Section 2

Description of the Project

PREAMBLE

This section commences with a description of the Project areas within Teralba Quarry, followed by details of the approvals required for the ongoing and extended operation of the quarry. Details of other activities within the Project Site undertaken by other parties and excluded from Metromix's Project Application are provided. A detailed description of extraction methods and design of the existing and proposed extraction areas is then provided, accompanied by a description of the planned extraction operations. This section also includes information on processing and product stockpiling, proposed production rates, product distribution and planned Project life. Metromix's plans for the progressive rehabilitation of the complete areas of the quarry and the proposed biodiversity offset are also outlined.

This section describes the Project in sufficient detail to provide an overall understanding of what is proposed and how all activities would be carried out. The information presented in this section forms the basis for the impact assessments presented in Section 5.

This page has intentionally been left blank

2.1 INTRODUCTION

The primary objective of this *Environmental Assessment* is to support Metromix's application for project approval to extract conglomerate from the proposed extension areas to the south and north of the existing approved extraction operations and to extend the operational life of the quarry by 30 years. This section presents sufficient information about both the existing approved and proposed operations to ensure that a comprehensive project approval can be issued that covers all activities undertaken by Metromix within the Project Site. It is intended that the existing Development Consent (DA 130/42) for the existing operations is surrendered following the receipt of a satisfactory project approval. Hence, the Project description is sufficiently detailed for reference in a project approval for both the existing approved and proposed operations.

Metromix has the following objectives in proposing the extensions of Teralba Quarry.

1. To acquire a long term secure tenure over the adjoining areas of valuable conglomerate resource adjacent to existing quarry infrastructure.
2. To extract quality conglomerate material to produce a range of high quality products for the next 30 years.
3. To operate the existing approved extraction areas and the proposed Southern and Northern Extensions in a manner that minimises impacts on surrounding land owners, land users and residents.
4. To provide for the rehabilitation of the Project Site to a combination of native vegetation and land suitable for ongoing industrial uses.

2.2 PROJECT EXTRACTION AREAS

2.2.1 Introduction

For the purposes of this document and the application for project approval, reference is made to four project extraction areas, namely:

- the existing Southern Extraction Area;
- the existing Mid Pit Extraction Area;
- the proposed Southern Extension; and
- the proposed Northern Extension.

Each of these project extraction areas was introduced in Section 1.3.3 with further detail provided in the following sub-sections. Each area is shown on the overall Project Site layout displayed on **Figure 2.1**.

Reference is also made throughout this section to the fixed processing plant and the related infrastructure throughout the existing and ongoing quarry.

2.2.2 Existing Southern Extraction Area

This area encompasses the area south of Rhondda Road that is not yet fully extracted and all stockpiling and processing facilities, site offices, crib rooms, workshop and weighbridge associated with the existing quarry. **Figure 2.1** presents the locations of each of these areas together with the private coal haul road leased to Oceanic Coal and the various electricity transmission lines that traverse the Project Site. The southern boundary of the existing Southern Extraction Area coincides with the boundary nominated in Development Consent DA 130/42.

The conglomerate resources within the existing Southern Extraction Area would be fully extracted by 2012. The area remaining for extraction lies within the floor of the extraction area where the remaining 10m to 12m of conglomerate above the underlying coal seam remains to be extracted. The total area of the existing Southern Extraction Area is approximately 40ha.

2.2.3 Existing Mid Pit Extraction Area

The existing Mid Pit Extraction Area covers approximately 7.5ha of the area approved for extraction north of Rhondda Road. Extraction commenced in this area during the fourth quarter of 2010 and is programmed to continue for approximately 3 years.

