



Rehabilitation Management Plan

Details			
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1. Introduction

Rehabilitation of the site during mining (**Progressive Rehabilitation**) and post mining (**Final Mine-Closure Rehabilitation**) is an integral part of the mining process.

Re-establishing the landforms post extraction of the HMC and replacement of the topsoil, will be undertaken in a systematic manner consistent with the objectives of the Rehabilitation Plan. Those objectives are:

- a) To create a landform with a similar contour and profile at final mine closure.
- b) To establish vegetation cover on all areas disturbed by mining activity; and
- c) To protect freshwater values associated with Collins Creek and the Canoe Creek Lagoon from the effects of erosion and sediment generation.

The mining process is expected to be continuous with no breaks in operations. Should the mine need to cease operations for any reason for a period of more than 3 months, all disturbed areas shall be rehabilitated as detailed in this document within 6 months from the date of the last mining works.

This rehabilitation plan should be read in conjunction with the Erosion and Sediment Control Plan.

The mining disturbance area is approximately 63 hectares with a maximum disturbed area at any one time being 8 hectares.

2. Resource Consent Requirements

The proposed conditions of consent which relate to rehabilitation are outlined below.

2.0 Notification	
2.1	For monitoring purposes, the Consent Holder must notify the Consent Authorities of the following: (a) the intended commencement date of activities at least 5 working days prior to commencement of works on-site; and (b) the intended completion of final mine closure rehabilitation activities at least 5 working days prior to works ceasing on-site.

4.0 Bond Conditions	
4.1	The Consent Holder must provide and maintain in favour of the Consent Authority a bond to secure compliance by the Consent Holder with all the conditions of these consents, including the completion of all final mine closure activities required by these consents and to avoid, remedy or mitigate any adverse effects on the environment arising as a result of the exercise of these consents.

5.0 Annual Work Programme	
5.1	At least 20 working days prior to mining activities commencing and thereafter on or before the anniversary date of the commencement of these consents, the Consent Holder must submit a programme of work ("Annual Work Programme") for certification by the Consent Authorities detailing: <ul style="list-style-type: none">○ The proposed works to be carried out over the next 12 months including:

	<ul style="list-style-type: none"> ▪ Equipment to be used; ▪ Areas of topsoil and overburden stripping and stockpile locations; ▪ New areas of land disturbance that will be mined; ▪ Access tracks; ▪ Drill/prospecting sites and other tracks to be constructed; and ▪ Any other site works within the consent area. <ul style="list-style-type: none"> ○ The approximate open volume of the working pit at the start of the year including depth of excavations and the area of the working pit. ○ The progressive rehabilitation works to be carried out over the next 12 months including: <ul style="list-style-type: none"> ▪ Areas of unrestored land (i.e. all land not finally topsoiled and revegetated) at the beginning of the new year; ▪ The area that will be fully rehabilitated during the forthcoming year; ▪ Maximum slope angles, bench heights and widths of recontoured ground, if applicable; and ▪ Rehabilitation method and technique including replacement of topsoil and vegetation cover. ○ Description of measures to prevent adverse effects on natural waters, including drainage works within the consent area, and the collection and treatment of site run-off before discharge to land. ○ Measures that must be adopted to ensure soil conservation and slope stability are controlled; ○ A description and analysis of any unexpected adverse effects that have arisen as a result of activities within the last 12 months, and the steps taken to address the adverse effect.
5.2	<p>The following plans, reports and results of monitoring must also be submitted as part of the Annual Work Programme:</p> <ul style="list-style-type: none"> ○ A detailed plan or aerial photograph showing: <ul style="list-style-type: none"> ▪ The open working area at the start of the year; ▪ Proposed mine path for the forthcoming year including haul and access roads; ▪ Rehabilitated ground behind the open pit area; ▪ Location of existing and intended topsoil or overburden dumps and their dimensions; ▪ Location of natural waterbodies; ▪ Location of present and intended drainage works and settling ponds; and ▪ Any other site works within the consent area. ○ A Site Specific Erosion and Sediment Control Plan in accordance with condition 23.0.

