

SNAPPER MINE

Northern Extension Modification

Submissions Report

TRONOX 



SNAPPER MINE NORTHERN EXTENSION MODIFICATION

SUBMISSIONS REPORT



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1 INTRODUCTION

1.1 BACKGROUND

Tronox Mining Australia Limited (Tronox) is the owner and operator of the Snapper Mineral Sands Mine (the Snapper Mine), which is located approximately 85 kilometres (km) north-east of Wentworth and approximately 170 km south-east of Broken Hill in western New South Wales (NSW).

The Snapper Mine was approved under Part 3A of the NSW *Environmental Planning and Assessment Act 1979* (EP&A Act) (Project Approval [06_0168]) in 2007.

The Snapper Mine integrates with the following Tronox mineral sands mining and processing operations located in western NSW:

- Broken Hill Mineral Separation Plant (MSP).
- Ginkgo Mineral Sands Mine (the Ginkgo Mine).
- Atlas-Campaspe Mineral Sands Project (Atlas-Campaspe Mine).

The Snapper Mine Northern Extension Modification (the Modification) includes an extension to the existing/approved mine path to extend operations at the Snapper Mine within the approved mine life and without increasing the size of the approved surface development area (Section 1.2).

On 22 November 2019, Tronox submitted the Modification Report to the NSW Department of Planning, Industry and Environment (DPIE). The Modification is being sought under section 4.55(2) of the EP&A Act. An overview of the Modification is provided in Section 1.2.

The Modification Report was placed on public exhibition by the DPIE from 4 December to 18 December 2019. During this period, Government agencies, non-government organisations (NGOs), businesses and members of the public were invited to provide submissions on the Modification Report to the DPIE.

The DPIE provided a letter to Tronox dated 20 December 2019 requesting a Submissions Report be prepared for the Modification. Tronox's responses to the submissions received during the public exhibition period are detailed in Section 4.

This Submissions Report has been prepared generally consistent with the draft *Preparing a Submissions Report – Guidance for State Significant Projects* guideline (Department of Planning and Environment, 2019).

1.2 OVERVIEW OF THE EXHIBITED MODIFICATION

Production at the approved Snapper Mine is currently scheduled to conclude in mid-2020. The Snapper Mine workforce is then planned to transition to the Atlas-Campaspe Mine. Based on this current scheduling, there is a risk of production and employment discontinuity between the cessation of Snapper Mine operations and commencement of Atlas-Campaspe Mine operations.

Tronox proposes to extend the existing/approved mine path at the Snapper Mine to maintain continuity of production and associated employment of the Snapper Mine workforce until the commencement of operations at the Atlas-Campaspe Mine.

The Modification would minimise the risk of production and employment discontinuity between the cessation of Snapper Mine operations and commencement of Atlas-Campaspe Mine operations without extending the mine life or the size of the approved surface development area.

The Modification would include:

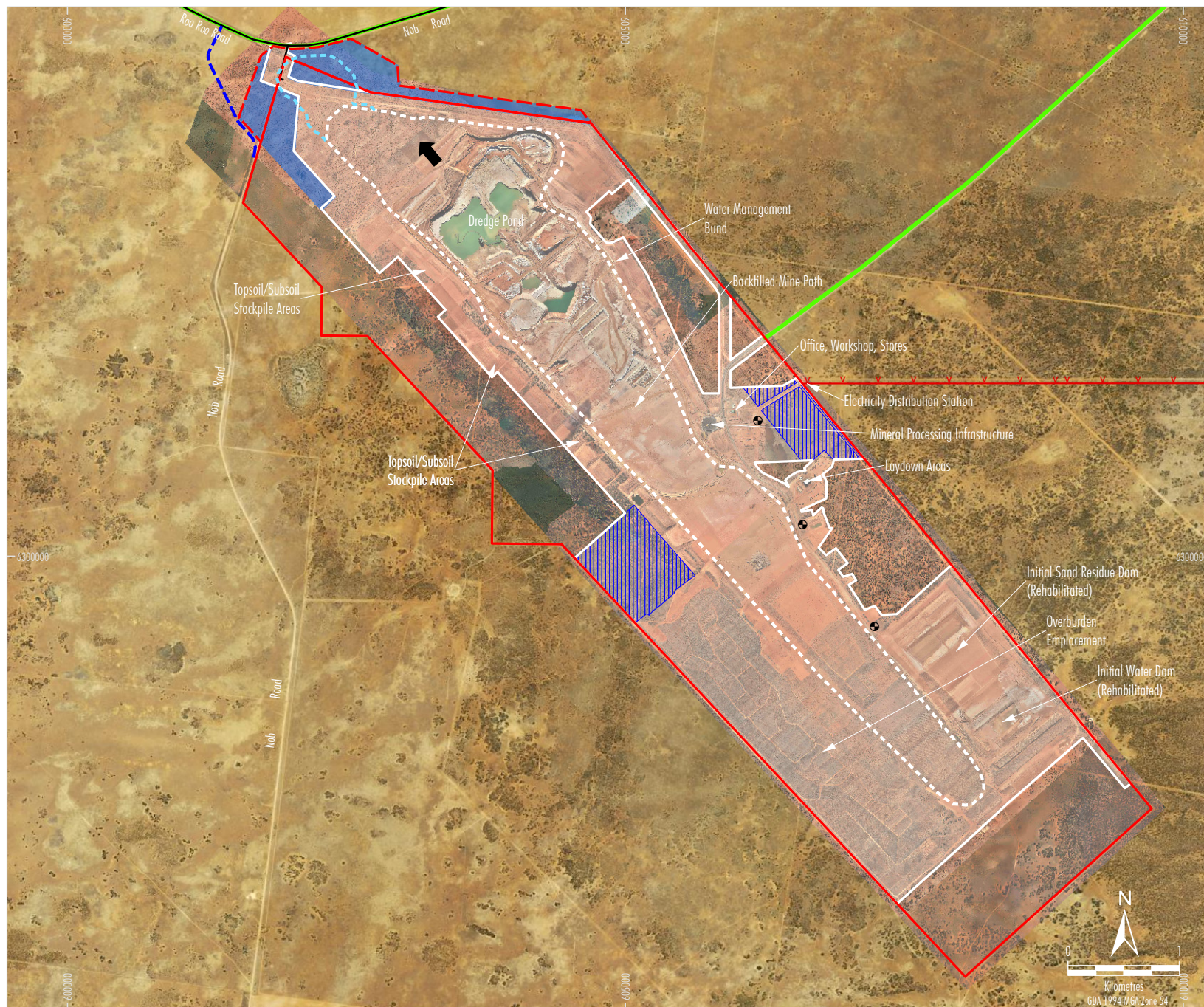
- extension of the existing/approved mine path and associated supporting infrastructure into Mining Lease Application (MLA) 1;
- development of temporary off-path overburden emplacements;
- additional soil stockpile areas;
- re-alignment of Nob Road around MLA 1;
- reduction in the number of final depressions from two to one;
- increased size of the remaining final depression; and
- relinquishment of approved surface development areas no longer required, resulting in a net reduction in surface development area.