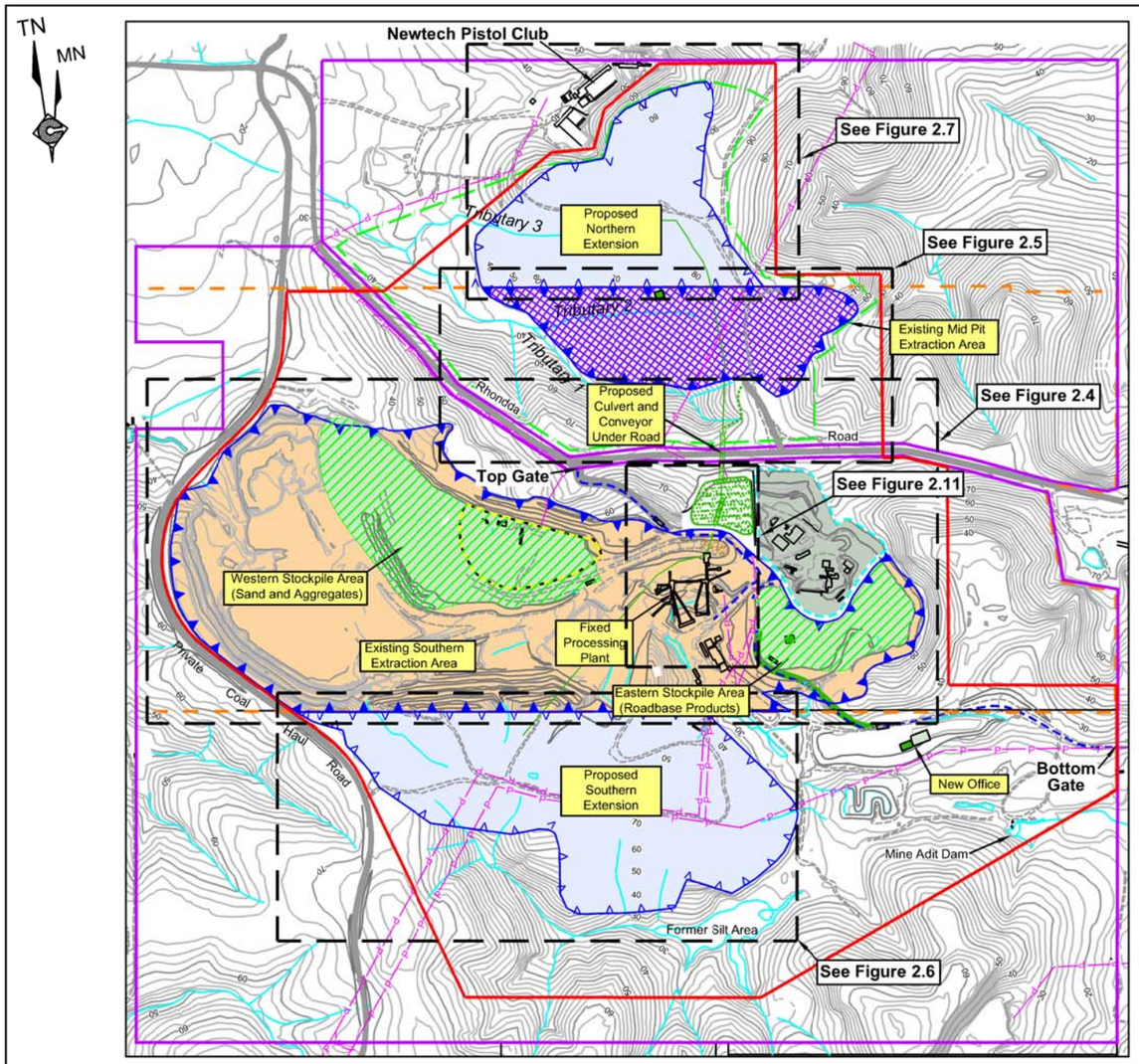
The southern boundary of the existing Mid Pit Extraction Area is set back 10m from a non perennial drainage line, i.e. a distance that does not compromise riparian vegetation or the function of the drainage line.

