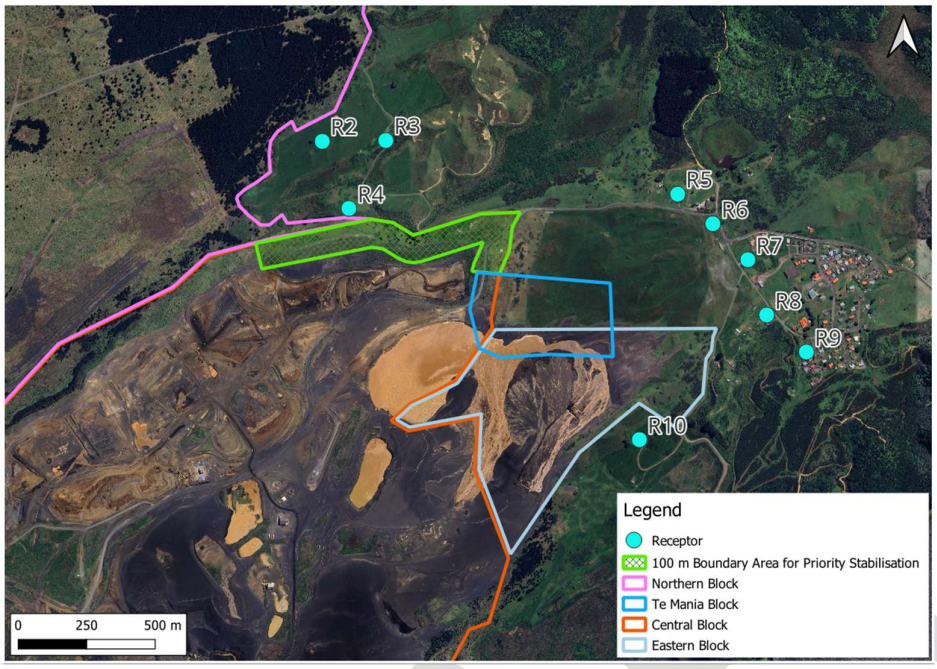

Figure 6-1: Priority stabilisation area in the Central Block

6.5 Saltation management

Saltation describes the process where sand particles (or any sized particle) are transported near the surface, in this case by wind. Near-surface turbulent air current lifts the sand particle, causing the particle to 'leap' downwind. As the sand particles land back on the surface, they can dislodge silt/clay particles and cause them to be suspended in the air, contributing to dust. It can also negatively affect rehabilitation efforts and cause maintenance issues for infrastructure.

Saltation is responsible for the majority of wind-driven sand movement and causes the characteristic dune features. In strong winds, large amounts of sand can be moved in a short period of time, particularly from dry, unstablised areas of open sand. The moving sand can bury roads, pipelines and other infrastructure as well as render some dust control measures ineffective. Taharoa is subject to a saltation transport, particularly within the mine site, but also in the unmodified areas.

If saltation needs to be managed, options include:

- Source stabilisation, which may include application of matting (like coconut matting) or surface grid structures like straw checkerboard barriers (SCB).
- Solid barriers (timber or block fences) that block the saltation process and result in a buildup of sand on the windward side of the barrier
- Lower, permeable barriers (fence (mesh wire) with a shade cloth/scrim attached to the windward face or well-spaced vertical timber slats supported by a post and wire fence)that reduce the transport by slowing the wind speed and result in sand buildup on both the downwind and upwind side of the barrier
- Solid barriers can be vertical structures (like a timber or block fence) or berms constructed of stabilised soil or woodchips/mulch.

6.6 Monitoring and reporting

Dust monitoring and reporting measures will allow evaluation and adaptation of the proposed mitigation measures and collection of data to judge the effectiveness of those measures. Monitoring and maintenance of the sand stabilisation/barriers will ensure their continued effectiveness.

Monitoring measures and reporting are set out in the following sections.

6.6.1 Monitoring

Monitoring will include:

- Check and log the weather forecast daily to determine the wind speed trigger level
- Maintain and check the dust monitoring instruments
- Inspect the site daily and record details in a log book. Include details of:
  - The operation of water cart or sprinkler system;
  - Dust mitigation measures implemented (if any);
  - Any exceedance of dust levels.
- Record the onsite weather data and the dust monitoring data
- Develop and maintain a database of dust monitoring and effectiveness of control measures and feed this back into the plan on a six-monthly basis as the mining area develops
- Carry out a weekly inspection of watering systems to ensure equipment is maintained and functioning effectively
- Keep an accurate log of all dust complaints from the public.
- Inspect any saltation control features, remove accumulated sand from solid/permeable barriers as needed. Repair damage to the installed barriers if required.
- Inspect the Straw Checkerboard barriers weekly and repair damage as needed

6.6.2 Meteorological forecasts

Meteorological forecasts should be sourced from the TIL preferred platform. Realtime weather data will be available for the site from TIL's meteorological monitoring stations.

6.6.3 Dust monitoring

- Visual inspections shall be undertaken at least once daily, depending on conditions, and logged in the logbook.

  o Daily inspections should include all exposed surfaces, active and inactive stockpiles, mining areas, adjoining roads, construction exits and land adjacent to the site

  o More regular inspections shall be conducted as per the wind trigger level requirements

- The realtime dust monitoring network shall be monitored regularly to determine the trigger level and ensure the required mitigation measures are implemented in a timely manner.

If TIL receives a dust complaint, the following should be recorded:

- Time, date and location of the complaint (if known)
- Description of the dust complaint (to the extent known)
- Wind direction and strength and weather conditions at the time
- As soon as possible (within 1 hour, where practicable), visit the area from where the complaint originated to ascertain if dust is still a problem

- Details of the site inspection following the complaint and dust management and control measures being undertaken at the time of the complaint as well as any changes made to these as a result of the complaint
- Contact the complainant to explain any problems found and remedial actions taken

6.7 Contingency

The following contingency measures are to be implemented in the event the primary mitigation measures fail, or are unsuccessful in managing dust in certain circumstances. Note, these measures will only be implemented if normal control measures are not successful in managing dust (**Table 6-5**):

Table 6-5: Contingency measures for dust management

Additional risks	Actions to consider
Breakdown or failure of water suppression systems	• Cease activities that may cause dust • Restore water system where possible • Source an additional supply if the original system cannot be restored
Large number of dust complaints (>10 in 12 hours)	• Cease activities upwind of the location complaints originated from. • Deploy additional water suppressants
Very high winds	• Deploy additional water suppressants, add polymers to water if appropriate

7 Hazardous substances

Hazardous substances are stored and used on-site to fuel, service and maintain the mining equipment.

A bulk fuel storage facility is located centrally in the Central Block. This is used to refuel larger mobile plant and smaller fuel tankers that refuel more stationary plant across the mine site. A smaller refuelling facility is located immediately to the east of the administrative centre, this facility is used for light vehicle refuelling. A small Jet A1 tank is also located at the Operations Centre for refuelling the helicopter. The location of these facilities is shown in **Figure 7-1**.

A range of other hazardous substances (lubricants, solvents, paints etc) are stored in the stores at the administration area. These are containerised, kept in relatively small quantities and mostly stored indoors.

Figure 7-1. Location of hazardous substance storage locations

TIL keeps a record of all hazardous substances that are stored, used or transported onsite. All storage and use complies with the relevant parts of the regulations.

Note that any use of hazardous substances means the risk is judged as **MEDIUM - HIGH (Table 7-1)**.

A Preliminary Site Investigation (PSI) has been undertaken and included in the substantive FTAA application. The objectives of the PSI were to assess:

- If any HAIL activities potentially are, or have been, present on the Site
- The applicability of the *Resource Management (National Environmental Standard for Assessing and Managing Contaminated Soil to Protect Human Health) Regulations 2011* (NESCS) to the proposed activities.

7.1 Environmental risk assessment

The hazardous substances that may be used on-site include:

- Fuels (diesel, petrol and Jet A-1)
- Lubricant oils and grease
- Hydraulic oils
- Paints and solvents.

Table 7-1: Environmental risk assessment for HAZARDOUS SUBSTANCES

Work type	Risk Rating
Refuelling at a fixed facility	MEDIUM
Mobile refuelling	HIGH
Storage of containerised hazardous substances	MEDIUM
Use of mobile plant	MEDIUM

7.2 Performance standards

The performance standards are dependent on the type of substance/material, but all storage and use of hazardous substances must comply with the relevant regulations and the performance standards in those regulations. This includes the Health and Safety at Work (Hazardous Substances) Regulations 2017 (the Regulations), resource consents and health and safety regulations.

7.3 Control measures

The following controls are a broad summary and TIL shall implement the specific controls required by the regulations for each hazardous substance stored. Note that required controls will depend on the type and volume of substance being stored and used on site.

7.3.1 Documentation and preparation

- Store all hazardous substances in approved containers within a secure hazardous substance storage facility away from ignition sources if flammable substances are stored. Secondary containment may be required for some substances.
- Segregate incompatible substances.
- Ensure hazardous atmosphere zones and location test certificates are identified and met, and copies of all location test certificates held on-site .
- Have an Emergency Response Plan including a Spill Response Plan.
- Maintain an inventory of all hazardous substances stored and used on site, this must include:
    - A description, UN number and SDS of each hazardous substance
    - The likely maximum amount of each hazardous substance stored and used on-site
    - The location of the hazardous substances (map) and a description of how it is stored (container type, volume etc)
    - Specific storage and segregation requirements.
- Ensure each hazard substance store has the appropriate fire-fighting equipment.
- Install appropriate signage for each store and on each hazardous substance container.