	<ul style="list-style-type: none"> ○ Results of surface water quality and water level monitoring from the previous 12 months in the form of an Annual Hydrological and Water Quality Report required by condition 26.7. ○ Any proposed updates to Management Plans submitted in accordance with the respective conditions of consent. ○ Results of dust monitoring from the previous 12 months required by Condition 28.5 for the previous 12 months.
5.3	The Consent Holder must provide the Consent Authorities with any further information, which the Consent Authorities may reasonably request after considering any Annual Work Programme. This information must be provided in a timely manner as required by the Consent Authorities.
6.0 Management Plans	
6.1	<p>The Consent Holder shall operate the site in accordance with the following management plans:</p> <ul style="list-style-type: none"> ● Noise Management Plan ● Avian Management Plan ● Wetland and Riparian Planting Plan ● Dust Management Plan ● Rehabilitation Plan ● Water Management, Monitoring and Mitigation Plan ● Erosion & Sediment Control Plan <p>(collectively Management Plans)</p>
6.2	<p>The Consent Holder may amend the management plans at any time to take into account:</p> <ol style="list-style-type: none"> a) Any positive measure/s to ensure the stated objectives of the management plans are achieved; b) Any required actions identified as a result of monitoring under these consents; and c) Any changes required to further reduce the potential for adverse effects as a result of actions identified in the Annual Work Programme. <p>Where management plans require the input of an appropriately qualified person, any amendments to those management plans must also be undertaken by the appropriately qualified person.</p> <p><i>Advice Note: Some management plans have ongoing annual review requirements which are required in order to avoid, remedy or mitigate effects. These specific review requirements are stipulated in the relevant conditions of this consent.</i></p>
6.3	Any amended Plans must be provided to the Consent Authorities within 20 working days of their review, for certification in accordance with Condition 6.1.
6.4	The Plans must not be amended in a way that contravenes the matters set out in the conditions for the respective Plans.

6.5	If the Consent Holder has not received a response from the Consent Authorities within one month of the date of submission of any reviewed management plan, the management plan must be deemed certified. If the response from the Consent Authorities is that they are not able to certify the management plan, the Consent Holder must consider any reasons and recommendations provided by the Consent Authorities, amend the management plan accordingly, and resubmit the management plan to the Consent Authorities.
6.6	A copy of the latest version of the Plans must be kept on site at all times and all key personnel must be made aware of the contents of each Plan and their responsibilities under each Plan.
6.7	Subject to any other conditions of these consents, all activities must be undertaken in accordance with the latest version of the Plans.

9.0 Rehabilitation	
9.1	<p>The Consent Holder must carry out progressive rehabilitation, to achieve the following requirements:</p> <ul style="list-style-type: none"> a) Reinstatement of the productive pasture; b) Reinstatement of existing drainage patterns to reflect pre-mining catchment areas; c) Ensure rehabilitated land is stabilised as quickly as possible; and d) Protect Collins Creek, the northern boundary drain, surrounding wetlands and the coastal lagoon from the effects of erosion and sediment generation. <p><i>Advice Note: Stabilised means an area inherently resistant to erosion such as rock, or rendered resistant by the application of aggregate, geotextile, vegetation, mulch or an approved alternative. Where vegetation is to be used on a surface that is not otherwise resistant to erosion, the surface is considered stabilised once an 80% vegetation cover has been established.</i></p>
9.2	<p>At the completion of mining (final mine closure), the mine area must be fully rehabilitated, by reinstating the productive pasture in general accordance with the Rehabilitation Plan prepared by TiGa Minerals and Metals Ltd dated April 2023.</p> <p><i>Advice Note: Final mine closure is the completion of all mining and progressive rehabilitation works and removal of buildings.</i></p> <p><i>Advice Note: All Management Plans are required to adhere to the requirements of Condition 6.0.</i></p>
9.3	If for any reason active mining ceases for more than 3 months, operational stockpiles must be removed and material returned to the mining area, and all disturbed areas must be rehabilitated as required by the conditions of these consents within 6 months from the date of the last mining activity.

13.3	The Consent Holder must remove all buildings with the exception of the Heavy Mineral Concentrate Storage Shed and reinstate the processing plant area to pasture before the completion of the term of consent.
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3. Mining and Progressive Rehabilitation process

3.1 Site establishment

Topsoil, Overburden and mineralised sand from the initial mining void, water treatment facilities at the plant and constructed wetland area will be stockpiled and used in the bunds and ore stockpiles. These stockpiles and bunds will be capped with the topsoil removed from the starter pit and water facilities. (Figure 3 shows bund and stockpile locations)

These bunds and stockpiles and bunds will also be progressively rehabilitated to get vegetative cover as soon as possible and sediment retention fences will be installed around them to control run off.

It is during this phase of the earthworks that the maximum disturbed area of 8 hectares will be reached.

3.2 Progressive Rehabilitation

The area of progressive rehabilitation is defined as the areas receiving tailings, overburden, topsoil and recontouring and revegetation.

Progressive rehabilitation is required to achieve the following requirements:

- e) Reinstatement of the landform to the agreed final landform approved by the land owner;
- f) Reinstatement of existing drainage patterns to reflect pre-mining catchment areas which discharge to the major drains;
- g) Ensure short and long term stability of the reinstated landform; and
- h) Protect Canoe Creek Lagoon and Collins Creek from the effects of erosion and sediment generation.