The indicative general arrangement of the modified Snapper Mine is shown on Figures 1 and 2. The additional surface development areas and Nob Road realignment are herein referred to as the Modification area.

The Modification would not change the following approved Snapper Mine components:

- mine life;
- mining rate or mining method;
- mineral concentrate processing;
- mineral concentrate transport;
- process waste management;
- water management, supply or demand;
- electricity supply;
- other supporting infrastructure;
- operational hours;
- rehabilitation strategy; or
- workforce.

Table 1 provides a comparative summary of the existing/approved and modified Project.



- LEGEND**
- Approved Project
- Mining Lease Boundary (ML 1621)
 - Existing/Approved Surface Development Extent
 - Mine Path Extent
 - Direction of Mining
 - Water Supply Bore
 - Mineral Concentrate Transport Route and MSP Process Waste Transport Route
 - Highway Access Road
 - Electricity Transmission Line
- Modified Project
- Mining Lease Application Boundary (MLA 1)
 - Approved Surface Development Areas Relinquished
 - Additional Surface Development Extent
 - Additional Mine Path Extent
 - Realigned Road

Source: NSW Spatial Services (2019); Tronox (2019)
 Orthophoto: Tronox (2019)

TRONOX
 SNAPPER MINE
 Modified Snapper Mine -
 Indicative General Arrangement

Figure 1

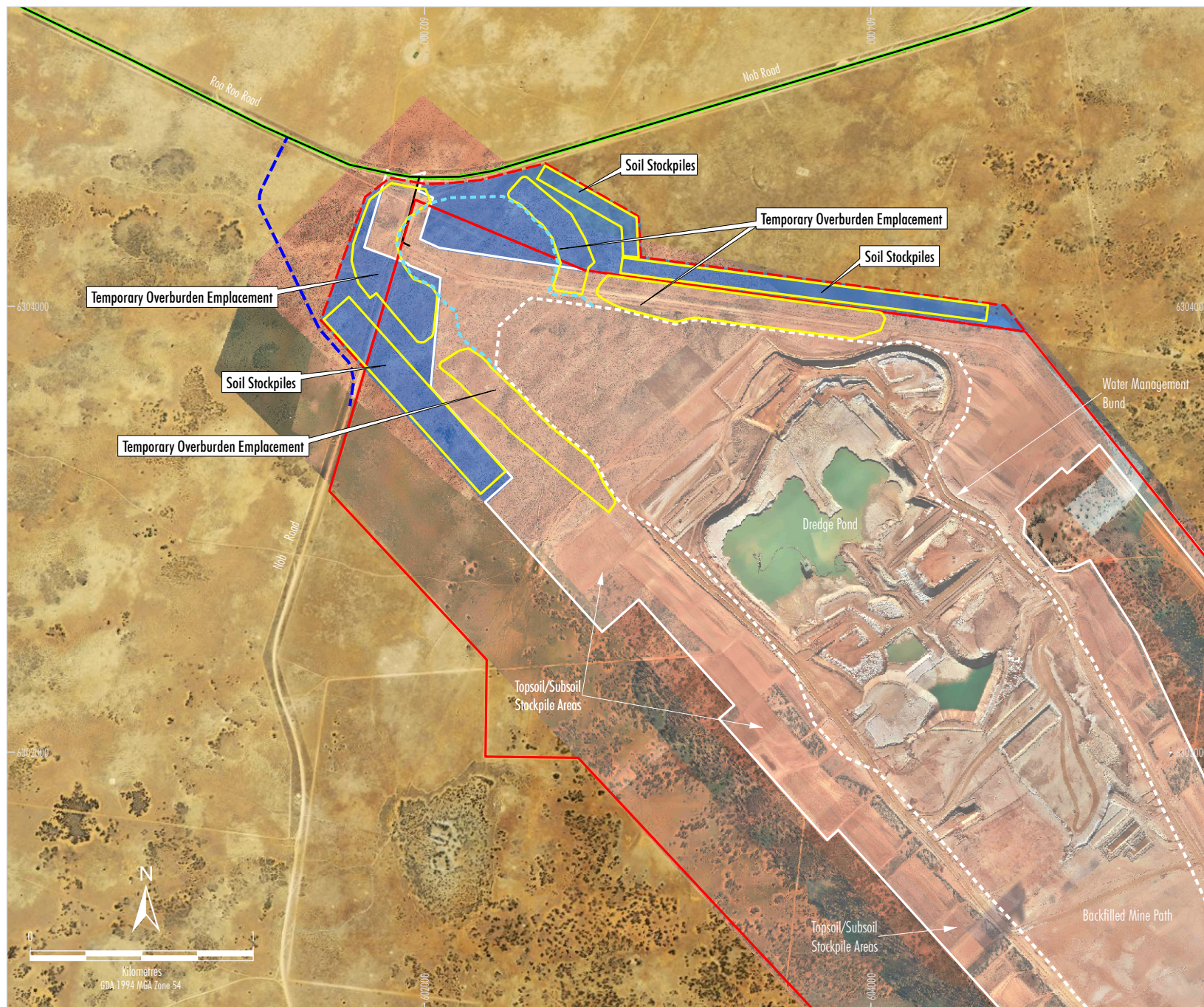


Figure 2

Table 1
Comparison of the Existing/Approved and Modified Snapper Mine

Snapper Mine Component	Existing/Approved Snapper Mine	Modified Snapper Mine
Mine Life	Mining operations until 10 July 2026.	No change.
Tenement	Mining Lease (ML) 1621.	New MLA (MLA 1).
Surface Development Area	Approximately 1,681 hectares (ha).	Overall net reduction in surface development area of approximately 3 ha.
Mining	- Dredge mining producing approximately 14 million tonnes per annum of ore. - Conventional mining (dozers and/or scrapers) for ore unable to be dredge mined.	No change.
Mineral Concentration and Mineral Concentrate Transport	- Mineral concentrate production up to 621,000 tonnes per annum (tpa). - Mineral concentrate transport from the Snapper and Ginkgo Mines combined to the MSP up to 975,000 tpa. - Ore concentrated in the primary gravity concentration unit (comprising a screen, surge bin and wet concentrator) to produce heavy mineral concentrate (HMC). - HMC washed in the salt washing facility prior to processing in the wet high intensity magnetic separation (WHIMS) circuit to produce ilmenite-rich, leucoxene-rich and non-magnetic (containing rutile-rich and zircon-rich) mineral concentrates.	No change.
Overburden Management	- Overburden removal ahead of ore extraction areas using conventional truck and shovel methods (e.g. excavators and haul trucks). - A conveyor system and/or haul trucks are approved to transport the overburden to either the mine void behind the advancing dredge pond or in the overburden emplacement.	- No change. - Additional temporary off-path overburden emplacements.
Sand Residue and Coarse Reject Management	Sand residues and coarse rejects placed in either an initial sand residue dam or dredge pond behind the advancing ore extraction area.	No change.
MSP Process Waste Management	- MSP process waste placed behind the advancing ore extraction areas at either the Ginkgo Mine, Snapper Mine or Atlas-Campaspe Mine. - MSP process waste transport up to 300,000 tpa to the Snapper and Ginkgo Mines.	No change.
Water Supply	Water requirements supplied by the Snapper Mine borefield.	No change.
Electricity Supply	Electricity supplied by distribution station connected to grid.	No change.
Site Access	- Access to the Snapper Mine via the Highway Access Route (HAR). - Eastern and northern (not constructed) access roads connect the Snapper Mine to the HAR.	- No change. - Northern access road would not be constructed.
Employment	Up to approximately 200 personnel during operations.	No change.