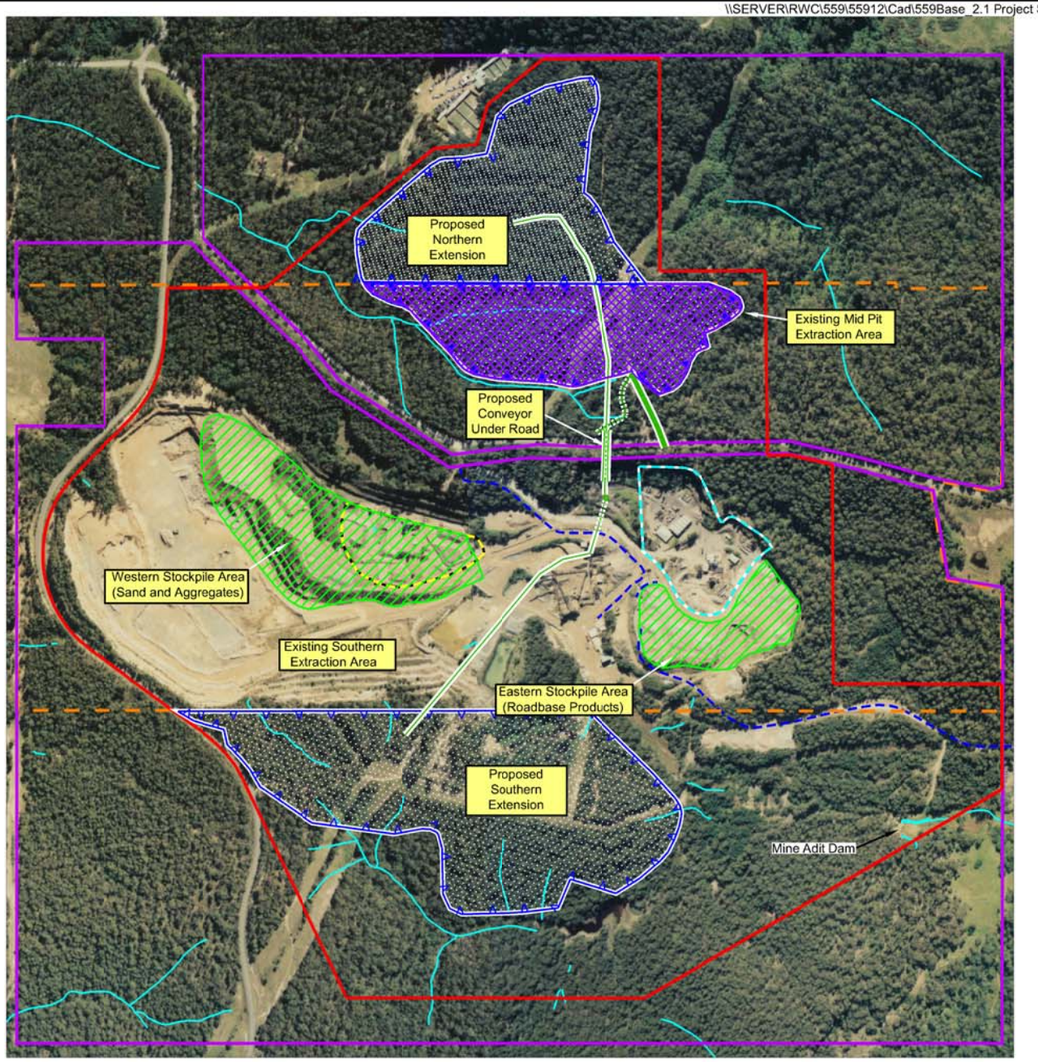
2.2.4 Proposed Southern Extension

The proposed Southern Extension covers an area of approximately 14ha and lies immediately south of the existing Southern Extraction Area. The southwestern boundary of the proposed Southern Extension has been set back approximately 15m from the private coal haul road and its boundary is aligned to avoid three locations where Black-eyed susan (*Tetratheca juncea*), a small threatened plant has been identified, and a drainage line close to the base of the Teralba Conglomerate. It is acknowledged that some *Tetratheca juncea* plants still remain in the area to be cleared for the Southern Extension (see Section 5.4 for the assessment of significance for this species).

The northern boundary of the proposed Southern Extension is positioned along the boundary between Lots 1 and 2 DP 224037. It is noted that the extension of extraction into the proposed Southern Extension would allow conglomerate within the remaining stepped benches within the existing Southern Extraction Area to be fully extracted. The eastern boundary of the proposed Southern Extension has been set at an elevation of approximately 32m AHD as the retention of existing vegetation down slope of this level would adequately shield the extraction activities in the western section whilst revegetation of the western benches is established. Further discussions of the use of this vegetation provide visual screening is provided in Section 5.8.4. area where existing vegetation to the east would assist to visually shield extraction activities from residences in the western parts of Teralba.

\\SERVER\RWC\559\55912\Cad\559Base_2.1 Project Site.DWG





REFERENCE
- Property Boundary
- Project Site Boundary
- Boundary of 1964 Development Consent
- Existing Southern Extraction Area
- Existing Mid Pit Extraction Area
- Proposed Extension
- Proposed Surge Stockpile Area
- Area Occupied by Downer EDI (long term activity)
- Area Occupied by Civilake (duration uncertain)
- Proposed Security Fence
- Contour (m AHD)(Interval =2m)
- Drainage Line
- Sealed Road
- Unsealed Road / Track
- Existing Power Transmission Line (See Figure 2.18 for re-aligned transmission lines)

SCALE 1:10 000 (A3)

100 0 100 200 300 400 500 m

Base Photograph Source: Geo-Spectrum (Australia) Pty Ltd - Date of Photography October 2010

Figure 2.1
PROJECT SITE LAYOUT

This page has intentionally been left blank

This page has intentionally been left blank

2.2.5 Proposed Northern Extension

The proposed Northern Extension covers an area of approximately 8.7ha and lies immediately north of the existing Mid Pit Extraction Area. The eastern boundary of the proposed Northern Extension effectively coincides with a prominent north/south ridge that traverses the land within the Project Site north of Rhondda Road. By adopting this boundary, Metromix would maximise the acoustic shielding from residences close to the eastern boundary of the Project Site. The southern and northern boundaries of the proposed Northern Extension are positioned in areas set back from local drainage lines to maximise the opportunities for Metromix to manage surface water in the existing Mid Pit Extraction Area and the proposed Northern Extension. The western boundary generally coincides with the western limit of the outcrop of the Teralba Conglomerate although it also reflects the setbacks from the area currently used by the Newtech Pistol Club (see Section 4.3.2 for further details). The exact location of the western boundary of the Northern Extension would be defined prior to the commencement of operations in that area.

2.2.6 Non-Project-related Commercial Operations

Two non-Project-related commercial operations are located in areas within the Project Site that, for the purposes of this document, are not included as components of the Project (although their environmental impacts are considered in a cumulative sense (see Section 5**)**. The two commercial operations are undertaken by companies independent of Metromix but who hold agreements with Metromix for their tenure on site. **Figure 2.1** displays the locations of the Civilake pugmill and Downer EDI asphalt plant.