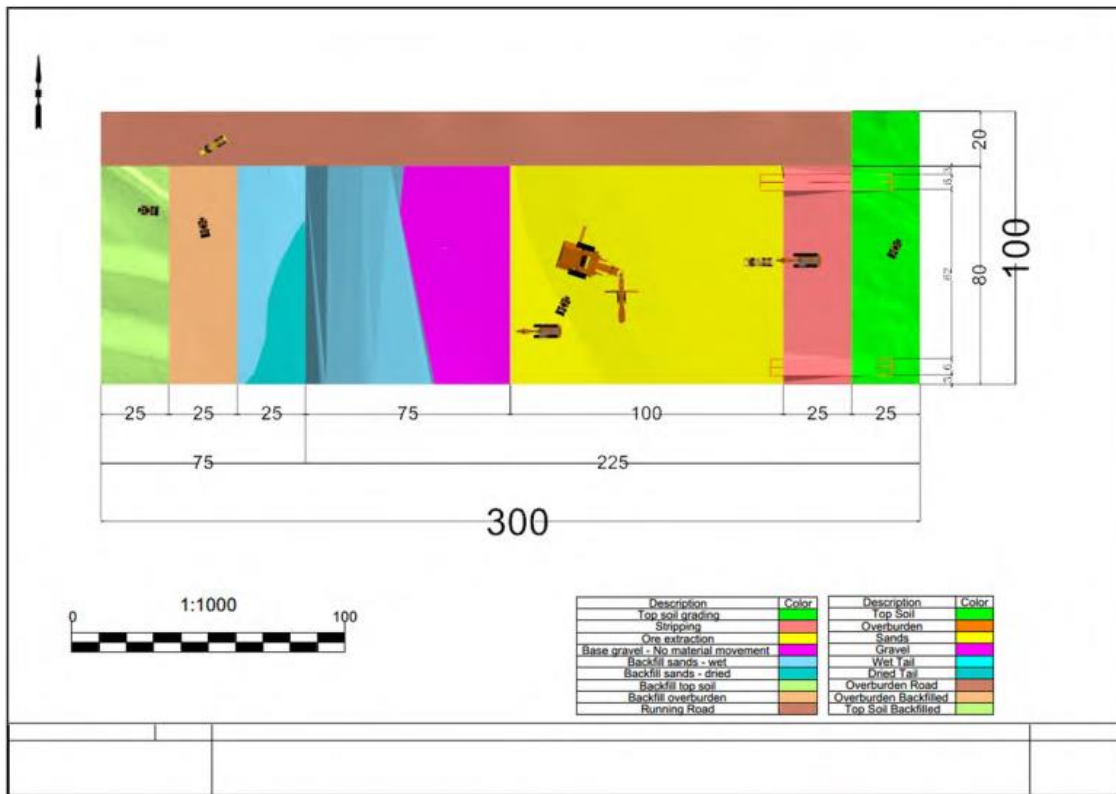
Progressive rehabilitation is defined as the 2ha area of progressive rehabilitation occurring as part the mine pit area. Progressive rehabilitation involves the following:

- placement of mine tailings and slimes in the mining void, (0.75 hectares)
- replacement of overburden, (0.25 hectares)
- spreading of topsoil, (0.25 hectares)
- returning the land to pasture, (0.75 -1 hectare)

Once the site establishment works are completed and mining is in sequence the approximate disturbed area will be 5 hectares. 3 hectares as shown in the schematic below and then 2 hectares in various states of rehabilitation identified above.

(The maximum disturbed area of 8 hectares allows for contingency during times when revegetation is harder or takes longer due to climatic reasons)

The below cross-section demonstrates the mining pit through extraction and Progressive Rehabilitation, with the right (western) part of the cross-section demonstrating extraction and the left (western) part of the cross-section demonstrating the ongoing Progressive Rehabilitation.



Schematic: Mining Pit extraction and Progressive Rehabilitation

Figure 1 (below) details the mining sequence schematics, which details the extraction and Progressive Rehabilitation process.

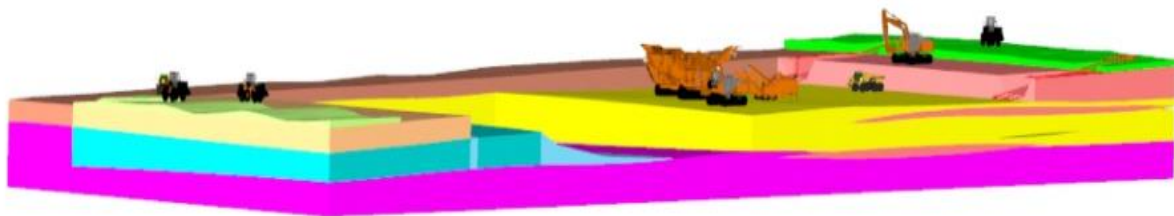


Figure 1: Mining sequence schematics

4. Initial Areas of Disturbance

Figure 2 (below) shows the initial areas for topsoil removal:

- starter pit,
- the plant site area,
- water management ponds at the plant and the
- constructed wetland in the northwest.