- Ensure all staff using and handling hazardous substances are trained in their use, storage and handling. The training should also include the use of appropriate Personal Protective Equipment (PPE) and how to respond to a spill.
- Appropriate spill kit(s) shall be provided at each hazardous substance store. Larger spill containment supplies shall also be kept within the administration area to deal with larger spills.
- Designate an Approved Handler who is responsible for the Hazardous Substances stores and ensuring compliance with this EMP and the Regulations.
- Ensure new types of hazardous substances brought to the site are documented and stored appropriately, and adjust spill kits if needed. Update inventory.

7.3.2 Day-to-day mining activities

- Ensure all machinery undergoes pre-start checks, particularly of hydraulic hose elements and connections.
- Ensure all practicable measures are undertaken to prevent oil and fuel leaks from vehicles and machinery.
- As far as practicable, refuel mobile plant at the fuel facilities. Where this is not possible (i.e. fixed plant, equipment working the mining area), the following procedures shall apply:
    - No refuelling of mobile plant within 50m of a waterway, wetland or the coastal marine area (excluding vessels and other marine/water-based plant or equipment)
    - All refuelling of equipment is to be supervised throughout the whole activity and spill containment equipment must be immediately available
    - Ensure all refuelling equipment has cut-off valves and the delivery side is attended to at all times.
- Ensure all vehicles and work areas have a spill kit appropriate to hazardous substances and volume being used (including for any hoses or equipment that could leak).
- Ensure spill containment equipment is available for water-based plant or plant where discharge to water is possible.

7.3.3 Waste management

All hazardous substances no longer required shall be:

- Removed and stored at another suitable storage facility for hazardous substances awaiting disposal; or
- Removed by a licensed operator and treated so that it is no longer a hazardous substance.
- Packaging that contained a hazardous substance shall be disposed of appropriately, taking into account the nature and type of packaging. If any residue of the hazardous substance has to be removed, or treated so it is non-hazardous, the package may be reused or recycled.

7.4 Monitoring and reporting

- Ensure the Hazardous Substances Inventory is kept up to date and made available on request to Waikato Regional Council and Worksafe staff.
- Regular checks of the hazardous substance stores, to ensure they remain compliant, will be undertaken by TIL. This shall include reconciling the inventory, checking compliance of all hazardous substance stores and ensuring spill kits are in place and in good repair.

7.5 Contingency

A Spill Response Plan shall be prepared which sets out how any hazardous substance spills will be managed.

8 Erosion and sediment control

This section discusses the erosion and sediment risks and controls associated with land-based mining works across the Taharoa C site. Erosion and Sediment Control (ESC) risks and measures relating to the following are not included in this section of the EMP:

- Wind-driven erosion (and transport) of sand is dealt with in the dust chapter (Section 6).
- Any additional specific sediment control measures required during harvesting Taharoa Forest are addressed in the Harvest chapter (Section 14).

There are a number of wetlands which are authorised to be removed (See Figure 8-1). ESC risks and measures will apply to land disturbance activities and associated discharges to the wetlands until they are removed.

8.1 Environmental risk assessment

Erosion and sediment control measures for the mining activities on site are required for:

- Stormwater runoff and discharge from buildings and hardstand areas (administration and operations facilities)
- The management of tailings and process water
- Ground disturbance works in proximity to waterways and wetlands (except for wetlands that are being removed as authorised by consent AUTH142035.18.01).

The site is underlain by permeable sand and rainfall rapidly infiltrates into the ground. As a result, surface runoff does not typically occur on site. Limited ponding occurs in areas with exposed clays/silts or localised low spots adjacent to internal roads. These limited areas of ponding rapidly infiltrate within a matter of a few hours.

As a result, this section focuses on the runoff from impervious surfaces (buildings/hardstand areas), management of the tailings water runoff and mining activities near waterways and wetlands across the Central and Southern Blocks. No specific controls are required for the mining activities on the remainder of the site.

Due to the permeable sands and the limited areas of impervious surfaces, runoff from buildings/hardstand area is considered **LOW** risk. The large volumes of water used in the mine process combined with the need to have large settlement ponds result in a **MEDIUM** risk category for the management of tailings and process water. Due to the potential effects on the aquatic and terrestrial ecologies of the waterways and wetlands, ground disturbance works in proximity to waterways and wetlands are also judged to have a **MEDIUM** risk.

Table 8-1: Environmental risk assessment for EROSION & SEDIMENT CONTROL

Work Stage	Risk Rating
Stormwater runoff from buildings and hardstand	LOW
Tailings runoff and process water	MEDIUM
Ground disturbance works in proximity to waterways and wetlands	MEDIUM

8.2 Performance standards

The water quality performance standards to manage discharges associated with activities are contained in the following documents, and the activities are authorised by several resource consents which are discussed below:

- The Resource Management Act 1991
- Resource Management (National Environmental Standards for Freshwater) Regulations 2020Waikato Regional Plan;
- Waitomo District Plan;
- Resource consents.

The measures which are to be implemented across the site are in general accordance with the WRC guidance document titled 'Erosion and Sediment Control – Guidelines for Soil Disturbing Activities' dated January 2009.

The discharge of stormwater from hardstand areas such as the administration buildings, to the Wainui Stream, are authorised by resource consent AUTH142035.06.01, which requires:

- All stormwater (and washwater) that discharges to the Wainui Stream is to be directed through an oil water separator before discharge
- The discharge shall not:
    - result in conspicuous oil or grease film, scum, foam or a conspicuous change in colour of visual clarity of the water in Wainui Stream after reasonable mixing
    - not cause the turbidity of the Wainui Stream, as measured 20 metres downstream of the discharge point, to increase by more than twice, when compared to a point above the discharge point

The discharge of mine process water to ground is authorised by resource consent AUTH142035.07.01, with the following restrictions:

- All process water shall be directed through settling ponds/soakage areas
- Settling ponds shall be de-sludged to maintain at least 80% of their volume
- WRC shall be given 1 month's notice of the desludging and records kept of the pond volume and desludging activities

The discharge of process water and stormwater to the CMA (via the export pipelines) is authorised by resource consent AUTH142035.13.01 which includes the following restrictions:

- The discharge must not exceed 32,600 m^3/day.
- The discharge must only occur where the discharge of stormwater and process water to land is not possible, for example during flood events or high rainfall periods when stormwater ponds have reached or exceeded 80% of their storage capacity.
- The discharge must be discharged at the ship loading buoy and may be coincident with ship loading of Ironsand (but does not have to be).
- The discharge must not result in conspicuous oil, grease, scum or foams present in the CMA after reasonable mixing.

Land disturbance associated with the mining activities is authorised by resource consent AUTH142035.01.01, enabling mining operations to occur but not within the following setbacks from sensitive receptors:

- 100m from the CMA,
- 30m from a perennial water body, including Mitiwai Stream and Wainui Stream
- 30m from a natural inland wetland (except wetlands where consent has been obtained to drain or disturb the wetland as shown in Figure 8-1).

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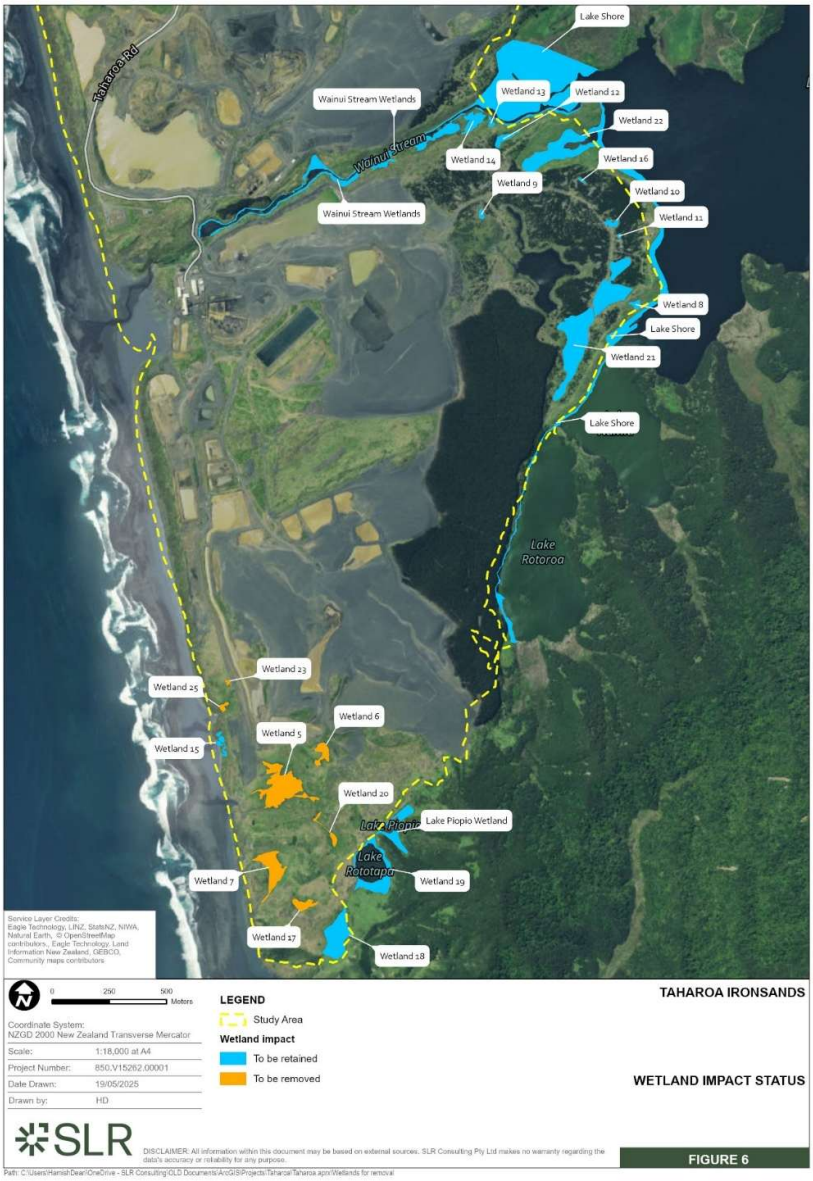

Figure 8-1: Wetlands in the Central Block showing wetlands which may be removed. *Source: Ecological Impact Assessment for wetlands and terrestrial vegetation (EcIA), SLR Consulting NZ, July 2025*

8.3 Description of the discharges

8.3.1 Stormwater runoff and discharge from buildings and hardstand areas

During rainfall events, runoff from buildings and hardstand areas needs to be managed to prevent erosion of the surrounding sand and the inappropriate discharge of stormwater water that may contain contaminants. Where that stormwater may contain contaminants and the discharge is to surface water (i.e. the Wainui Stream) or the CMA (if the stormwater ponds have reached their storage capacity), treatment of the runoff may be required.