Rehabilitation Works	- Progressive rehabilitation undertaken as mining advances. - Two final depressions associated with the final dredge pond and water disposal dam, respectively.	- No change to rehabilitation strategy. - Reduction in the number of final depressions from two to one. - Increased size of the remaining final depression.

2 ANALYSIS OF SUBMISSIONS

2.1 NUMBER OF SUBMISSIONS

A total of eight submissions on the Modification were received, consisting of:

- six from NSW Government agencies, namely:
 - DPIE;
 - Biodiversity and Conservation Division (BCD) within the DPIE;
 - Division of Resources and Geoscience (DRG) within the DPIE;
 - Resources Regulator within the DPIE (Resources Regulator);
 - Crown Lands within the DPIE (Crown Lands); and
 - Environment Protection Authority (EPA).
- one from the Wentworth Shire Council (WSC); and
- one from members of the public.

A register characterising each submission (i.e. support, objection or comment) and a reconciliation of the comments provided is provided in Appendix A.

Tronox did not receive any submissions from Commonwealth Government agencies or stakeholder groups.

2.2 SUMMARY OF SUBMISSIONS

Wentworth Shire Council

The WSC did not provide any comment or objection to the Modification.

NSW Government Agencies

The DPIE, BCD, Resources Regulator, Crown Lands and EPA provided comments on the Modification. The DRG was supportive of the Modification in its submission.

Members of the Public

One submission was received from members of the public, the leaseholders of the Manilla property. The Manilla property leaseholders objected to, and provided comments on the Modification.

2.3 KEY ISSUES RAISED IN SUBMISSIONS

The following key issues were raised in the submissions:

- Potential air quality and noise impacts due to the Modification.
- Potential greenhouse gas emission changes due to the Modification.
- Rehabilitation of the final landform and post-mining land use.
- Clarification of certain aspects of the Modification Hydrogeological Review.

Tronox's responses to the submissions which included comments are provided in Section 4.

3 ACTIONS TAKEN SINCE EXHIBITION

3.1 REFINEMENT OF THE PROJECT

As a result of continuing consultation with the Manilla property leaseholders (Section 3.2), Tronox would backfill the portion of the modified final depression inside the Manilla property so that it is level with the surrounding natural ground surface (i.e. no final depression would be located in the Manilla property). Revised overburden material balance calculations concluded this could be achieved without affecting the design of the remaining portion of the modified final depression (Figure 3).

The revised modified indicative final landform (including the final depression) is shown on Figure 3. Further details on the rehabilitation of the final landform are provided in Section 4.2.2.

3.2 ENGAGEMENT ACTIVITIES

Wentworth Shire Council and Crown Lands

Since the lodgement of the Modification Report, Tronox has continued to consult with the WSC and Crown Lands in relation to the realignment of Nob Road and the opening and closing of road reserves associated with the Nob Road realignment.

Tronox will continue to consult with the WSC and Crown Lands in this regard.

Surrounding Leaseholders

Tronox is continuing to consult with the leaseholders of the Carstairs and Manilla properties regarding obtaining access to their properties to allow for the extension of the existing/approved mine path, and the realignment of Nob Road (Carstairs property leaseholders only).

As described in Section 3.1, as a result of consultation with the Manilla property leaseholders to date, Tronox would backfill the portion of the modified final depression inside the Manilla property so that it is level with the surrounding natural ground surface.

In addition, Tronox is continuing to consult with the Manilla property leaseholders regarding the implementation of measures¹ to minimise approved noise impacts at the Manilla homestead (Section 4.6). Tronox is committed to implementing noise mitigation measures at the Manilla homestead.