Figure 2: Extent of site for initial topsoil removal

Initial Soil removal will be undertaken in the following sequence.

1. Plant ponds construction. Provides sediment control for plant site and road construction.
2. Road and Plant area.
3. North-western constructed wetland.
4. Mining starter pit.

The overburden and mineralised sand removed in this construction phase will be used to create bunds and the topsoil from these areas will be used to cap the bunds and stockpiles.

Once vegetative cover is established on the bunds and stockpiles these areas are removed from the disturbed area.

As the mine progresses, subsequent topsoil removal will be immediately placed back onto backfilled and reshaped areas to minimise re-handling of topsoil as part of Progressive Rehabilitation.

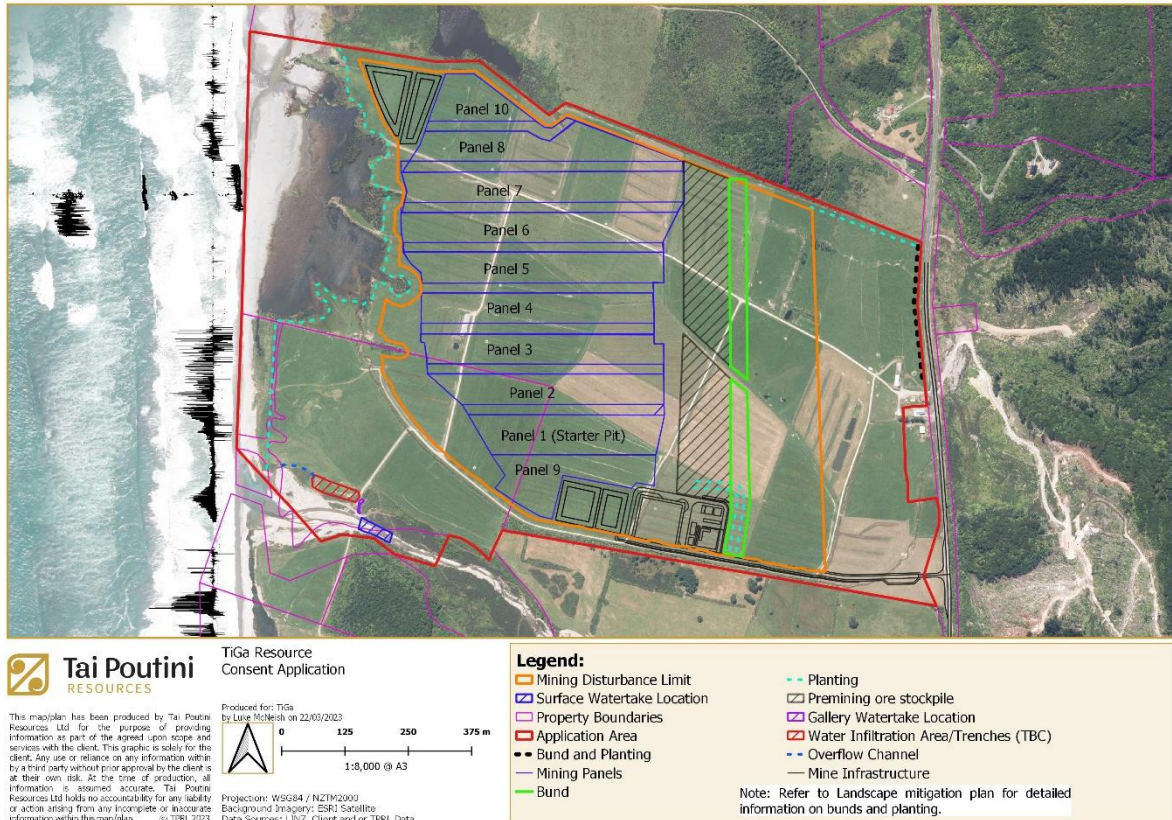


Figure 3: Site Plan

The Eastern Stockpiles and Bund has the following physical properties:

- Maximum height above current land is 4.5m;
- Maximum length and width are approximately 740 m and 130 m, total surface area of 8.3 hectares;
- Volume of overburden, Soils and Ore is approximately 200,000m³

This bund will be formed during the first six months of extractive operation and will then be rehabilitated with topsoil and seeded to all sides and top.

The bund and stockpiles will be recovered in the final mining sequence and land rehabilitated.

The maximum total site disturbed area of approximately 8 Ha occurs approximately seven months after commencement of mining. Then as topsoil stripping occurs, progressive rehabilitation is undertaken at the same rate to keep the total disturbed area at approx. 5 Ha for the remainder of the mine life.