1. Civilake Pugmill – Civilake, as part of Lake Macquarie City Council, operates a road base pugmill within a 2.1ha area within the existing Southern Extraction Area. Products from Teralba Quarry and various recycled materials are mixed with a cementitious binder in the pugmill for use in construction products throughout the local government area. Civilake recycles concrete and asphalt through the pugmill, bringing in specialised crushing plant for this purpose when required. The pugmill operates under a separate development consent issued by Lake Macquarie City Council and the plant is operated in accordance with Environment Protection Licence 13015 for Recovery of General Waste and Waste Storage. It is understood the pugmill produces up to 100 000tpa of products.
2. Downer EDI – The asphalt plant occupies a 3ha area adjoining the existing Southern Extraction Area. The plant operates in accordance with its dangerous goods licence. The plant typically produces approximately 70 000t of bitumen products annually. The aggregate raw materials for the asphalt plant are all supplied from external sources and are stockpiled immediately north of Metromix's eastern stockpile area. A number of the laden product trucks from this plant also use the road leased through Teralba Engineering to allow trucks to exit via Railway Street and avoid laden trucks travelling down Rhondda Road towards Teralba.

These two operations operate independently to the Teralba Quarry and as such, their operation, environmental impact and any impact mitigation employed is not addressed in this document, except in the assessment of cumulative impacts for the entire Project Site.

The rehabilitation of the areas within and adjoining the existing Southern Extraction Area where these operations are located, however, remain the ultimate responsibility of Metromix, hence the rehabilitation and final landform of these areas is included in Section 2.16.

The western boundary of the existing Southern Extraction Area and part of the western boundary of the proposed Southern Extension are limited by the presence of the private coal haul road between Eraring Power Station and various coal mines north of Rhondda Road. This section of the private road is leased to Oceanic Coal by the owner of the land whom Metromix also leases the Project Site from, namely Mr A.C. Fowkes. The ultimate rehabilitation and responsibility for the private coal haul road lies with Oceanic Coal.

2.3 APPROVALS REQUIRED

The approvals and licences which are currently held for the existing quarrying operations are recorded in Section 1.4.3. Based upon the current project design and understanding of environmental issues, the Project would require the following approvals to proceed.

1. Because the Project was classified as a "Major Project" under *State Environmental Planning Policy (Major Development)* 2005 a project approval was sought from the then Minister for Planning. Pursuant to Lake Macquarie Local Environmental Plan 2004, extractive industries are permissible within those areas of the Project Site where extraction activities are either existing or proposed.

   In order for the combined existing approved extraction areas (and the existing approved processing operations and ancillary activities) and proposed Southern and Northern Extensions to be managed in accordance with a single project approval, Metromix intends to seek a project approval that covers the entire Project Site. Subject to the receipt of a satisfactory project approval covering the entire quarry development, Metromix proposes to relinquish DA 130/42 within 12 months of the project approval being granted.

   Section 1.5 provides a summary of the approvals process commencing from the preparation of the *Preliminary Environmental Assessment* until the determination of the Project Application. Section 1.5 also provides an indicative timetable for a number of the individual component activities throughout the period until the Project Application is determined.

2. The existing Environment Protection Licence 536 would need to be modified through an application to the Office of Environment and Heritage to incorporate all extraction areas, to acknowledge the continued importation, placement and/or reprocessing of up to 100 000 tonnes of virgin excavated natural materials (VENM) and excavated natural materials (ENM) and up to 30 000tpa of concrete returns onto the Project Site. It is noted that Environment Protection Licence 536 already covers the land titles for both the existing operations and the proposed extension operations and provides for sufficient production volume.

3. A Section 138 Permit, issued under the *Roads Act 1993*, by Lake Macquarie City Council, would be required for the construction of a culvert under Rhondda Road in which a conveyor would be constructed and used to convey primary-crushed rock from the northern side of Rhondda Road to the southern side of Rhondda Road. This permit would not be required until about 2020 i.e. prior to the commencement of extraction within extraction of the Northern Extension.
4. A licence will be required under the *Water Act 1912* for the recovery of water from the Mine Adit Dam as this dam will solely collect groundwater from the Great Northern Coal Seam and Fassifern Coal Seam.

It is noted that there is no requirement for an approval from the Mine Subsidence Board given the now proven practice of extracting conglomerate above the former coal workings in the Great Northern Coal Seam.