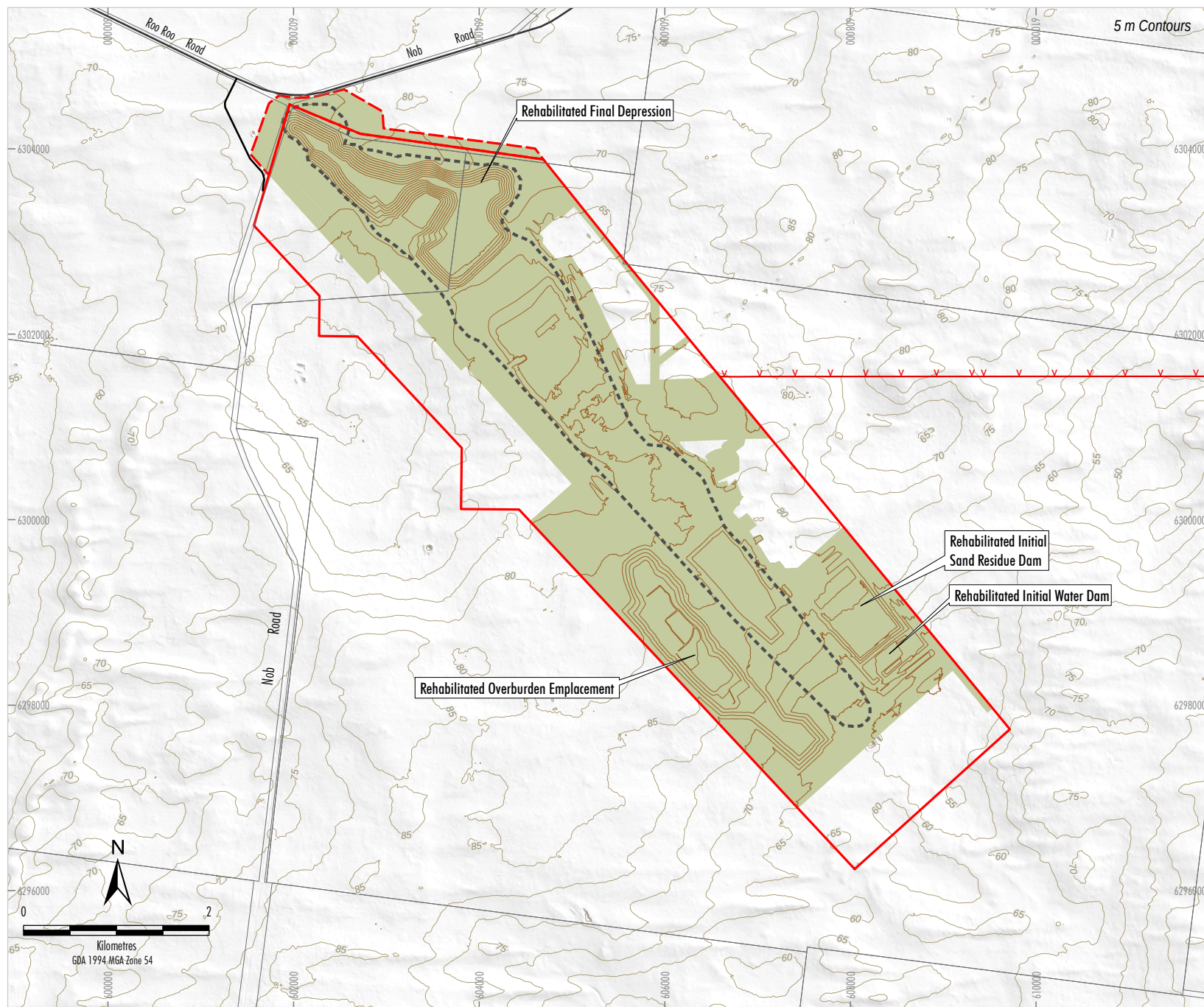
DPIE – Biodiversity and Conservation Division and Registered Aboriginal Parties

Following submission of the Modification Report, Tronox provided the BCD and Registered Aboriginal Parties (RAP) with a copy of the final Aboriginal Cultural Heritage Assessment (ACHA) for the Modification in accordance with the Department of Environment, Climate Change and Water (2010) *Aboriginal cultural heritage consultation requirements for proponents 2010*, incorporating the outcomes of the RAP consultation period.

3.3 FURTHER ENVIRONMENTAL ASSESSMENT

The DPIE requested further consideration of the potential changes to greenhouse gas emission due to the Modification, which has been provided in Section 4.5.

¹ In accordance with the NSW *Voluntary Land Acquisition and Mitigation Policy*, based on the results of the Noise Review (Wilkinson Murray, 2019), Tronox is not required to undertake any mitigation measures at the Manilla homestead.



- LEGEND
- Mining Lease Boundary (ML 1621)
 - Mining Lease Application Boundary (MLA 1)
 - Extent of Backfilled Mine Path
 - Extent of Rehabilitation
 - Electricity Transmission Line

Source: NSW Spatial Services (2019); Tronox (2019)

TRONOX
S N A P P E R M I N E
Revised Modified Snapper Mine -
Indicative Final Landform

Figure 3

4 RESPONSE TO SUBMISSIONS

Responses to the issues raised by the various stakeholders are provided in the sub-sections below.

4.1 OPERATIONAL MINE LIFE

The Modification would extend the existing/approved mine path at the Snapper Mine to maintain continuity of production and associated employment of the Snapper Mine workforce until the commencement of operations at the Atlas-Campaspe Mine (Section 1.2).

Comment 1

The DPIE requested that the expected operational life of the existing/approved and modified Snapper Mine be clarified.

Response 1

The approved mine life is to 10 July 2026 (Table 1). Production at the approved Snapper Mine is however currently scheduled to conclude in June 2020, as mining progression to date has been faster than planned.

The Modification would extend the operational life of the Snapper Mine by approximately one year to June 2021 but would remain within the approved mine life (i.e. July 2026).

4.2 FINAL LANDFORM

Two final depressions associated with the final dredge pond and water disposal dam are approved to remain at the cessation of mining at the approved Snapper Mine. The Modification would reduce the number of final depressions from two to one. The water disposal dam final depression would be integrated within the final dredge pond final depression at the northern extent of the mine path (Section 2.5.2 of the Modification Report).

The DPIE, Manilla property leaseholders and Crown Lands provided comments in relation to the approved and modified final depression/s, and the rehabilitation and post-mining land use of the Snapper Mine final landform. These comments, and a response to each have been provided below.

4.2.1 Final Depression Design

Comment 2

The DPIE requested the depth, volume, area and drainage catchment size of the approved and modified final depression/s.

Response 2

Table 2 provides the approximate depth, volume and area of the approved final depressions and modified final depression.

Table 2
Comparison of the Approved and Modified Final Depressions

Component	Approved Final Depressions ¹	Modified Final Depression
Volume (million m ³)	9.1 ²	41.7
Depth (mbgl)	44	41
Area (ha)	40 ²	184

Notes:

¹ The volume and area values for the two approved final depressions have been combined.

² Estimate based on the final depressions shown on Figure 6 of the Modification 5 Environmental Assessment.

m³ = cubic metres

mbgl = metres below ground level

In accordance with the Snapper Mine rehabilitation objectives described in Condition 19, Schedule 3 of Project Approval (06_0168), the drainage catchment of the modified final depression would be minimised as far as reasonable and feasible (Section 6.10.2 of the Modification Report). The drainage catchment would be minimised through the implementation of surface water control features such as bunding around the crest of the modified final depression. The drainage catchment of the modified final depression would therefore be a similar size to the area of the modified final depression (i.e. 184 ha – Table 2).

Comment 3

The DPIE requested clarification regarding the grade of the batter slopes for the modified final depression.

Response 3

The slopes of the approved final depressions are 1:4. The Modification would reduce the grade of the batter slopes to between 1:5 and 1:10 (Section 2.5.2 of the Modification Report) (Figure 4).

Tronox would update the Mining Operations Plan to incorporate the Modification (including the modified batter slopes) (Section 4.7.1 of the Modification Report).