From now topsoil stripping, mining and tails replacement (Extraction and Progressive Rehabilitation) continues until final tails landforms are achieved.

5. Mining Sequence

The mining sequence now includes all seven stages of the mining process as per Figure 1.

The stages are: -

- Undisturbed farmland.
- Topsoil stripping –placed directly onto backfilled and contoured tailings and overburden.
- Removal of overburden.
- Mining of sand – pumped to the processing plant.
- Tailings deposition – tailings pumped from processing plant to back fill mining void and positioned with cyclone and contoured by use of excavator and bulldozer.
- Rehabilitation of tailings with overburden,
- Placement of topsoil and contoured.
- The area will then be stabilized and seeded with suitable arable grass seed.

The pre-stripped and stockpiled ore will be processed through the mining field unit and tailings discharged to the mining void (Panels 8, 9 and 10) to complete rehab. Then topsoil and overburden from the eastern bund will be used to level and contour the area.

6. Final Land Form

Figure 4 shows the mine area final landform and the rehabilitation of pre-stripped ore stockpile and disestablishment of the eastern bund.

Once mining ceases, the processing plant and all associated equipment will be de-commissioned and removed from site. The lower of the two sheds used for the stockpiling of heavy mineral concentrate maybe retained by the land owner for use in the farming operation. The silt and settling ponds will be decommissioned and removed. The constructed wetland in the Northwest will be retained

These areas will be rehabilitated using the remaining overburden and topsoil that was stockpiled.

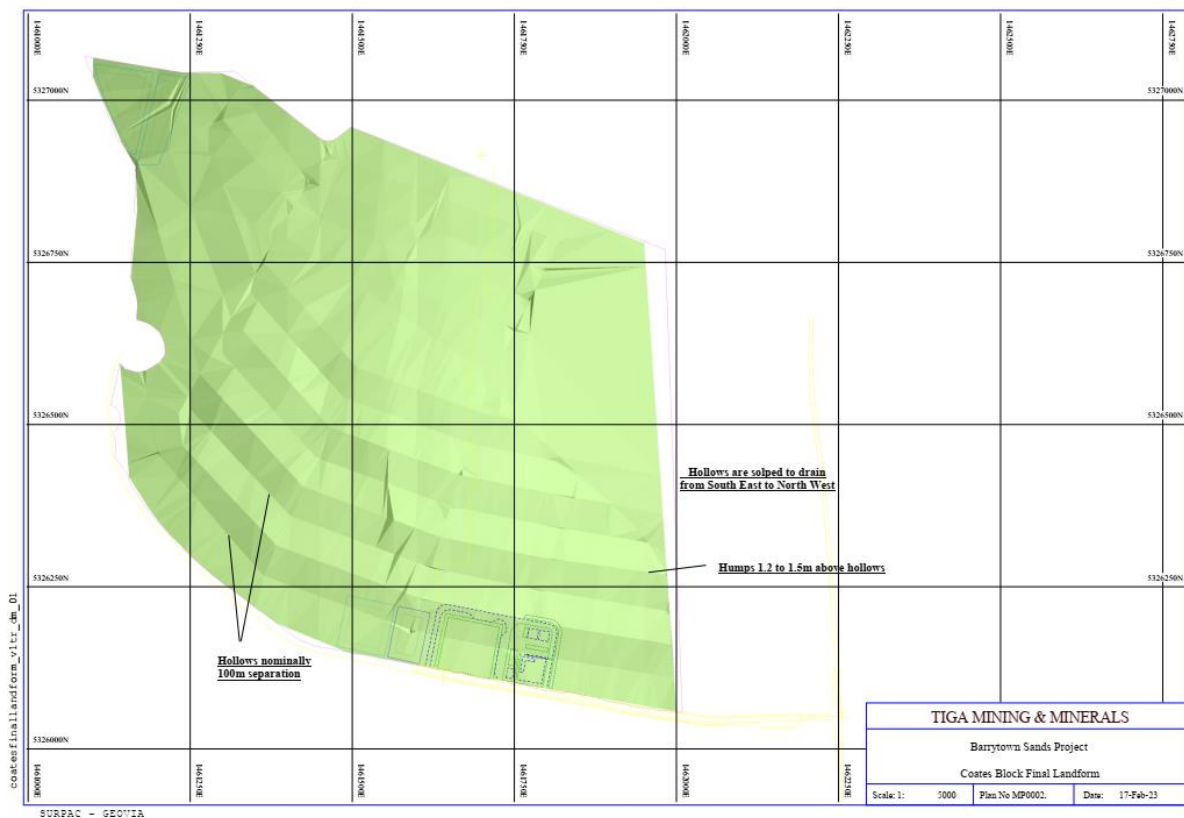


Figure 4: labelled drawing of humps and hollows

Figures 6 and 7 compare the contours of the original topography and the final site landform and figures 8,9 and 10 show cross sections through the area with the existing and post mining ground level shown. The mix of humps and hollows that existed pre-mining is replaced with humps and hollows that generally align to the north west. This design was the preferred option of the land owner.