Currently, roof runoff is captured in tanks and recycled for wash water and other non-potable uses in the administration area. Overflow from these tanks discharges to the ground.

Only small areas of impervious surfaces exist in the administration area, with runoff from those areas largely discharging directly to the ground. Where runoff does occur, it is captured and passed through an oil water separator before being discharged into the mines operation water system for re-use as process water.

Due to the topography of the area (and sand base) some incidental areas around the administration area may discharge overland towards the Wainui Stream. These informal small-scale discharges typically discharge to the ground through the sands. If overland flow occurs, it must flow through a large vegetated buffer before reaching the Wainui Stream. As a result, these incidental discharges almost always discharge to the ground before reaching the Wainui Stream.

Runoff from the roofs and helicopter pad at the Operations Centre discharges to the ground, either via small soakage pits (roofs) or to the surrounding sand (helicopter pad).

8.3.2 Tailings runoff and process water discharge

The mining process uses large amounts of water to transport and refine the Ironsands. Water is discharged at the following points in the mining process:

- Excess process water, containing fines, from the concentration plant is discharged to the SSP storage ponds for settlement of fines. The water from these ponds is fed back into the concentration plant.
- Water and the non-ferrous sands are pumped from the concentration plant to the active tailings area. The number and location of active tailings areas vary, but all tails are discharged into previously mined areas via guns or spreaders. The slurry or water and sand is sprayed from a high point into the tailings area. The sand immediately settles and the water percolates out of the tails and is collected in a system of canals and settlement ponds. Some of the tails water discharges directly to the ground. Treated water, from the settlement ponds, is recycled back into the process water system.
- The concentrate from the treatment plant is pumped as a slurry to the export stockpiles. Cyclones are used to extract the majority of the water as the concentrate is placed in the stockpiles. The remaining water percolates to the base of the pile and is collected and directed to settlement ponds for reuse as process water.

The various aspects of the mine process water use and recycling are closely monitored via the mine's CITEC process management system. This enables the operator to visualise and control the various aspects of the system, including pump rates, valves and the various pond levels.

8.3.3 Land disturbance near waterways

Mining operations adjacent to waterways (streams, lakes and the CMA) and wetlands may result in sediment-laden water entering the waterways/wetlands and result in adverse effects on those habitats and ecologies. The consent requires setbacks from these features, however, additional controls are to be implemented across the site for mining operations outside those setbacks but adjacent to surface water and wetlands. The setback distances for activities occurring near wetlands that are to be removed (as shown in Figure 8-1) do not apply to land disturbance activities occurring near those wetlands when they are being removed.

The environmental risks from the discharges related to the mining operations are summarised as:

- An accidental discharge of sediment-laden water to surface water (streams or lakes), wetlands or to the CMA from a failure or leak from the canals or settlement ponds
- Discharge of sediment-laden water (to surface water or land) from a pipeline rupture
- Discharge of sediment-laden water to a surface waterway or wetland from incorrectly directed tailings discharge
- Discharge of stormwater to the CMA (via the pipeline) that has high concentrations of sediment or contains oils that breach the consent conditions.
- Discharge of sediment-laden water from mining operations adjacent to surface waters and wetlands.

The following section includes specific controls to prevent these scenarios, and the resultant effects, from occurring.

8.4 Control measures

The following table sets out the controls for each element of the mining operation that may result in discharges of water. Due to the detail of the controls, the table refers to the following sections which describe the controls in detail.

Table 8-2: Control methods for EROSION & SEDIMENT control

Work Stage	Risk Rating	Control Measures
Process water collection and settlement system	MEDIUM	As described in Section 8.4.1
Stormwater discharges from the administration and operations area	LOW	As described in Section 8.4.2
Works adjacent to surface water and wetlands	LOW	As described in Section 8.4.3

8.4.1 Process water collection and settlement system

The process water network is complex and constantly evolving to meet the needs of the mining operations. To simplify the controls, this section sets out the controls for the primary features of that network.

Tailings discharge and water management

The discharge of tailings shall be undertaken with the following controls:

- Tailings shall not be discharged within, or allowed to flow to, the consent-required setbacks (30m from a waterway, 100m from the CMA).
- Tailings water collection features must be set up before tailings operation commences. This may include bunds, trenches and ground contouring to collect and direct tailings runoff water.

- Tailings placement to be subject to engineering design to ensure the stability of the tailings and appropriate drainage.
- All tailings water collection and conveyance features must be designed to collect and convey the expected tailings water flow and include an allowance for rainfall runoff and sediment accumulation. The volume of rainfall, and the chosen design storm, will depend on how long the system will be used and the consequence if the system is overwhelmed. Longer-term, critical parts of the system should be designed to cope with larger storm events than temporary structures.
- The tailings operation must be closely monitored (physically and electronically) to ensure the ongoing placement is operating as expected and complies with this plan and the relevant resource consent. At a minimum, daily inspections are required.
- Where practicable, the conveyance canals shall be designed, so that if a breach occurs, any discharge is contained on land and not discharged to a waterway or the CMA.

Settlement ponds

To ensure the water and sediment contained in the sediment ponds are safely contained and discharged appropriately, the following controls shall be employed:

- Newly created settlement ponds are to be located outside the relevant setbacks (as required by the consent).
- All water retaining structures are to be subject to the appropriate engineering design and in accordance with the relevant standards and guidelines. The ponds shall be constructed in accordance with that engineering design and any associated specifications.
- All ponds shall have a high-level emergency outlet designed to prevent overtopping of the pond sides. The discharge from the emergency overflow must be directed to an overflow containment or soakage area and must not discharge directly to the CMA, surface waters or a natural inland wetland.
- The ponds shall be designed with the capacity to contain the expected volume of water with a safety margin for unexpected weather events and an allowance for the accumulation of sediment.
- Each pond shall have access points for maintenance and monitoring.
- An interlock system should be in place to prevent tailing water from being pumped to areas when the settlement pond systems are at capacity.

Pipework and pumping system

The mine process water is conveyed around the site via a series of on-ground pipes, pump stations and control valves. These pipes can convey clean water, head feed or concentrate (as a slurry) or sediment-laden water. To prevent an accidental discharge from the pipe network, the following controls shall be implemented:

- All pipework shall be inspected for damage (crack, pitting and wear) prior to use
- All connecting elements and valves shall be inspected before use, and maintained in accordance with the manufacturer's specifications
- Where a pipe crosses a waterway, the pipe shall be encased or double-walled to contain any potential leaks
- Where practical, mobile/portable pump systems, valves and connection points shall be located in a position where, if a leak occurred, the water would not be discharged to the CMA or a waterway.

8.4.2 Stormwater discharges from the administration and operations centres

As the ground underlying the site is permeable sands, stormwater runoff is relatively uncommon on the site and the associated risks are low. Within the Administration and Operation centres, stormwater from impervious surfaces (roofs and sealed surfaces) is generated and may result in runoff across the ground during intense rainfall. Stormwater may contain contaminants (sediment, metals and hydrocarbons) which, if discharged to surface waters, could cause adverse effects. To avoid the discharge of stormwater directly to surface waters, the following controls shall be put in place:

- Stormwater from the roofs of the Administration Centre shall be directed to rainfall collection tanks and used for non-potable uses. Overflow from these tanks shall be discharged to the ground or collected for recycling into the mine process water system.
- Stormwater runoff from sealed areas around the Administration Centre shall be collected and conveyed to the sediment and soil separation system near the Wainui Stream. The collected water, following treatment, shall be incorporated into the mine process water system for re-use.
- No stormwater runoff shall be directed to the Wainui Stream, either directly, or via the sediment/oil treatment device.
- The impervious surfaces at the Operations Centre are relatively small and can be discharged directly to the ground. Roof water shall be discharged via downpipes to suitable soakage areas. Runoff from the helipad shall be discharged directly to the ground around the perimeter of the helipad.
- The stormwater collection systems shall be inspected every 6 months and maintained to ensure they remain effective.
- Any areas that receive stormwater discharge to the ground shall be inspected every 6-months to ascertain if the discharge is causing erosion or an accumulation of sediment and to confirm that the runoff is infiltrating into the ground.
- If erosion is occurring and it may result in adverse effects, the erosion shall be repaired. If sediment is accumulating at the discharge/soakage location and causing an adverse effect (in particular reducing infiltration such that the discharge no longer infiltrates into the ground) the sediment shall be removed.