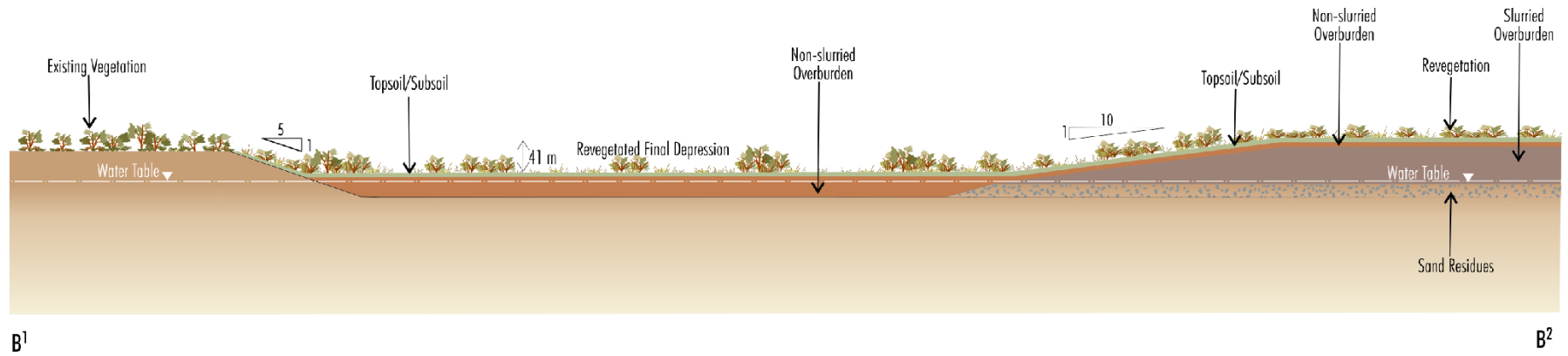
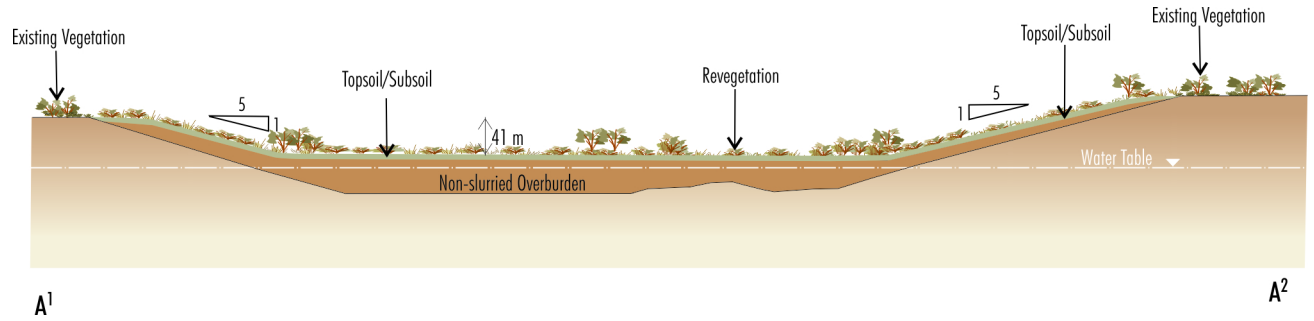
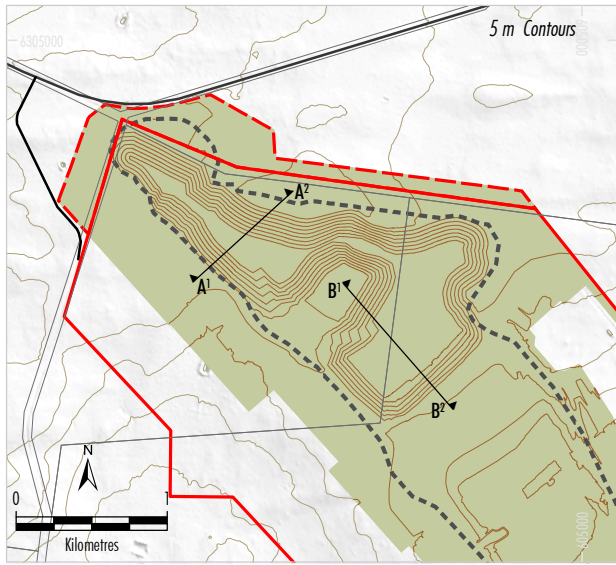
Comment 4

The DPIE requested that Figure 6 of the Modification Report be updated to include a scale and the increments of the surface contour lines shown on the inset.

Response 4

Figure 6 of the Modification Report has been updated and is provided as Figure 4. Figure 4 shows the indicative final depression depth, batter slopes and the increments of the surface contour lines. Figure 4 also notes that the conceptual cross sections of the modified final depression are indicative only, and are not to scale.

Figure 5 of the Modification Report has also been updated to show the increments of the contours lines and is provided as Figure 3.



Note: Cross sections are indicative only and are not shown to scale

Source: NSW Spatial Services (2019); Tronox (2019)

Figure 4

4.2.2 Rehabilitation and Land Use

Comment 5

The Manilla property leaseholders provided a comment regarding the rehabilitation of the Modification area (including a portion of the modified final depression) within the Manilla property, specifically in relation to the safety and suitability of the rehabilitated final landform for the approved final land use of light intensity grazing.

Response 5

As described in Section 3.1, as a result of ongoing consultation with the Manilla property leaseholders, Tronox would backfill the portion of the modified final depression inside the Manilla property so that it is level with the surrounding natural ground surface (Figure 3).

The approved final land use at the Snapper Mine is light intensity grazing, and would remain unchanged as a result of the Modification (Section 2.5.3 of the Modification Report).

Furthermore, in accordance with the rehabilitation objectives outlined in Condition 19, Schedule 3 of Project Approval (06_0168) and the approved Rehabilitation Strategy (Cristal Mining Australia, 2014), the Snapper Mine will be rehabilitated to meet the following objectives:

- Safe, stable and non-polluting.
- Final land use compatible with surrounding land uses (i.e. light intensity grazing) determined in consultation with relevant landholders and regulatory authorities.
- Final landforms designed to incorporate micro-relief, natural drainage lines and minimise visual prominence by integration with the surrounding landscape.
- Restore self-sustaining ecosystems, including establishing local native plant species

Accordingly, the modified Snapper Mine (including the portion comprised by the Manilla property) would be rehabilitated to land suitable for light intensity grazing, to be safe, stable and non-polluting, and would be integrated with the surrounding landscape.

Comment 6

Crown Lands provided a comment regarding the potential impacts of the temporary off-path overburden emplacements associated with Modification, and their potential effects on the sub-soil and surrounding land.

Response 6

Prior to development of the temporary overburden emplacements, Tronox would undertake topsoil and subsoil stripping of the areas associated with the temporary overburden emplacements.

The Acid Rock Drainage Assessment undertaken for the Snapper Mine Environmental Assessment (BEMAX Resources, 2007) found that samples of the five major overburden units (namely the Woorinen formation; Shepparton formation; Upper Loxton-Parilla Sands; Mica Sands [Loxton-Parilla Sands]; and Lower Loxton-Parilla Sands) were classified as non-acid forming.