Figure 6: Contours of Original Topography

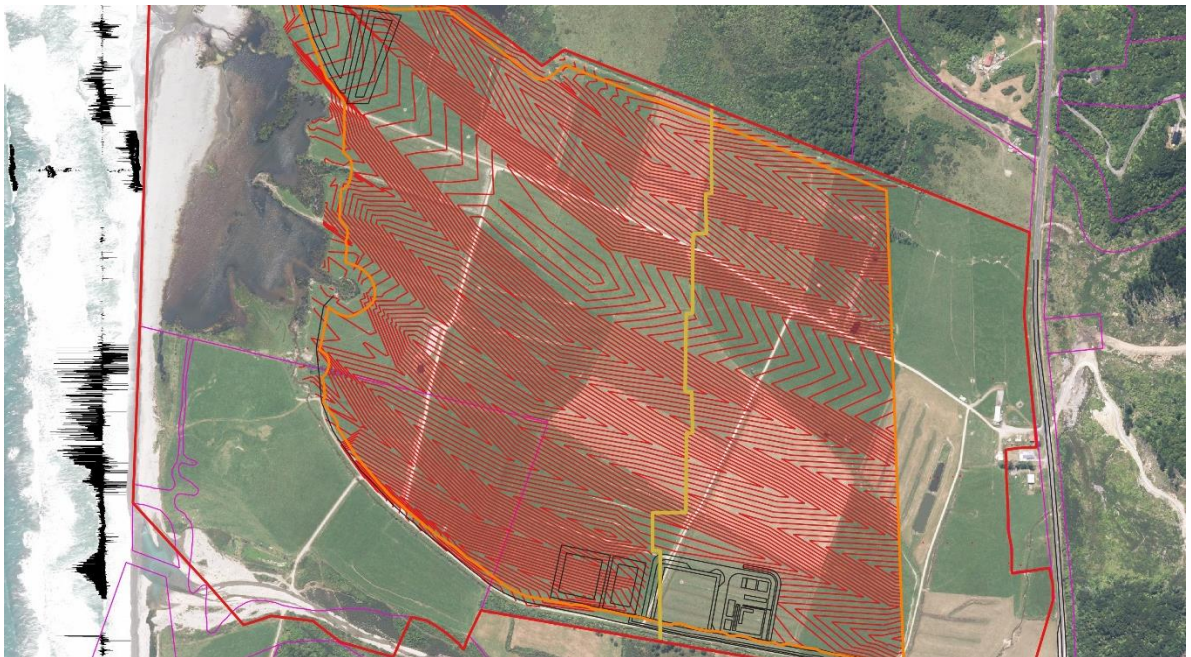


Figure 7: Contours of Final site landform

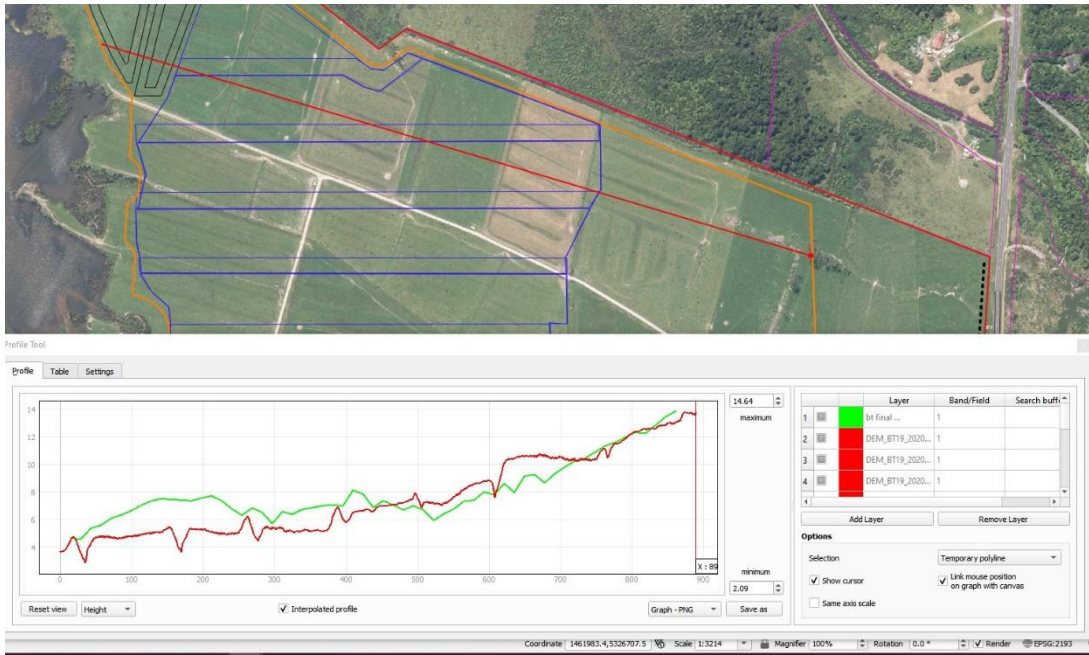


Figure 8: Northern Cross section (green line is post mining)