8.4.3 Ground disturbance works adjacent to surface water and wetlands

Ground disturbance works can result in the generation of sediment-laden runoff, which can cause adverse effects if discharged directly to surface waterways or wetlands.

The types of controls that can be implemented to avoid, minimise or manage the discharge of sediment-laden water to surface waters or wetlands are set out below. These measures are consistent with the guidance provided by WRC for managing erosion and sediment control from ground disturbance activities.[5] These measures shall be implemented when the ground disturbance measures are adjacent to surface waterways or wetlands and there is a risk, that due to topography, runoff water may be discharged to the waterway or wetland.

[5] Waikato Regional Council earthworks guidelines and factsheets https://www.waikatoregion.govt.nz/services/consents-and-compliance/resource-consents/earthworks/guidelines-factsheets-and-as-built-certification-sheets/. Viewed 28 July 2025.

- Perimeter diversion measures to intercept 'clean' water upgradient of the disturbance works and divert it away from the works area to reduce the stormwater runoff volume running through the disturbed ground.
- The site should be graded to ensure runoff is directed to collection sumps or channels and not to surface waterways or wetlands. Collected water shall be discharged to the ground at an appropriate location or pumped into the mine process water system.
- Sediment fences and silt control may also be used to prevent sediment discharging from the site to the surface waters or wetlands. Silt fences shall be installed across the site contours downgradient of the area of disturbed ground. The silt fences shall be installed in accordance with the WRC guidance.

8.5 Monitoring and reporting

Monitoring and reporting requirements depend on the types of works being undertaken.

8.5.1 Monitoring and inspections

In order to evaluate the effectiveness of the control measures, monitoring and inspections are required. Due to the highly dynamic environment, quantitative monitoring is not always possible, consequently, the monitoring is a mixture of qualitative and quantitative measures.

Monitoring measures are:

- Process water collection and process water system
    - Daily visual monitoring of the tailings placement operations, to confirm it complies with the engineering design parameters and that the runoff water is being collected and conveyed as intended.
    - Confirm that tailings and runoff water are not encroaching on the required setbacks.
    - Monitoring of the pond water and sediment levels (either electronically or manually) to determine if they are nearing capacity (80% must be maintained) and if maintenance work is needed
    - Regular inspections of the elements of the mine process water system, including pipework, valves, connections and pump stations
    - Monitoring of the mine water distribution (electronically) to ensure water is being distributed to areas with the capacity to receive it.
    - All collection bunds, canals, ponds and their components are to be inspected following significant storm events to identify any damage to the system, including erosion, blockages, and accumulation of sediment and to determine if water flowed through the emergency overflow system. If water did flow through the overflow system, it shall be inspected for damage, and sediment accumulation and to confirm all the runoff was contained within the system.
    - Prior to a forecasted significant storm event, the collection bunds, canals, ponds and their components shall be inspected to confirm they are in good working order, have the capacity for the predicted rainfall and that the emergency overflow system is operational.
- Stormwater discharges from the Administration and Operations centres
    - Weekly visual inspections of the sediment/oil water treatment system adjacent to the Wainui Stream.
    - Monthly measurement of the levels of accumulated sediment in the sediment/oil water treatment system, and removal of sediment as necessary.

    - Following a significant storm event, a visual inspection of the key elements of the stormwater system and its discharge points shall be conducted to identify erosion and any sediment accumulation on the ground or within the stormwater system and confirm that no direct discharge to the Wainui Stream occurred.
- Ground disturbance works adjacent to surface water and wetlands
    - Daily visual pre-start visual inspections to confirm the installed sediment control measures are in place and in good working order.
    - If runoff is occurring, daily visual inspections of the runoff (from an elevated position) and the point it enters the receiving environment to confirm the sediment control measures are effective and the discharge meets the performance standards.
    - Before a forecasted significant storm event and after a significant storm event, the erosion and sediment control features shall be inspected to ensure they are in good working order, have capacity for the storm event and that sediment has not accumulated in the system.
- Discharges into the CMA
    - Measuring the turbidity of the discharge, as set out in the consent conditions.
    - If the trigger level is exceeded, the discharge must cease until the trigger level is no longer exceeded.

8.5.2 Maintenance requirements

Maintenance is required to ensure the systems and control measures are in good working order and are performing as expected. There should be a combination of regular scheduled maintenance and reactive maintenance in response to the monitoring set out above. **Table 8-3** includes information about the maintenance requirements for the different aspects.

Table 8-3: Maintenance requirements

Feature	Frequency	Maintenance actions
Process water valves, pumps and other electric/mechanical components	As per the manufacturer's specification	• As per the manufacturer's specifications, but anticipated to include lubrication, replacement of worn parts, filters and cathodic protection elements etc.
Tailings water collection, conveyance and sediment settling ponds	In response to issues identified during monitoring	• Remove accumulated sediment from ponds, canals and overflow systems so that 80% of the capacity is maintained at all times. • Repair erosion damage to bunds and pond walls • Remove vegetation growth if it is impacting operational capacity • Regrade tailings as required to ensure the design angles are maintained • Remove any sediment of tailings that may have encroached on the setbacks • Repair the automated monitoring instrumentation as needed
Sediment control features	In response to issues identified during monitoring	• Remove accumulated sediment where it may impact the performance of features. • Repair elements where damage has been identified through visual monitoring.

Feature	Frequency	Maintenance actions
		• Install additional controls if the discharge is breaching the performance standards.
Administration/operations stormwater system	In response to issues identified during monitoring	• Remove accumulated sediment from the sediment/oil treatment system • Remove sediment from the other parts of the stormwater system if it is impacting the system's capacity. This includes soakage areas where the sediment reduces the ground permeability. • Repair identified erosion • Institute additional controls if uncontrolled direct discharge to the Wainui Stream has occurred. • Replace worn, damaged or broken elements of the stormwater system as needed, i.e. downpipes, /roof water tanks etc

8.5.3 Reporting

TIL shall keep a record of all repairs, replacements and upgrades to the system, including the monitoring equipment. It shall also keep a record of any unintentional discharges and the measures taken to remedy any breaches.

8.6 Contingency

Where inspections identify areas of non-compliance, TIL will immediately rectify the non-compliance and implement additional controls.

9 Marine activities

TIL undertakes the following activities in the coastal marine environment:

- Pipeline operation, maintenance and repair
- Operation, maintenance and repair of the Single Buoy Mooring (SBM) and associated anchoring system
- Ship loading and associated dewatering discharge.

9.1 Environmental risk assessment

Marine works can result in a disturbance of seabed sediments or the direct discharge of contaminants into the marine environment. .

Mitigation and control measures are required to control the discharge of contaminants (primarily sediment) and minimise the effects of disturbance, including for the following:

- Management of debris, sediment and ecological effects from works associated with the pipeline operation and maintenance/repair
- Management of debris, contaminants and seabed disturbance from the operation and maintenance/repair of the SBM
- Sediment plumes from the ship loading operation

Specific mitigation measures to manage potential adverse effects of activities in the CMA on coastal birds and marine mammals are included in the consent conditions and discussed further in the Ecology and Marine Mammals section of this EMP.

9.1.1 Management of debris and sediment from pipeline operation and maintenance/repair

The pipelines are buried in the intertidal area but are on the seabed (secured by piles) in the subtidal zone beyond the surf break zone. Work on the pipelines may require excavation to expose the pipelines, dewatering of seepage water, welding and other metal work, use of paints, glues and solvents and filling the excavated area.

These activities will disturb the seabed sediments and could cause sediment plumes that may migrate away from the site. These sediment plumes can impact on the marine environment. The metalwork and use of small quantities of paints and solvents could result in a discharge of contaminants to, and impacts on, the marine environment.

The marine environment at Taharoa is high energy and the seabed sediments are subject to a high degree of wave-induced movement. Due to the naturally high-energy environment, the coastal water can have elevated and variable turbidity. In comparison to the scale of natural sediment movement, the disturbance and deposition associated with the pipeline maintenance/repair works are minor. Similarly, the likely scale and duration of sediment plumes from these works are expected to be relatively minor and temporary in nature. Due to the nature of the marine environment and the likely scale of the activities, the potential effects for typical works are considered to be **LOW**. Larger scale works, i.e. large sections of the pipeline need replacing, could have higher risks but would be very infrequent. In any case, control measures to mitigate the risks are necessary.

9.1.2 Management of debris, contaminants and seabed disturbance from the operation and maintenance/repair of the SBM

The SBM is kept in place by six anchors and associated anchor chains. Flexible pipes connect the buoy with the export pipeline on the seabed. SBM and its components are regularly inspected to ensure the safe and efficient operation of the ship mooring and ship loading process. On occasion, elements may need repair or replacement, or the anchor system may need adjustment. These activities may include metal works (grinding, cutting, welding etc) painting and movement of the anchoring system.

Adverse environmental effects could include disturbing the seabed, generation of sediment plumes and release of contaminants to the sea from the metalworks and painting. Due to the very minor nature of these works, the high energy of the marine environment, the short duration and the infrequent nature, the potential effects are considered to be **LOW**. To ensure best practice is followed, standard control procedures are included below.

9.1.3 Sediment plumes from the ship loading operations and process water disposal

The ship loading operation involves pumping ironsand mixed with freshwater into the export vessel, via the pipeline. The ironsand settles to the base of the hold and the water is removed by decanting and collection of drainage water which is discharged through the vessel's hull.