As described in the Snapper Mine Water Management Plan (GHD, 2016), sediment and erosion control measures such as interception drains and collection storages are implemented around stockpile areas and overburden emplacements containing saline materials. Tronox would implement these sediment and erosion control measures around the temporary overburden emplacements to minimise the potential for impacts on the surrounding land.

At the end of the mine life, the temporary overburden emplacements would be dozer pushed into the mine path to establish the final landform, and rehabilitated to land suitable for light intensity grazing, to be safe, stable and non-polluting, and would be integrated with the surrounding landscape (see Response 5).

Given the above, it is unlikely that the temporary overburden emplacements would result in any environmental impacts to the underlying soil or surrounding land.

4.3 GROUNDWATER

A Hydrogeological Review was prepared for the Modification by GEO-ENG (2019), and was included as Appendix F of the Modification Report.

The BCD provided comments in relation to the modelling and monitoring of groundwater at the Snapper Mine, potential stygofauna monitoring in the vicinity of the Snapper Mine, and the approved reverse osmosis (RO) Plant. These comments, and a response to each have been provided below.

4.3.1 Monitoring Results

Comment 7

The BCD commented on the correlation between predicted and measured groundwater level results to date, which are presented in Attachment A of GEO-ENG (2019).

Response 7

GEO-ENG (2019) considers that the observed groundwater levels at the Snapper Mine reasonably match the predicted groundwater levels from the existing groundwater model. The predicted groundwater level trends are generally consistent with the observed groundwater levels. In addition, the predicted groundwater levels generally over predict the observed groundwater levels and therefore the predicted groundwater levels are considered conservative.

Given the above, GEO-ENG (2019) considered that the existing groundwater model was appropriate to estimate potential groundwater impacts associated with the Modification.

Comment 8

The BCD suggested that water-pressure loggers (e.g. piezometers) measuring at daily or sub-daily intervals be installed for groundwater monitoring at the Snapper Mine.

Response 8

In accordance with Condition 2, Schedule 3 of Project Approval (06_0168), a Water Management Plan (GHD, 2016) has been prepared for the Snapper Mine by suitably qualified experts and in consultation with the DPIE – Water and the EPA, and was approved by the Secretary of the DPIE.

In accordance with Condition 5(d), Schedule 3 of Project Approval (06_0168), the Water Management Plan includes a comprehensive groundwater monitoring program, which includes monthly and quarterly groundwater level measurements at multiple bores in the vicinity of the Snapper Mine.

Tronox considers the existing groundwater level monitoring program to be sufficient for detecting any changes in groundwater levels, as the groundwater level changes at and surrounding the Snapper Mine are relatively minor and occur over relatively long-term time intervals. It is considered that water pressure loggers measuring at daily or sub-daily levels would provide little value in detecting groundwater level changes due to mining operations.

Comment 9

The BCD suggested that groundwater level and quality monitoring results could be presented by separating results for bores within and outside of the mine footprint.

Response 9

The location of the Snapper Mine monitoring bores are shown on Figure 11 of the Modification Report. Monitoring bores PW1 and PW2 are the only monitoring bores that were located in the mine path footprint.

Total dissolved solids (TDS) monitoring results for all monitoring bores are shown together on Chart 1 of the Hydrogeological Review (GEO-ENG, 2019) (using different symbology for each bore) so they can be easily compared. Tronox does not consider it necessary to show these monitoring results on separate charts.

4.3.2 Depth to Groundwater

Comment 10

The BCD requested clarification about the depth to groundwater at the Snapper Mine and at nearby lakes (e.g. Travellers Lake, shown on Figure 1 of the Modification Report).

Response 10

Surface elevations at the Snapper Mine range from approximately 60 m Australia Height Datum (AHD) in the south-eastern and north-western ML 1621 area to approximately 80 m AHD in the centre of ML 1621 (Figure 3).

Groundwater level investigations undertaken by Golder Associates (2007) found that the pre-mining groundwater level (i.e. water table) at the Snapper Mine was approximately 34.2 m AHD. Depth to groundwater at the Snapper Mine therefore varies between approximately 25 m and 45 m.

As noted by the BCD, the elevation of lake floors in the vicinity of the Snapper Mine are approximately 41 m AHD to 45 m AHD (i.e. at least 15 m lower than elevations within ML 1621). Therefore, the depth to groundwater at these lakes is approximately 5 m to 10 m. Tronox also notes that the closest lake to the Snapper Mine, namely Travellers Lake, is located approximately 8 km away.

4.3.3 Reverse Osmosis Plant

Comment 11

The BCD requested further information regarding the approved RO Plant, including the potential environmental impacts of brine on surface water, groundwater and soil.

Response 11

The RO plant is approved to supply up to 21 litres per second of desalinated water. The desalinated water is used at the salt washing facility and WHIMS circuit (not constructed to date), and for dust suppression and a potable water supply.

Brine produced by the RO plant is approved to be disposed in the mine path with process wastes (e.g. sand residues) behind the advancing mining operations, which is subsequently covered by overburden.

As brine is disposed in the mine path in accordance with approved management measures, brine disposal would not have any significant impact on soils or surface water.

Further, disposal of brine in the mine path would have no significant impact on groundwater due to the high salinity of the groundwater (i.e. TDS in excess of 35,000 milligrams per litre [mg/L]) in the upper aquifer.

The Modification would not change the approved operations of the RO plant or brine disposal and management.

4.4 STYGOFAUNA

Comment 12

The BCD provided a stygofauna related comment on the Modification, noting that no stygofauna sampling or monitoring has been conducted by Tronox at the Snapper Mine.

Response 12

Tronox does not consider sampling for stygofauna within the Snapper Mine area to be necessary, given the following:

- the relatively significant depth of the water table (i.e. approximately 25 m to 45 m);
- the high salinity of the upper aquifer (i.e. TDS of up to approximately 35,000 mg/L);
- the minor and localised extent of groundwater drawdown due to operations at the Snapper Mine; and
- the extent of the upper aquifer surrounding the Snapper Mine.

4.5 GREENHOUSE GAS

Comment 13

The DPIE requested an estimate of the Scope 1, 2 and 3 greenhouse gas emissions that would be produced by the modified Snapper Mine (i.e. due to 12 months of additional mining).

Response 13

In accordance with requirements under the Commonwealth *National Greenhouse and Energy Reporting Act 2007*, Tronox calculates its estimated Scope 1, 2 and 3 greenhouse gas emissions for the Snapper Mine annually. In 2019, the following estimated Scope 1, 2 and 3 greenhouse gas emissions were associated with the Snapper Mine (Greenbase Environmental Accountants, 2020):

- Scope 1 = 46,104 tonnes (t) carbon dioxide equivalents (CO₂-e)
- Scope 2 = 25,179 t CO₂-e
- Scope 3 = 10,440 t CO₂-e²

Given that the Modification would not result in any changes to mining rate or mining method, mineral concentrate processing, mineral concentrate transport or electricity supply at the Snapper Mine, the additional Scope 1, 2 and 3 greenhouse gas emissions associated with the mining of the extended mine path (i.e. due to 12 months of additional mining) are expected to be approximately the same as 2019 listed above.