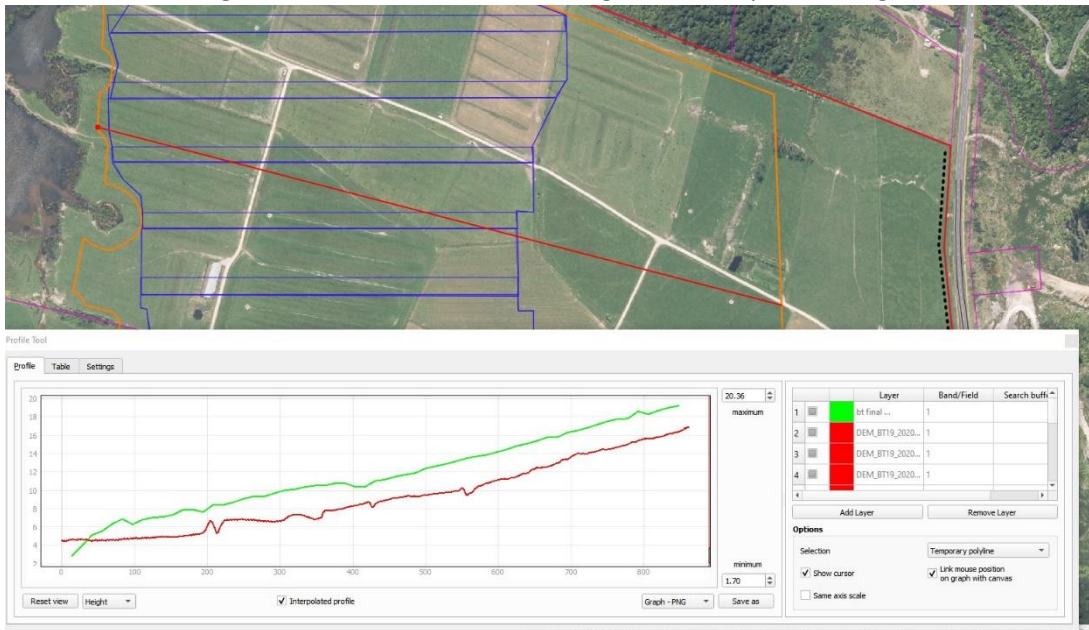


Figure 9: Mid-Point Cross Section

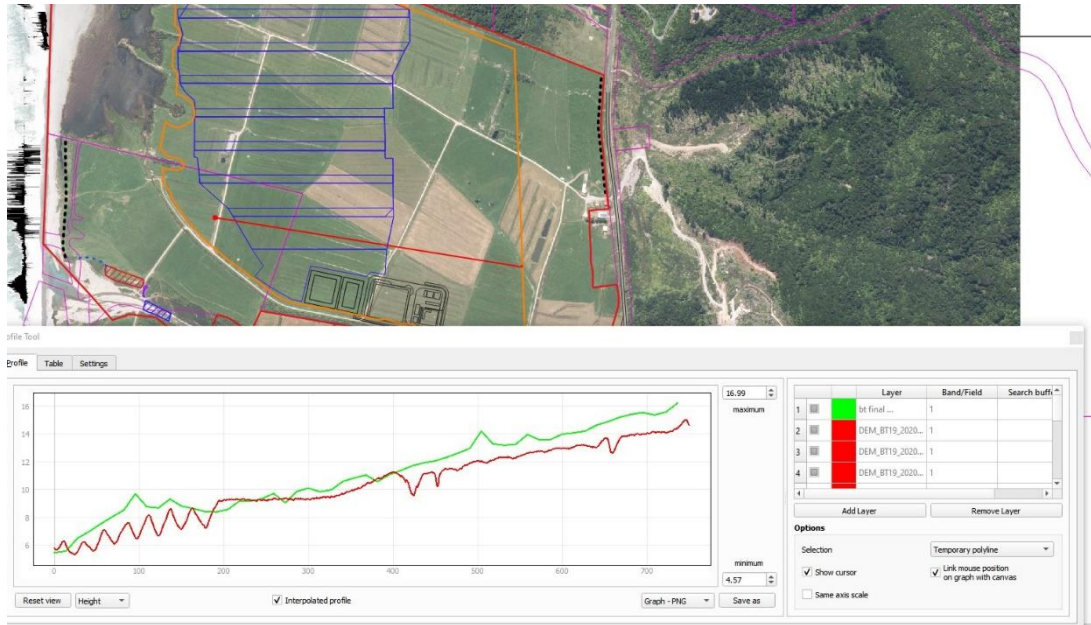


Figure 10: Southern Cross Section

The post mining contour is created from redistribution of some material located between the Mining cut off and the edge of the mine disturbance area. This area is approximately 20 hectares which will be recontoured as shown in figure 10 to match in with the land form created as part of the progressive rehabilitation. This area will also hold the pre stripped ore, overburden and topsoil extracted as part of the pre-mining activities and development of mine infrastructure.

7. Rehabilitation quality assurance

The resource consent conditions require that this Rehabilitation Plan addresses specific measures that will ensure a robust rehabilitation. These measures include:

- *A programme of progressive rehabilitation of the pre-mining landform, adhering to maximum disturbed area limits;*
- *The original and anticipated final mine closure topography*
- *Contour and stability of all post-mining landforms;*
- *Establishment of pasture cover over all disturbed land;*
- *Restoration of drainage discharge channels;*
- *Protection of water and soils from the effects of erosion;*
- *The achievement of water quality standards for water interacting with previously distributed sites/areas in the long term to protect aquatic values;*
- *Removal of buildings, equipment and structures; and*
- *Post-mining weed and pest control requirements.*

Each of these measures is addressed as follows:

7.1 A programme of progressive rehabilitation of the pre-mining landform, adhering to maximum disturbed area limits

The programme of progressive rehabilitation is covered in Section 3 above.

7.2 The original and anticipated final mine closure topography

The original and final mine closure topography are shown in Figures 6 and 7 above. Drainage patterns of the original site layout has been planned to be re-instated as best as possible by mechanical means. The rehabilitated landform will be approximately same as level and Contour as the original landform, however the alignment of the humps and hollows will be different.

7.3 Contour and stability of all post-mining landforms

As tailings are deposited back to the mining areas the sand will be levelled and the overburden levelled and contoured over the top of the sand.

Topsoil will be placed onto these tailings as soon as possible to ensure minimal wind disturbances. The placed topsoil will be lightly compacted by a dozer used to position the topsoil.

7.4 Establishment of pasture cover over all disturbed land

Once final topsoil is in place and a suitable area has been established and compacted, sowing of suitable pasture grass seeding will be undertaken. It is also expected that as topsoil has been relocated from the Eastern areas directly to the western areas, a significant amount of self-seeding will also occur.