Metromix submitted a referral to the Commonwealth Department of Sustainability, Environment, Water, Population and Communities on 9 June 2011. After a comprehensive review of the listed flora, fauna and migratory species, only species, a vulnerable flora species (*Tetratheca juncea*) was considered may experience a significant impact if the Project proceeds. As a result of the referral, the Assistant Secretary as a delegate of the Minister for Sustainability Environment, Water, Population and Communities decided the Project was "not a controlled action, provided it is taken in accordance with the manner described in the enclosed decision document". The key components of the decision document relate to:

i) not clearing more than 25.9ha of Spotted Gum – White Mahogany – Grey Ironbark Open Forest and Woodland as specified in the referral document;

ii) retaining 118ha of vegetation for conservation on site; and

iii) managing the conservation areas in accordance with the referral document and the Flora Assessment for Teralba Quarry Extensions, prepared by Idyll Spaces Environmental Consultants.

2.4 RESOURCES AND PROJECT LIFE

Resource drilling has been undertaken by Metromix and Rangott Mineral Exploration on the southern side of Rhondda Road with the results illustrated in **Figure 2.2.** The understanding of the resource on the northern side of Rhondda Road has been obtained from drill hole data compiled for the coal mining activities and some confirmation drilling undertaken by Metromix on the western side of the Northern Extension. As discussed in Section 2.2.5, the exact western boundary of the proposed Northern Extension generally coincides with the western limit of the outcrop of the Teralba Conglomerate. **Table 2.1** indicates the estimated remaining resource in each of the extraction areas covered by this *Environmental Assessment*.