4.6 NOISE

The following components of the Modification would have the potential to alter noise emissions generated at the Snapper Mine (Wilkinson Murray, 2019) (Section 6.6.2 of the Modification Report):

- extension of the existing/approved mine path and associated supporting infrastructure into MLA 1; and
- minor change to the approved mining fleet.

The DPIE and Manilla property leaseholders provided comments regarding the potential noise impacts of the Modification. These comments, and a response to each have been provided below.

Comment 14

The DPIE requested that the potential noise impacts of the Modification be assessed against the noise criteria in the *Industrial Noise Policy* (INP) (EPA, 2000).

Response 14

The Project Approval (06_0168) noise criteria is consistent with the INP noise criteria for the day, evening and night-time (i.e. 35 A-weighted decibels [dBA]).

The Noise Review undertaken for the Modification by Wilkinson Murray (2019) found that noise levels generated by the modified Snapper Mine would achieve the Project Approval (06_0168) noise criterion of 35 dBA at the closest sensitive receiver (i.e. the Manilla homestead). Hence, the modified Snapper Mine would achieve the INP noise criteria under neutral and adverse meteorological conditions.

Comment 15

The Manilla property leaseholders provided comments regarding current noise impacts at the Manilla homestead, the potential noise impacts of the Modification, and the potential noise effects of the dominant south-west wind direction at the Manilla homestead. The submission noted that the Snapper Mine operations are “at times” audible inside the Manilla homestead.

² Estimate includes emissions within ‘Category 3’ only, namely “Fuel and energy related activities not included in Scope 1 or Scope 2”, as defined in the *Corporate Value Chain (Scope 3) Accounting and Reporting Standard*.

Response 15

Tronox notes that although the Snapper Mine operations may be audible at the Manilla homestead, attended and unattended compliance noise monitoring undertaken by Tronox and Renzo Tonin & Associates (2019), respectively, found that compliance with the Project Approval (06_0168) noise criterion of 35 dBA at the Manilla homestead is being achieved (Section 6.6.1 of the Modification Report).

Wilkinson Murray (2019) found noise levels at the Manilla homestead due to the modified Snapper Mine would achieve the Project Approval (06_0168) noise criterion of 35 dBA, and the Noise Policy for Industry (NPfI) Project noise trigger levels of 40 dBA, 35 dBA and 35 dBA for the day, evening and night-time respectively, under the neutral and adverse meteorological conditions defined by the NPfI (EPA, 2017).

In relation to potential wind effects on noise impacts at the Manilla homestead, Tronox notes that activities at the Snapper Mine are already occurring directly south-west of the Manilla homestead. In addition, the mine path extension (where a large portion of the mining fleet operates) would be located further from the Manilla homestead (4.3 km) than the existing/approved mine path (3.8 km).

Notwithstanding the above, Tronox is continuing to consult with the occupants of the Manilla homestead regarding potential measures to minimise noise impacts at the Manilla homestead³. Tronox is committed to implementing noise mitigation measures at the Manilla homestead.

4.7 AIR QUALITY

The following components of the Modification would have the potential to alter particulate matter (e.g. dust) emissions at the Snapper Mine (Katestone Environmental Pty Ltd [Katestone], 2019) (Section 6.5.2 of the Modification Report):

- extension of the existing/approved mine path and associated supporting infrastructure into MLA 1; and
- temporary placement of overburden around the crest of the mine path extension rather than placing behind the advancing dredge pond, reducing haulage distances.

The Manilla property leaseholders provided air quality related comments on the Modification Report. These comments, and a response to each, have been provided below.

Comment 16

The Manilla property leaseholders provided comments regarding current dust deposition levels at the Manilla homestead (noting the recent elevated dust deposition levels at and in the vicinity of the Manilla homestead), their impact on vegetation, and the potential air quality effects of the Modification and the dominant south-west wind direction at the Manilla homestead.

Response 16

Dust deposition monitoring to date generally indicates compliance with the Project Approval (06_0168) annual average air quality criterion of 4 grams per square metre per month (g/m²/month) since the commencement of operations at the Snapper and Ginkgo Mines (Katestone, 2019).

³ In accordance with the NSW *Voluntary Land Acquisition and Mitigation Policy*, based on the results of the Noise Review (Wilkinson Murray, 2019), Tronox is not required to undertake any mitigation measures at the Manilla homestead.

Notwithstanding, dust deposition records at the Manilla homestead (dust gauge DG01 shown on Figure 9 of the Modification Report) exceeded the annual average air quality criterion of 4 g/m²/month (Katestone, 2019) in 2018 and 2019. As noted by the Manilla property leaseholders and Katestone (2019), the persistent warm and dry conditions throughout 2018 and 2019 would have contributed to elevated ambient dust levels in the region, and it is likely these elevated dust deposition records were primarily due to regional dust sources and not operations at the Snapper or Gingko Mines. Tronox considers that dust deposition on vegetation at the Manilla property would therefore also be due to regional dust sources and not operations at the Snapper or Gingko Mines.

The Modification would result in a reduction in total dust emissions from the Snapper Mine, due to a decrease in overburden haulage distances of approximately 30 percent (Katestone, 2019). The Modification would however result in a minor decrease in distance between soil stockpiles/surface development areas and the Manilla homestead (from approximately 3.6 km to 3.3 km). The relative size of soil stockpiles would not change for the Modification.

Given the above, the Modification is expected to result in negligible change to the existing/approved dust deposition rates at the Manilla homestead, and it is expected that the modified Snapper Mine would continue to comply with the relevant air quality criteria (including particulate matter less than 10 micrometres in diameter [PM₁₀] and particulate matter less than 2.5 micrometres in diameter [PM_{2.5}]) at all sensitive receivers surrounding the Snapper Mine (Katestone, 2019).

In relation to potential wind effects on dust deposition at the Manilla homestead, Tronox notes that activities at the Snapper Mine are already occurring directly south-west of the Manilla homestead.

4.8 ABORIGINAL CULTURAL HERITAGE

An ACHA was undertaken for the Modification by Landsape (2019), included as Appendix B of the Modification Report.

Comment 17

The BCD provided a comment in relation to the ACHA prepared for the Modification, requesting that ACHA field survey transects be included in the ACHA.