During periods of prolonged wet weather TIL may need to discharge excess process water and stormwater via the offshore pipelines. The discharge is from the process water system and is very similar in quality to the discharge from the ship loading discharge.

The discharges contains sediment (silts and clays) that naturally occur in the ironsand deposit. The discharged sediment forms a plume that reduces in concentration as it travels away from the discharge point.

The discharge has the potential to cause adverse effects on the marine environment due to sediment accumulation on the seabed/intertidal areas or due to the turbidity of the water. Based on modelling undertaken by MetOcean and ecological investigations by 4Sight/SLR, the potential effects of the discharge are considered **LOW** due to the high-energy receiving environment that has naturally high levels of sediment input and transport.

Table 9-2: Environmental risk assessment for MARINE WORKS

Work Stage	Risk Rating
Operation, maintenance and repair of the pipeline	LOW
SBM maintenance (metalwork, painting and anchoring system)	LOW
Sediment plumes from ship loading operations	LOW

9.2 Performance standards

TIL holds a resource consent to operate, maintain and replace the SBM (AUTH142035.11.01). The consent requires;

- The WRC is notified 10 days prior to maintenance or repair activities.
- If the SBM is to be permanently moved, the WRC are to be given 3 months notice and must approve the new location.
- Following the relocation of the SBM, the WRC, LINZ and Maritime NZ must be notified of the new location.

- Within 6-months of the SBM relocation, a suitably qualified marine engineer must certify the newly located SBM is sound and suitable for mooring of vessels.

In addition, every effort should be made to:

- Prevent the loss of debris to the marine environment.
- Avoid or minimise the loss of contaminants to the marine environment.
- Minimise the disturbance of the seabed.

The discharge of water and sediment to the CMA from ship loading is authorised by resource consent AUTH142035.12.01, with the following standards:

- The annual volume of discharge must not exceed 7.5 x 10^6 cubic metres in any 12-month period.
- There must be no conspicuous oil, grease, scums or foams present after reasonable mixing.
- Samples of the discharge must be collected annually and tested for grain size, composition, clay mineralogy and dissolved heavy metals (Aluminium, Arsenic, Nickel, Copper, Iron, Manganese, Lead and Zinc). Samples must be taken during the loading cycle, one near the start, one sample in the middle and one sample near the end. Each sample must be taken as close as practical to the point where the discharge enters the marine environment.
- The results of the sampling must be submitted to WRC within one month of the results being received.
- A one-off underwater noise survey must be completed within 6 months of the consent commencing,

The discharge of stormwater and excess process water, to the CMA at the ship loading buoy, is authorised by resource consent AUTH142035.13.01 with the following restrictions:

- The discharge must not exceed 32,600 m^3/day.
- The discharge shall only occur when the discharge of stormwater and process water to land is not possible due to wet weather or the settling ponds have reached or exceeded 80% of their capacity.
- There must be no conspicuous oil, grease, scums or foams present after reasonable mixing.
- Turbidity of the discharge must be monitored before discharge, and the discharge cease if the trigger level set in the consent is exceeded.

The seabed disturbance associated with the maintenance and operation of the pipelines are authorised by a resource consent (AUTH142035.09.01) which requires:

- The WRC shall be notified 10-days prior to any proposed maintenance replacement/reconstruction work (emergency work can shorten the notification period).
- The WRC shall be notified 3 months prior to the replacement of the pipe.
- Proposed maintenance replacement/reconstruction work within the onshore beach environment shall avoid the dotterel breeding season (September to January) unless written approval is obtained from WRC. See Avifauna Chapter of this EMP.

9.3 Control measures

A summary of the required controls for activities in the CMA is shown in **Table 9-3.**

Table 9-3: Control methods for activities in the CMA

Work Stage	Risk Rating	Control Measures
SBM maintenance (metalwork, painting adjusting anchoring system)	LOW	• Monitor weather forecasts to be informed of upcoming wind/wave events so the work can be undertaken in low swell conditions. • Ensure any liquids or materials used in the works are securely stored so nothing is lost to the marine environment. • If chemicals are being used (i.e. cleaning solvents etc) apply them in a manner that minimises the discharge to the marine environment, if necessary, use absorbent mats to capture runoff. • Undertake the works in a manner that prevents debris from being lost to the marine environment. • Have a suitable spill kit and a way to capture/retrieve debris lost to the marine environment. • Use anchor adjustment methods that minimise the disturbance of the bed (by the anchor or chain) as much as practicable. • Ensure all paint and equipment are secure for the duration of the operation. • Refill equipment, decant paint and other liquids in a manner where any spills will be captured and not discharged to the sea. Use absorbent mats as needed. • Do not wash painting equipment in the marine environment.
Pipeline maintenance and repair	LOW	• Monitor weather forecasts to be informed of upcoming wind/wave events so the work can be undertaken in low swell conditions. • As far as practicable, undertake the works during low tide conditions to avoid working in the water. If possible, take advantage of the spring-neap cycle. • Where dewatering is required, it shall either be discharged into the mine process water (if freshwater) or to the intertidal are. Any discharge to the intertidal area shall be via an energy dissipation device to prevent scouring of the seabed. • Vehicle and equipment movements in the CMA shall be limited to that necessary to undertake the works • All refuelling of mobile equipment shall be undertaken outside the CMA. • Minimise the area disturbed to that essential to carry out the works • If excavated material needs to be stockpiled across a tide cycle, it shall be stockpiled above the high tide level for that tidal cycle. • All excavations shall be filled with the excavated material and finished as closely as possible to the original level and form. • Minimise the use of hazardous substances.

Work Stage	Risk Rating	Control Measures
		• All material used for the maintenance and repair shall be stored outside CMA and all waste material removed upon completion of the work.
Shiploading discharge	LOW	• Ensure daily and annual limits are not exceeded. • Ensure the ironsand treatment process is operating effectively so there is the minimum practical content of fine sediment in the concentrate. • Ensure the ship loading water has the lowest practical concentration of sediment before mixing with the concentrate. • Ensure the excess stormwater/process water has been treated so that the sediment concentration in the discharge is as low as practicable.

9.4 Monitoring

The following shall be undertaken:

- SBM maintenance
    - Regular visual inspection of the location where equipment is being stored during the works, particularly after a shift in wind direction or an increase in wave height. The purpose of these inspections is to ensure the materials remain securely stored.
    - Inspect and replace absorbent mats as required.
    - Regularly inspect the marine area around the works to identify if any material or liquid has been lost to the marine environment. Deploy spill kits as needed, and remove any floating debris as soon as it is observed.
- Pipe maintenance
    - Monitor weather conditions
    - Prior to works, inspect the site for the presence of Dotterels on the beach, and continue to monitor during the works
    - During work, regular visual inspection of any discharge point to identify scour and sediment plumes
- Shiploading discharge
    - Collect water samples on a yearly basis and test for the determinants as required by consent conditions. Provide results to the WRC.
- Stormwater/Process water
    - Before discharging, undertake a visual inspection of the ponds the discharge will be pumped from to confirm the suspended sediment levels are appropriate for discharge.

9.5 Contingency

If an emergency repair or maintenance is required, the 10-day notification to WRC can be reduced, but the WRC must still be notified. The site of the works, if in the coastal marine area (CMA)[6], should be inspected for the presence of nesting Dotterels at any time of year, in accordance with the conditions of consent.

The controls set out in **Table 9-3** shall still be applied as much as possible.

[6] As defined in the RMA 1991

10 Archaeology

Taharoa is a culturally important location for local iwi Ngati Mahuta , with a long history of use, occupation and important events occurring on or near the site. The site historically contained a large number of known archaeological features, including ūrupa. All of the known ūrupa are contained within cultural reserves (wāhi tapu) that are clearly demarked on the mining plans. The Central and Southern Blocks have been extensively modified by the mining operations to date, particularly the surficial deposits. Many of the recorded archaeological sites are considered to be destroyed (59 sites) with the remainder either intact or partially intact , or their status is unknown (30 sites). The location of the 30 sites are generally in parts of the Site which will not be mined, such as the edges of streams.

The Heritage New Zealand Pouhere Taonga Act 2014 (HNZPTA) protects all archaeological sites, whether recorded or not, and they may not be damaged or destroyed unless an authority to modify an archaeological site has been issued by Heritage NZ. An Authority from Heritage NZ has been applied for and includes procedures to be implemented if an archaeological site is discovered and/or a known site is modified by mining activities. An archaeology management plan is required as part of the application process, and is appended to this EMP.

11 Noise

Mining activities generate noise via a range of sources, primarily from the operation of mobile and stationary plant. The closest sensitive receivers are to the Central Block, less than 150 m from the mining area. There are no sensitive receivers close to the Southern Block because the ocean is to the west, and lakes to the east. The village is located approximately 800m from the mining activity and also has topographical screening.

Mining activities are undertaken 24 hours a day, with the use of excavators, loaders and DMU's, generators and pumps occurring throughout the night. The mining activities do not include loud activities like blasting and piling. Based on an acoustic assessment undertaken by T+T[7], the noise limits within the Southern Block are predicted to comply with permitted activity limits in the Waitomo District Plan (WDP). However noise modelling indicates that operations in parts of the Central Block require specific management measures or methodology modifications to ensure the noise limits are complied with at the notional boundary of the closest noise sensitive receivers, which are located north of the northern boundary of the Central Block. In these areas activities will not be undertaken 24 hours a day, and will occur between 7am and 7pm until operations progress below the ridge line and out of site of the nearest sensitive receptors.