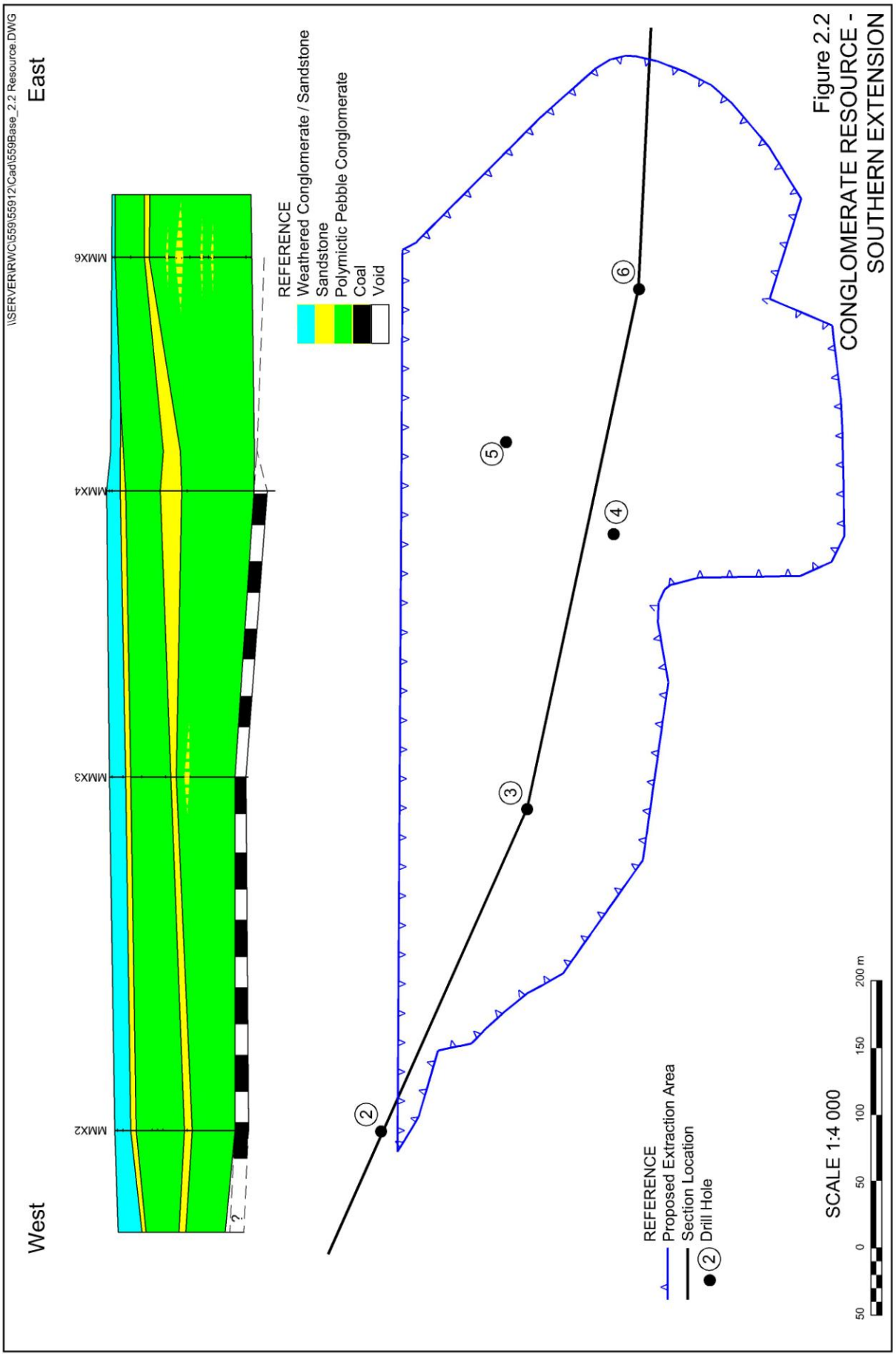

\\SERVER\RWC\559\55912\Cad\559Base_2.2 Resource.DWG
East
West
MMX6
MMX4
MMX3
MMX2
REFERENCE
Weathered Conglomerate / Sandstone
Sandstone
Polymictic Pebble Conglomerate
Coal
Void
Figure 2.2
CONGLOMERATE RESOURCE -
SOUTHERN EXTENSION
REFERENCE
Proposed Extraction Area
Section Location
Drill Hole
SCALE 1:4 000
50
0
50
100
150
200 m

Table 2.1
Recoverable Conglomerate Resources within the Project Site

Extraction Area	Recoverable Resource (t)
Southern Extraction Area	870 000[#]
Mid Pit Extraction Area	16 200 00*
Southern Extension	13 030 000
Northern Extension	6 790 000[@]
Total Resource (t)	22 310 000
[#] 2010 estimate. * To 40m AHD [@] To 25m AHD – including Mid Pit Excavation below 40m AHD Area	
Source: Resource estimates based on calculations by Minarco-MineConsult	

The existing Southern Extraction Area has approximately 1 million tonnes of recoverable resource remaining, providing an operational life of less than 12 months, based on current extraction rates. It is currently planned that extraction in the existing Southern Extraction Area would continue longer than 12 months (to late 2012) as Metromix increases production in the existing Mid Pit Extraction Area concurrently with the latter stage of the existing Southern Extraction Area. This will ensure sufficient flexibility is achieved for production of the full range of products required from the Mid Pit Extraction Area.

2.5 DESIGN OF EXTRACTION AREAS

2.5.1 Introduction

The factors influencing the locations of the boundaries of the proposed extraction areas have previously been outlined in Section 2.2.4 and 2.2.5. The design of the extraction areas themselves are influenced by a range of other factors, the principal factor being the presence of previously worked Great Northern Coal Seam of the former Northern Extended Colliery at the base of the Teralba Conglomerate. Other factors influencing the design of the extraction area relate to the strength of conglomerate itself and its variability.

The bulk of the existing and proposed extraction areas are underlain by underground workings within the Great Northern Coal Seam. These workings were undertaken using a room and pillar method which has resulted in numerous coal pillars interspersed with mined voids, or 'rooms'. **Figure 2.3** displays the location of previous workings in the Great Northern Coal Seam beneath the Project Site. The Great Northern Coal Seam is underlain by approximately 6m to 12m of tuff and then the Fassifern Coal Seam workings.

Until about 2005, Metromix had confined the extraction of the conglomerate to a level referred to as the "16m safe working floor" although some trials had commenced to establish whether a lower safe working floor could be adopted. Throughout this document, the extraction area above the safe working floor is referred to as the "upper level" whilst removal of the lower section of conglomerate to the top of the Great Northern Coal Seam is referred to as "lower level" extraction. Following consultation and investigations with Oceanic Coal (the current lessee of the former Northern Extended Colliery),