7.5 Restoration of drainage discharge channels

All the existing drainage channels and catchments will be reinstated as much as practical within the new humping and hollowing layout. It is expected that catchment areas will remain approximately the same and discharge via approximately the same locations.

7.6 Protection of water and soils from the effects of erosion

Topsoil and over burden removed from the plant site, water infrastructure and starter pit will be utilized in the eastern bund and will be immediately profiled and planted as part of the visual mitigations. Further detail regarding protection from erosion is provided in the Erosion and Sediment Control Plan.

7.7 The achievement of water quality standards for water interacting with previously distributed sites/areas in the long term to protect aquatic values

The Water Management Plan required by the conditions of consent (Condition 24) provide actions that will be undertaken to manage water quality effects. The conditions of consent also require (Conditions 25 and 26) water monitoring, which will ensure the achievement of water quality standards throughout the mining process, and consequently following rehabilitation.

7.8 Removal of buildings, equipment and structures

The processing plant and some of the associated buildings will be removed from site post mining. With agreeance with the land owner the lower of the two buildings may stay as permitted by the COC held by Nikau Deer Farm.

The silt and settling ponds, and stormwater drains, will be cleaned of any silt and sediments followed by the backfilling, compaction and re-seeding of these areas back to pasture.

7.9 Post-mining weed and pest control requirements.

The land will be handed back to the Land owner post mining where it will be utilized as a dry stock farm as it was pre mining. As such pest and weed control will be undertaken as required in line with normal farming practises..

8. Final Mine Closure

Final mine closure will occur at the completion of all mining and progressive rehabilitation works, end of mine landscaping on the Eastern area of mine disturbance, and includes the replacement of the temporary Overburden and soil stockpile back to the mine area, and where the previous land drainage patterns are reinstated acknowledging the change in hump and hollow layout.

Landforms at the point of final mine-closure at detailed at Figures 6 – 10.

The Consent Holder must notify the Consent Authorities of the intended completion of final mine closure rehabilitation activities at least 5 working days prior to works ceasing on-site in accordance with Condition 2.1 of General conditions and WCRC Consent.