11.1 Environmental risk assessment

The predicted maximum source noise levels for general mining activities that operate near the site boundaries are given in Table 11-1. Due to the distance to sensitive receptors (see Figure 11-1) and the relatively low generated noise levels, the environmental risk assessment of noise at the site is judged as **LOW**, except for the part of the site along the northern boundary of the Central Block. For this part of the site, the risk is judged as **HIGH** (see Table 11-2).

Table 11-1: Predicted maximum noise levels for significant types of work

Activity	Maximum sound power level (dB L_{WA})
Mobile plant (trucks/bulldozers/excavators)	113 - 120
DMU	120
Generators and Pumps	TBA

[7] Taharoa Ironsands Central & Southern Block Fast Track Application for Mining – Noise Assessment prepared by Tonkin & Taylor Ltd, September 2025

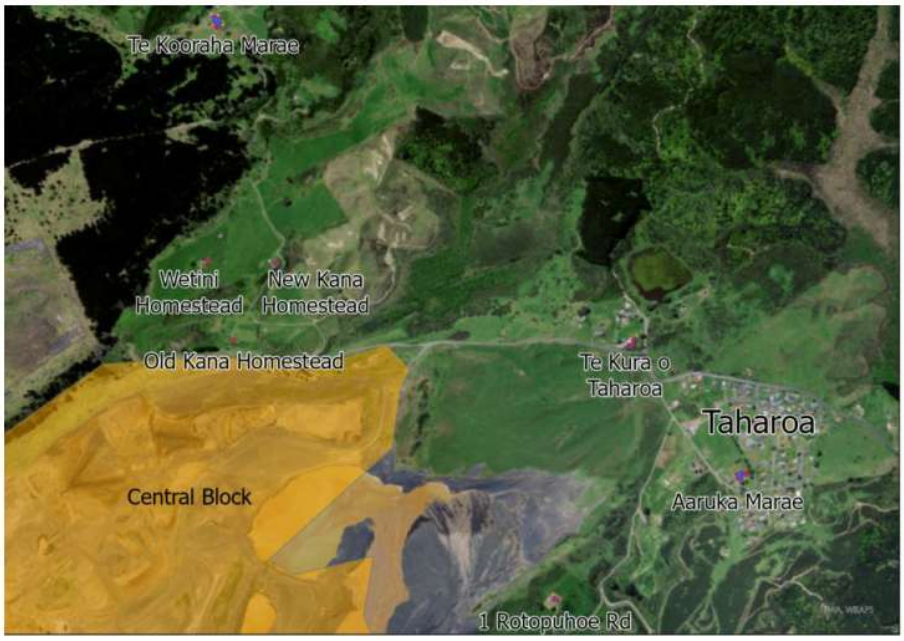

Figure 11-1: Location of Noise Sensitive Receivers in relation to the Central Block. *Source: Figure 2.2. of Noise Assessment prepared by Tonkin & Taylor, September 2025.*

Table 11-2: Environmental risk assessment for NOISE

Location	Work Stage	Risk Rating
Central and Southern Blocks	Mobile plant (excavator, loader etc)	LOW
	Operation of the DMU	LOW
	Stationary treatment plant	LOW
	Mobile rougher plant	LOW
	Dredging	LOW
	Tailings placement	LOW
	Truck and other machinery movements	LOW
Central Block - northern boundary	Mobile plant (excavator, loader etc)	HIGH
	Operation of the DMU	HIGH
	Stationary treatment plant	HIGH
	Mobile rougher plant	HIGH
	Dredging	HIGH
	Tailings placement	HIGH
	Truck and other machinery movements	HIGH

11.2 Performance standards

The proposed Waitomo District Plan include noise limits for permitted activities which apply at the notional boundary near a noise sensitive receiver. The noise level, at the notional boundary of the receiver, shall not exceed:

- 50 dBA LAeq during daytime, meaning 7am to 7 pm
- 45 dBA LAeq during the evening, meaning 7pm – 10pm

- 40 dBA during night-time, which means all other times.

To ensure that the PA noise limits are not exceeded, a suite of management measures are to be implemented across the site, as set out in the following section.

11.3 Control measures

To ensure best practices and minimise noise disturbance from the site, the following are recommended:

- All staff shall receive training on noise matters, so they are aware of where the sensitive receptors are located relative to the mine and understand how to minimise noise whilst working near those receptors
- Maintain equipment well to minimise rattles, squeaks etc
- Orientate stationary equipment so the noise is directed away from the sensitive receptors
- Avoid unnecessary use of horns or tonal reversing beepers on mobile plant
- If atypical, high-noise activities are required, plan to undertake those activities during daylight hours.
- Minimise operation of multiple items of plant, particularly bulldozers, at the same location near the edge of the mining block. Where practical, design mining operations so that only one piece of heavy equipment operates in potentially noise-sensitive locations at the same time.
- Avoid leaving equipment and vehicles running when not in use.
- Install and operate noise monitoring at representative locations in the Central Block, to validate ongoing compliance during operations.
- Monitoring will provide triggers when noise level could have potentially been exceeded.

Additional control measures which are to be implemented when mining the Central Block northern boundary ridge which separates the Central Block from adjacent residential properties.[8] The properties include the Old Homestead, New Homestead, and Wetini. Additional measures include:

- Mining sequence for the ridgeline must ensure that mining equipment is not within a line of sight to the adjacent dwellings.
- Evening (7 pm – 10 pm) and night-time (10 pm – 7 am) restrictions must be implemented whereby no mining activities occur on the ridgeline between these times.
- Until mining of the ridge drops below the ridge line and out of site of residential properties, mining must be limited to daytime works only (7 am – 7 pm).
- When mining the top of the ridge, alternative mining methods and quieter equipment must be used.
- Noise monitoring should be undertaken at the commencement of ridge mining works to check compliance with noise limits. Method modifications should be undertaken to ensure the noise limits are complied with. Regular monitoring should be undertaken during the ridge mining to ensure ongoing compliance.

[8] Taharoa Ironsands Central & Southern Block Fast Track Application for Mining – Noise Assessment prepared by Tonkin & Taylor Ltd, September 2025

11.4 Monitoring and reporting

11.4.1 Monitoring

Noise monitoring is conducted at representative locations to validate ongoing compliance during mining operations. Noise should be monitored in accordance with the following:

- At the notional boundary of the three dwellings north of the site, at the commencement of mining the ridge and regularly throughout the ridge mining. This monitoring will require permission of the landowners, and if this is not forthcoming the monitoring shall be at the site boundary with modelling undertaken to translate those results to the notional boundary of the dwellings.
- By a suitably qualified and experienced specialist (e.g. Member of the Acoustical Society of New Zealand) in accordance with the requirements of New Zealand Standard NZS 6803: 1999 “Acoustics - Construction Noise”.
- For an appropriate duration, reported with the measured level (e.g. 65 dB LAeq (30min)).

The results will be used to update the control measures in the EMP, if appropriate.

11.4.2 Reporting

A record of completed noise monitoring logs as well as any incident or complaint investigations shall be maintained.

Reasonable complaints will be acknowledged and responded to as soon as practicable. If a more detailed response is needed, it will be provided within a timeframe agreed with the complainant.

All noise complaints will be recorded in a complaints file that is available to WRC, on request.

11.5 Contingency

Complaints must be managed using the complaints process set out in Section 15 of this EMP.

12 Ecology

The mine site encompasses a vast area which includes a range of ecological habitats, including freshwater lakes and streams, wetlands, exotic forestry, low scrub and grass cover and stands of recovering native forest. These areas support a diverse range of flora and fauna, and mining activities have the potential to cause adverse effects on plants and animals and their habitats. A

12.1 Environmental Risk Assessment

Ecological surveys have been undertaken at the site over a number of years, to understand what species are present, and how they may be impacted by mining activities. Assessments, in accordance with the Ecological Impacts Assessment Guidelines (EcIA) have been completed, and information about environmental monitoring, species present at the site, and potential adverse effects effects on those species and habitats are set out in four ecological assessment reports covering fauna, terrestrial ecology, freshwater ecology and marine ecology[9]. Adverse effects on species and habitats may occur during the following activities:

- Pre-mining vegetation clearance (including forest harvesting) – could result in the loss of nesting/foraging habitat, and potential for injury and/or death during
- Infrastructure maintenance activities such as pipeline maintenance – could result in nesting habitat disturbance to species favouring the dunes / beach
- Land disturbance during extraction and processing – there is the potential for dust, vibration and noise disturbance to species
- Shiploading and activities in the CMA – there is the potential for adverse effects on marine mammals
- Damming, diverting and taking water from Wainui Stream – these activities could impact freshwater species and habitats within Wainui Stream and Lake Taharoa and lake margin wetlands.

There are high value species present along the margins of the Central and Southern Blocks where limited land disturbance has occurred to date. The risks to those species has been generally assessed as LOW-MEDIUM, as set out in the assessment reports and summarised in Table 12-1. Marine mammals present at Port Taharoa, such as Māui Dolphins, have been assessed as Medium risk.

Table 12-1: Risk rating for species

Species	Risk Rating
Bats	MEDIUM
Avifauna	LOW
Herpetofauna	LOW
Katipō	Negligible

12.2 Performance standards

Performance standards for managing potential adverse effects on ecology are included in multiple legislation, including:

- Resource Management Act 1991

[9] Fauna Assessment, Freshwater Ecology Assessment, Terrestrial Ecology Assessment, Marine Ecology Assessment.