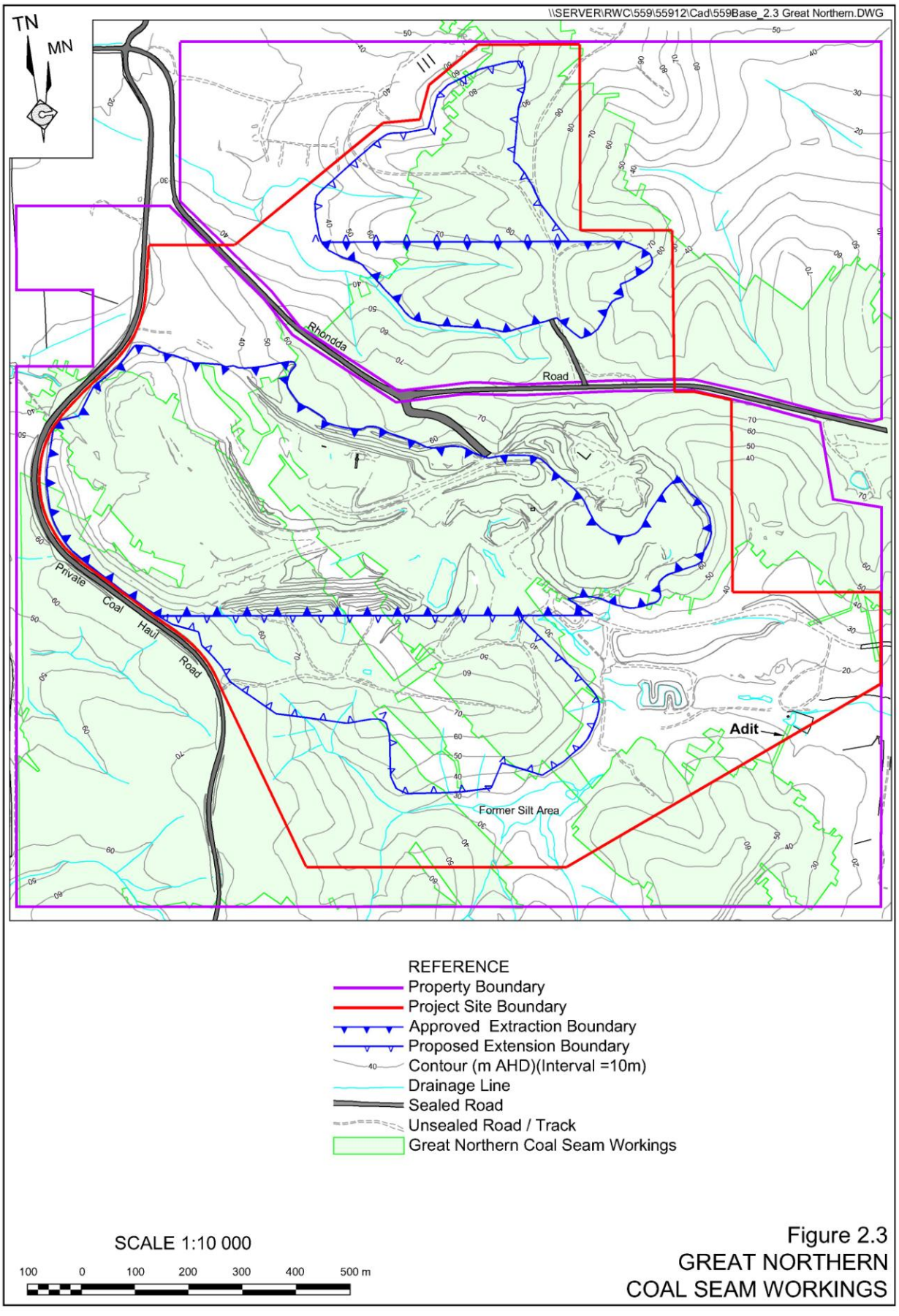


Figure 2.3
GREAT NORTHERN
COAL SEAM WORKINGS

Metromix developed a method of extracting the valuable conglomerate resource between the safe working floor and the top of the coal seam, i.e. the lower level. The then I&I NSW-MR have approved this method of drilling and blasting and Metromix now successfully extracts conglomerate from the lower level of the existing Southern Extraction Area. It was established at that time that non-life supporting gases accumulated within the former workings were not an issue for consideration during blasting or extraction.

The upper surface or roof of the Great Northern Coal Seam workings dips slightly to the southeast. Hence, the lower level of the conglomerate extraction would also dip in that direction. The upper surface of the Great Northern Coal Seam varies from approximately 21m AHD to 20m AHD south of Rhondda Road to 25m AHD to 24m AHD north of Rhondda Road. The Great Northern Coal Seam workings typically varied from 3m to 5m in height beneath the existing and proposed extraction areas. The extent of coal recovery from the "rooms" was typically approximately 50% of the coal present.

2.5.2 Design Features

2.5.2.1 Extraction Levels

As discussed in Section 2.5.1, extraction within the Teralba Quarry is undertaken on two levels, namely the upper level and the lower level. Based upon the trials and observations since extraction of the lower level conglomerate commenced, Metromix currently sets the safe working floor between the upper level and lower level at between 10m and 12m above the Great Northern Coal Seam.

2.5.2.2 Upper Level

The design of the extraction areas within the proposed quarry extensions above the safe working floor are based on the following parameters.

- 4m and 8m high drill and blast interim faces.
- 8m high terminal faces.
- Operational benches of approximately 30m width.
- Terminal benches of approximately 8m width.
- Extraction faces at a typical terminal angle of approximately 75°.
- The use of 4m high benches would occur largely in the near surface areas of each extraction area until uniform benches are created at the nominated levels.

Other issues reflected in the design of the extraction areas include proximity to watercourses and haul routes to the processing plant.

Existing Southern Extraction Area

Figure 2.4 displays the final layout of the existing Southern Extraction Area. All resources have been recovered from the upper level in the existing Southern Extraction Area and limited resources remain within the lower level.

Existing Mid Pit Extraction Area

Figure 2.5 displays the layout of the existing Mid Pit Extraction Area, i.e. until a level of 40m AHD is reached. This level would be above the safe working level to be set at approximately 35m AHD.

It is proposed that the benches within the existing Mid Pit Extraction Area would be set between approximately 48m AHD and 72m AHD, i.e. with an elevation difference between each bench of 8m. In total, there would be up to five x 8m benches within the Mid Pit Extraction Area. The southern boundary of the existing Mid Pit Extraction Area is set back 10m from Tributary. The existing Mid Pit Extraction Area comprises two pits referred to as the Eastern Pit and Western Pit. The Eastern Pit would be initially be used for soil storage and ultimately as an equipment compound during the period when the proposed Northern Extension is operational.