Response 17

Figure 10 of the Modification ACHA (Landsape, 2019) has been updated to show the approximate transects traversed during the field survey. The revised Figure 10 showing the field survey transects was included in the final ACHA provided to the BCD and RAPs (Section 3.2).

4.9 MINE ACCESS

The Modification would include extension of the existing/approved mine path and associated supporting infrastructure into MLA 1 and the re-alignment of Nob Road around MLA 1.

Comment 18

Crown Lands provided a comment in relation to Tronox obtaining access to MLA 1.

Response 18

Access to the Snapper Mine is provided by the HAR via the eastern and northern (not constructed) access roads, which connect the Snapper Mine to the HAR.

Access to the modified Snapper Mine would continue to be provided by the eastern access road (i.e. the Mineral Concentrate Transport Route shown on Figure 2), while the northern access road would not be constructed for the Modification.

4.10 MINING OPERATIONS PLAN

The Modification would include extension of the existing/approved mine path and associated supporting infrastructure into MLA 1 (Section 2.1 of the Modification Report).

Comment 19

The Resources Regulator indicated that the currently approved Mining Operations Plans (Cristal Mining Australia, 2015) would need to be updated prior to any Modification-related construction activities occurring, including the preparation of a new Rehabilitation Cost Estimate (RCE).

Response 19

Tronox would update the Mining Operations Plan to include all relevant aspects of the Modification prior to any Modification-related construction activities occurring at the Snapper Mine (Section 4.7.1 of the Modification Report). This would include the preparation of a new RCE to reflect the proposed changes to the Snapper Mine.

4.11 ENVIRONMENT PROTECTION LICENCE

The EPA provided a comment regarding the Environment Protection Licence (EPL) Tronox holds for the Snapper Mine, namely EPL 12799.

Comment 20

The EPA commented that the Modification would not affect EPL 12799, and therefore no variations to EPL 12799 would be required.

Response 20

Tronox appreciates the EPA's comments regarding EPL 12799, however notes that Section A2 of EPL 12799 contains incomplete and/or incorrect Lot/Deposited Plan (DP) and Mining Lease "Premises Details" for the Snapper Mine as follows:

*Snapper Mine
Nob Road
Pooncarie
NSW 2648
Lot 1927 DP 763905, Lot 1929 DP 763907
MLA 210 and MLA 272*

The modified Snapper Mine would be located in new Lot 1926 DP 763904 associated with the Manilla property, and MLA 1, that are not included in the "Premise Details" in EPL 12799. Tronox would therefore apply to the EPA to vary EPL 12799 to incorporate Lot 1926 DP 763904 and MLA 1 in the "Premise Details".

5 UPDATED EVALUATION OF MERITS

The Modification Report concluded that the Modification is justified on environmental, economic and social grounds.

Based on Tronox's consideration of the submissions on the Modification, Tronox considers that the justification provided in the Modification Report remains unchanged.

6 REFERENCES

- BEMAX Resources (2007) *Snapper Mineral Sands Project Environmental Assessment*.
- Cristal Mining Australia (2014) *Snapper Mine Production Increase Modification Environmental Assessment*.
- Cristal Mining Australia (2015) *Snapper Mineral Sands Mine Mining Operation Plan 2015 – 2020*.
- Department of Environment, Climate Change and Water (2010) *Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010* (Part 6 National Parks and Wildlife Act, 1974). NSW Department of Environment, Climate Change and Water, Sydney.
- Department of Planning and Environment (2019) *Preparing a Submissions Report – Guidance for State Significant Projects*. Draft report. June 2019.
- Environment Protection Authority (2000) *NSW Industrial Noise Policy*.
- Environment Protection Authority (2017) *Noise Policy for Industry*.
- GEO-ENG (2010) *Snapper & Ginkgo Mines – Hydrogeological Assessment, Pooncarie, NSW*.
- GEO-ENG (2012) *Ginkgo Mine Modification Crayfish Deposit – Hydrogeological Assessment*.
- GEO-ENG (2013) *Ginkgo Mine Modification Crayfish Deposit – Hydrogeological Assessment Pooncarie, NSW*.
- GEO-ENG (2014) *Snapper Mine Production Increase Modification Hydrogeological Review Pooncarie, NSW*.
- GEO-ENG (2019) *Snapper Mine Northern Extension Modification Hydrogeological Review, Pooncarie, NSW*.
- GHD (2016) *Ginkgo and Snapper Mines Water Environmental Management Plan*.
- Golder Associates (2007) *Snapper Mineral Sands Project Hydrogeological Assessment*.
- Greenbase Environmental Accountants (2020) *GHG Emissions for Snapper Mine*.
- Katestone Environmental Pty Ltd (2019) *Air Quality Review for the Snapper Mine Northern Extension Modification*.
- Landskape (2019) *Snapper Mine Northern Extension Modification Aboriginal Cultural Heritage Assessment*.
- Renzo Tonin & Associates (2019) *Snapper Mine Noise Monitoring Acoustic Report*. Report prepared for Tronox Holdings Limited.
- Wilkinson Murray (2019) *Snapper Mine Northern Extension Modification Noise Review*.

APPENDIX A
SUBMISSIONS SUMMARY

Submitter	View	Submission Format	Submission Topic/s Addressed										
			Mine Life	Aboriginal Heritage	Biodiversity	Final Landform and Land Use	Noise	Air Quality	Greenhouse Gas	Groundwater	Land Access	Mining Operations Plan	Environment Protection Licence
NSW Government Agencies													
Department of Planning, Industry and Environment (DPIE)	Comment	Letter	X			X	X		X				
Biodiversity and Conservation Division within the DPIE	Comment	Letter		X	X					X			
Division of Resources and Geoscience within the DPIE	Support	Letter	No comments provided.										
Resources Regulator within the DPIE	Comment	Letter										X	
Crown Lands within the DPIE	Comment	Letter				X					X		
Environment Protection Authority	Comment	Letter											X
Local Councils													
Wentworth Shire Council	-	Email	No comments provided.										
Members of the Public													
Leaseholders of the Manilla property	Object	Letter				X	X	X					
Total			1	1	1	3	2	1	1	1	1	1	1

APPENDIX B
REGISTER OF SUBMITTERS

Group	Submitter	Section Issues Addressed
NSW Government Agencies	Department of Planning, Industry and Environment (DPIE)	4.1, 4.2, 4.5, 4.6
	Biodiversity and Conservation Division within the DPIE	4.3, 4.4, 4.8
	Division of Resources and Geoscience within the DPIE	N/A
	Resources Regulator within the DPIE	4.10
	Crown Lands within the DPIE	4.2, 4.9
	Environment Protection Authority	4.11
Local Councils	Wentworth Shire Council	N/A
Members of the Public	Manilla property leaseholders	4.2, 4.6, 4.7