- Wildlife Act 1953
- Conservation Act 1987
- Waikato District Plan

Ecological Impact Assessment guidelines (EcIA) have been published by the Ecological Institute of Australia and New Zealand (EIANZ) and these guidelines have been used for assessments at the Site.

The resource consents required under the RMA, include conditions to manage adverse effects on species and habitats at the Site.

A permit under the Wildlife Act has been applied for to manage adverse effects of mining activities on herpetofauna.

12.3 Control measures

Managing the effects of mining activities on ecological values at the site is generally restricted to parts of the site where high value species and their habitats are located, and therefore control measures are unlikely to apply across the entire site. Consent conditions include mitigation measures to manage potential effects on ecological values, but in some circumstances it is appropriate to include best practice protocols in management plans. A series of species and habitat-specific management plans have been, or will be prepared and will form part of the EMP framework. They will include detailed control measures to address any adverse effects of mining activities on ecology, including monitoring and reporting requirements.

Management plans appended to the EMP include:

- Lizard Management Plan (Appendix F);
- Draft Natural Inland Wetland and Buffer Management Plan (Appendix C);
- Draft Lake Level and Water Management Plan (Appendix D);

The objective of the Natural Inland Wetland and Buffer Management Plan is to avoid, minimise or remedy the adverse effects of mining activities on natural inland wetlands identified on or adjacent to the site.[10] The plan includes:

- Information about monitoring and reporting on the health and extent of the raupo and flax wetlands on the margins of Lake Taharoa
- Identification of land to be included in pest management, including pest management methods
- Management actions to avoid, minimise remedy, offset or compensate for the loss of natural inland wetlands
- Methods to ensure machinery is properly cleaned and decontaminated, to reduce the risk of introduced pest plants arriving on site
- Details of the plant and tree species to be included in restoration and rehabilitation areas.

The objective of the Lake Level and Water Management Plan is to set out the management actions set by consent conditions and how they will be complied with.[11] This includes:

- Details of the Wainui Stream residual flow, fish pass and dam;

[10] Appendix G: Schedule 1 – General Condition; condition 17(a)
[11] Appendix G: Schedule 1 – General Conditions; condition 17(b)

- Information about the monitoring programme to ensure the ongoing effectiveness of the Wainui Stream fish pass;
- Steps to be taken to reduce water abstraction if there is an adverse effect on the lake margin wetlands.

The development and implementation of the plans requires knowledge about TIL's mining methods, site and operations, as well as technical expertise in a particular subject area. Consequently, the plans will be updated as required by a suitably experienced person with advice from the relevant subject matter expert and TIL's operational staff.

13 Marine Mammals

Marine mammals are present in and around Port Taharoa, using the surrounding marine environment for feeding, resting or breeding. They may be vulnerable to mine activities occuring in the marine environment, associated with ship loading. The Port Taharoa area is part of ecologically significant habitat for the nationally critically endangered Māui dophin and represents important year-round habitat. For other species of marine mammals, including common dolphin and orca, the waters represent only a small fraction of similar habitats available throughout nearby coastal regions.

13.1 Environmental Risk Assessment

Activities in the coastal waters at Port Taharoa could result in adverse effects on marine mammals. TIL operates three export vessels, moored offshore at the stationary single berth mooring buoy located approximately 3.5 km offshore. Shiploading operations could occur up to 35 times per year. During shiploading the export vessel receives the slurry by pumping freshwater into the hold. Dewatering equipment removes freshwater from the slurry as it is pumped into the hold and discharges the freshwater into the CMA. There is some residual fine suspended material (inert, inorganic geological material) which is removed from the ironsand slurry and discharged into the CMA. This results in turbidity and a buoyant plume floating on the seawater surface before dispersal and dilution. The plume can be visible for several hours after discharge ceases and before dispersal.

An assessment by Cawthron Institute for the FTAA application[12], on the direct and indirect effects of activities on marine mammals from shiploading, considered:

- Ecological effects from the discharge, including contaminants and prey impacts
- Underwater noise from vessels and pipelines
- Vessel strike
- Vessel lighting
- Entanglement.

The assessment is based on the types of effects set out above, their spatial scales and durations, and relevant species information, and found that the overall risk of any adverse effects on marine mammals, including Māui dolphin, to be nil to less than minor (see Table 13-1).

Table 13.1: Risk rating for marine mammals

Potential impact	Risk Rating
Underwater noise	NIL-LOW
Vessel strike	NEGLIGIBLE
Vessel lighting	NIL TO NEGLIGIBLE
Entanglement	NIL TO NEGLIGIBLE
Ecological effects	NIL TO NEGLIGIBLE

[12] Assessment of environmental effects on marine mammals: Taharoa Ironsands Limited Central and Southern Blocks Fast-track application. Cawthron Report 4175, 6 October 2025.

13.2 Performance Standards

Resource consents, under the RMA, are held for the following activities which are relevant to managing any adverse effects on marine mammals:

- To occupy, use and maintain structures (pipelines) in the CMA for shiploading (AUTH142035.09.01)
- To occupy, use and maintain the mooring buoy and associated structures in the CMA (AUTH142035.11.01)
- To discharge ship loading water, including freshwater and fine sediment, into the CMA during shiploading operations (AUTH142035.12.01)

The New Zealand Coastal Policy Statement includes Policy 11a, which refers to avoiding adverse effects on nationally and/or internationally recognised threatened species (which includes Māui dolphin).

13.3 Control Measures

Because of the low level of overall risk to marine mammals, no measures are required to mitigate the effects of shiploading activities on marine mammals, however best management practices for working in environments with marine mammals are recommended.

Best management practices, as set out in the Cawthron Report, include:

- Minimising the potential of injury to marine wildlife
    - Minimise underwater noise effects
    - Regular maintenance and proper upkeep of equipment and vessels (e.g. lubrication and repair of pumps etc.)
    - Record marine mammal interactions
    - Ensure minimum vessel lighting is used, and minimising light 'spill' overboard
- Minimise the risk of vessel collisions with any marine mammal
    - Adopt best boating guidelines for marine mammals, including speed limits
    - Establish and maintain a watch for marine mammals
    - Record marine mammal sigtings to build baseline information
- Minimise entanglement
    - Avoid loose rope and/or rubbish around or off bessels. All deck lines to be tied up when not in use or be under some degree of tension
    - Minimise potential for loss of rubbish and debris from vessels. Recover any lost material
    - Record all entablement incidents

13.4 Monitoring and Reporting

Monitoring and reporting associated with the above best management practices is included in table 13-2.

Table 13-2: Marine mammal monitoring and reporting

Recommended monitoring and reporting	Frequency
Measuring underwater noise levels from existing operation and any new/different equipment or activities	• Existing operation - within 6 months of consent commencing

	• New equipment – as soon as practicable when any substantially different equipment is used for ship loading activities
Recording marine mammal interactions – the type and frequency of interactions	Provide annual reports to DOC
Recording vessel strike incidents or near incidents	In case of a fatal marine mammal incident, recover carcass(es) if possible and give to DOC. Further steps to be taken in consultation with DOC
Recording all entanglement incidents	Provide records to DOC annually

Because there is limited site specific information available about underwater noise levels near the Site from the export vessels, an *in situ* study is recommended because it will provide useful information for benchmarking and understanding the current underwater noise levels to which local marine mammals and other wildlife are subjected. This study could confirm the expected noise levels of the export vessels and their pump activities, and the pipeline, by measuring noise when:

- Export vessels are arriving and departing from Port Taharoa
- Vessels are attached to the buoy
- Vessels and the pipeline are collecting and dewatering the slurry.

The study is included in consent AUTH142035.12.01, conditions 7 and 8, requiring:

- Within 6 months of the commencement of the consent, a one-off underwater noise survey will be conducted. It will measure the noise generated by vessels arriving and departing from Port Taharoa, from vessels undertaking ship loading, including any noise generated from the pipeline.
- The results of the survey will be submitted to the Waikato Regional Council within one month of the results being received.

14 Harvest Procedures

The mine site includes a 60.6 hectare Radiata Pine forest in the Southern Block, to the west of Lakes Rotoroa and Numiti, which will be harvested ahead of mining in the Southern Block.

14.1 Environmental risk assessment

Procedures are required when harvesting the forest to ensure:

- Ground disturbance works within the forestry block, including harvesting of trees, and maintenance and construction of tracks, roads and skidder sites, do not result in any erosion or discharge of sediment to waterways and wetlands.
- Activities associated with forest harvesting, including ground disturbance works, do not result in adverse effects on flora and fauna.

Due to the permeable sands, limited areas of impervious surfaces, location of tracks, roads and skidder sites, and topography (relatively flat), runoff from the areas where tracks, roads and skidder sites are located is considered to be **LOW** risk.

Lakes Rotorua and Numiti are located to the east of the forest. The land boundary is set back from the lakes, and a proposed setback distance of 100m is proposed. The risk of adverse effects on water quality and ecology, if sediment were to enter the lakes during harvest activities, is considered to have a **MEDIUM** risk.

Bats are known to forage in the forest and potentialy roost in larger trees. An assessment of the effects of forest activities on bats concluded that there are likely low numbers within the pine plantation forest with the vast majority of bat detections were along the edges of Lake Rotoroa and Numiti. The forest is considered high value foraging habitat and potential short-term roost habitat, with the pines forming only part of the foraging habitat available to the bats in the area. Removal of the trees may result in loss of nesting, foraging and commuting habitat caused by harvesting and ground disturbance activities. The ecological value of bats is **VERY HIGH**, and the magnitude of effects on bats, without mitigation measures being implemented, is considered to be **MEDIUM**.

Table 8-1: Environmental risk assessment for Harvesting and Earthworks associated with removal of forest

Work Stage	Risk Rating
Earthworks to establish tracks, skidder sites etc..	LOW
Harvesting trees – effects on freshwater	MEDIUM
Harvesting trees – effects on bats	MEDIUM

14.2 Performance standards

Performance standards for harvesting and earthworks associated with harvesting are included in the National Environmental Standards for Commercial Forestry (NES-CF). These seek to manage harvesting activities, minimise soil erosion during and after harvesting, and address effects of harvesting on water quality, vegetation in the riparian zone, wetlands and the CMA. The NES-CF includes a requirement for undertaking works in accordance with a Forestry Earthworks Management Plan and Harvest Plan, which are included in **Appendix E**.

14.3 Control measures

Control measures for harvesting and earthworks associated with the forest are set out in the management plan (Appendix E) and summarised here:

- A Harvest Plan is prepared in accordance with Schedule 6 of the NES-CF 2017, and implemented at the site
- A Forestry Earthworks Management Plan in accordance with Schedule 4 of the NES-CF 2017, must be prepared and implemented at the site
- At least 20 working days (but not more than 60 working days) before harvesting commences, the Waikato Regional Council must be given written notice of the harvest location and the dates when harvesting will begin and end.
- Any changes to the HP or FEMP must be documented and dated, and provided to WRC.
- All harvesting must be in accordance with the HP.
- The HP is provided to all personnel working at the site
- Harvest machinery must not be operated within certain setback distances of perennial rivers, lakes and wetlands, as set out in the HMP
- Trees must be felled away from any water body, except where it is unsafe to do so.
- Machinery must not operate near freshwater
- Slash must be placed onto stable ground, and not onto land that would be covered by water during a 5% AEP flood event.

The requirements of the NES-CF includes restrictions on land disturbance associated with the forest harvesting, with land disturbance to not occur within the following setbacks:

- 100m from the CMA,
- 30m from a perennial water body
- 30m from a natural inland wetland where the land disturbance will not result in hydrological changes to the wetland
- 100m from a natural inland wetland in other cases.
- Planting of an indigenous vegetation buffer to provide foraging and roosting habitat for bats

14.4 Monitoring and reporting

Monitoring and reporting requirements relating to the harvesting of the forest are contained in the Harvest Plan and Forestry Earthworks Management Plans, and include.

- Weekly checks of infrastructure
- Checks on site the first working day following a rainfall event
- Post-harvest monitoring for a minimum of 6 months

14.5 Contingency

The following contingency measures are to be implemented in the event the primary mitigation measures fail, or are unsuccessful in managing environmental effects during harvesting.

- Halt harvesting operations and seek advice from the relevant subject matter expert and TIL's Environmental Manager.

- Implement additional controls, as recommended by TIL's Environmental Manager/Experts, along with specific monitoring to assess if these measures are successful in managing the effects.

If further harvesting stages are to take place, the Harvest Management Plan should be updated to include these additional measures.

15 Complaints

If complaints are received regarding environmental effects, and they are reasonable and relate to TIL's operations, they shall be investigated to assess if additional controls are needed.

15.1 Complaints register

A complaints register must be maintained, recording all complaints received by the Consent Holder regarding all aspects of operations at the site related to the exercise of the Consents (proposed condition 5 of Schedule 1: General Conditions).

Table 15-1 below presents a table to track the complaints.

Table 15-1: Complaints register

Date	Location	Possible cause	Weather conditions	Corrective action	Next steps	Other relevant info

15.2 Complaints procedure

The following procedure shall be followed for all direct complaints:

- All complaints should be immediately directed to TIL's Health, Safety and Environment Manager in the first instance.
- As soon as the complaint is received, it will be recorded on the project complaints register. This should include details about the complaint, including the date, time, nature of the effect and potential links to the mining operations.
- If the effect is clearly linked to the mining operation, and the effect is breaching a standard or consent, TIL shall implement an initial response. Depending on the nature of the complaint, the initial response could be to immediately. This initial response is likely to include applying additional control (e.g. water sprayer for dust) or modifying the activity causing the effect, in some cases, it might not be practicable to provide immediate relief. TIL shall inform the complainant of actions taken
- Where the initial response does not address the complaint, the TIL HSE Manager will be informed and will undertake further investigation, corrective action and follow-up monitoring as appropriate. The complainant will be advised of the outcome of this process
- All actions will be recorded on the project complaints register and the complaint will then be closed
- Any complaint received must be forwarded to the Waikato regional Council, in writing, within 48 hours of the complaint being received.

16 Documentation

All paper/electronic files relating to the EMP will be kept in the Site Office. This will include:

- The EMP and associated documentation;
- Consent documents
- Consultation and complaints registers
- Monitoring data
- Signed induction records which show that people inducted onto site understand what is required of them under the EMP

17 EMP Review and Reporting

To maintain relevance, the EMP must be reviewed when any changes to the mining operations are made and updated accordingly. Any changes must be made in accordance with the relevant conditions outlined in resource consents.

This EMP must be amended if:

- The mining operation changes methods or location
- The mitigation measures are not working sufficiently
- Responsible parties change
- The area of works increases or changes
- TIL has identified improvements to the process or mitigation measures.

Changes to the EMP can be logged in **Table 1-2** located in Section 1.

18 EMP Consultation

TIL must consult with the following parties during preparation, and any subsequent reviews of this EMP:

a) Department of Conservation
b) The Proprietors of Taharoa C Incorporation Limited
c) Taharoa Lake Trustees
d) Te Rūnanga o Ngaati Mahuta ki te hauaauru
e) Te Kōraha Marae
f) Aaruka Marae
g) Waikato Regional Council

This EMP must include a record of the consultation undertaken with the above parties, including a summary of the parties' comments and Consent Holder's responses. Table 18-1 includes a template register to be used to record consultation

Table 18-1 : Register of consultation during EMP preparation

Party	Summary of feedback	Consent Holder response
Department of Conservation		
The Propriertors of Taharoa C Incorporation limited		
Taharoa Lake Trustees		
Te Rūnanga o Ngaati Mahuta ki te hauaauru		
Te Kōraha Marae		
Aaruka Marae		
Waikato Regional Council		

19 Applicability

Enviser Ltd has prepared this EMP for Taharoa Ironsands Limited in accordance with the agreed scope. No other party, aside from TIL and its contractors, may rely on this report, or any conclusions or opinions within it, for the management of construction effects without the express written permission of Enviser Ltd. This does not preclude the use of this report to inform the consenting of the project.

The opinions and conclusions within this report are based on the information that was viewed during the preparation of the report.

Prepared for Enviser Ltd by:

Jared Pettersson
Environmental Engineer
CPEng, MIPENZ, IntPE

Appendix A – Risk assessment tools

Table A-1: Risk assessment matrix

		Impact				
		Insignificant	**Minor**	**Moderate**	**Major**	**Extreme**
Likelihood	**Almost Certain**	Medium	High	High	Very High	Very High
	Likely	Medium	Medium	High	Very High	Very High
	Possible	Low	Medium	High	High	Very High
	Unlikely	Low	Low	Medium	High	High
	Very Unlikely	N/A	Low	Medium	Medium	High

Table A-2: Risk impact definitions

Element	Insignificant	Minor	Moderate	Major	Extreme
Environmental		Moderate effects on biological or physical environment but little or quickly remedied impact to ecosystem. Short term reversible damage	Serious environmental effects such as displacement of species and partial impairment of ecosystem. Reversible but widespread medium-term impact/damage.	Significant impact on highly valued species or habitats. Reversible, but long-term damage. Some impact not reversible	Long term destruction of highly significant ecosystem or very significant effects on endangered species or habitat. Irreversible damage.
Legislative		Minor non-compliance with no legal / regulatory requirements.	Non-compliance with legal / regulatory requirements, or cessation of works.	Non-compliance with enforcement action, possible prosecution.	Prosecution.

Element	Insignificant	Minor	Moderate	Major	Extreme
Stakeholders	Negligible or isolated impact to stakeholders(s) with no impact to normal levels of complaints	Impact to one stakeholder with some notable trend/similarity in complaints.	Community group impact with formal/justifiable complaints lodged or complaints in relation to public health.	A number of community groups affected (e.g. with some protest action)	Widespread impact to city population.

Table A-3: Risk likelihood definitions

Rating	Probability	Description
Almost Certain	> 90%	Virtually guaranteed to occur
Likely	> 70%	Will probably occur in most circumstances
Possible	> 40%	Common occurrence
Unlikely	> 10%	Could occur at some stage
Very Unlikely	< 10%	Some history of occurrence

Appendix B – Archaeology Management Plan

Not attached in this draft version – included elsewhere in the application.

Appendix C – Natural Inland Wetland and Buffer Management Plan

Not attached in this draft version – included elsewhere in the application.

Appendix D – Lake Level and Water Management Plan

Not attached in this draft version – included elsewhere in the application.

Appendix E – Harvest and Earthworks Management Plan

Not attached in this draft version – included elsewhere in the application.

Appendix F – Lizard Management Plan

Not attached in this draft version – included elsewhere in the application.

Appendix G – Resource Consents

Not attached in this draft version.

Appendix H - Archaeological Authority

Not attached in this draft version.

Appendix I - Wildlife Act Permit

Not attached in this draft version.