Proposed Southern Extension

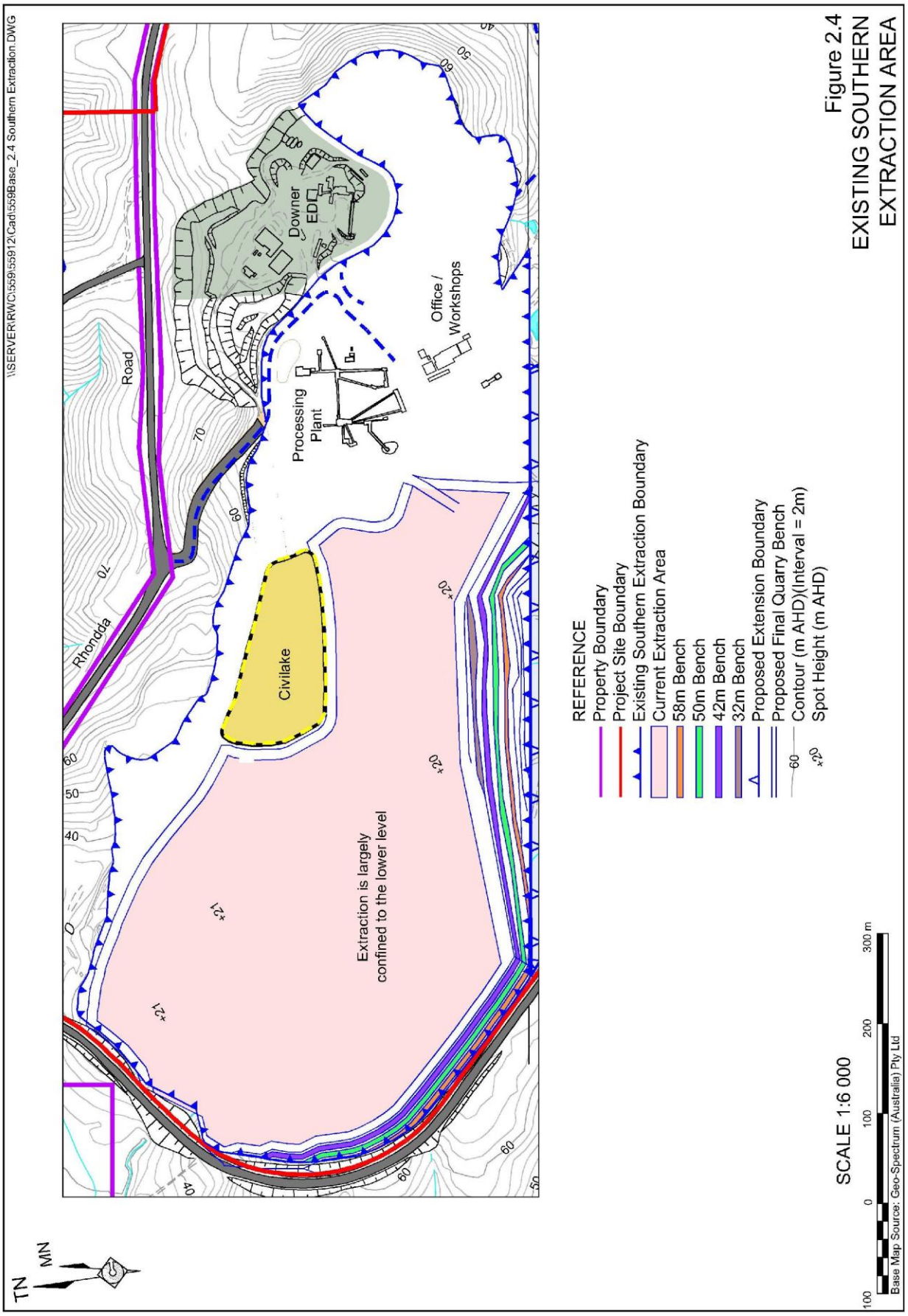
Figure 2.6 displays the final layout of the proposed Southern Extension. The extraction within the upper level within the proposed Southern Extension would be confined to the area above approximately 30m AHD, i.e. a level comparable to that in the existing Southern Extraction Area. The benches on the southwestern side of the Southern Extension would be set at similar elevations to those within the existing Southern Extraction Area namely 32m AHD, 42m AHD, 50m AHD and 58m AHD.

Proposed Northern Extension

Figure 2.7 displays the final layout of the proposed Northern Extension. The extraction within the upper level in the proposed Northern Extension would be confined to a level above approximately 35m AHD, i.e. where the Great Northern Coal Seam was mined beneath the proposed Northern Extension (see **Figure 2.3**). The adoption of a safer working level would not be required for the 3ha area within the Northern Extension that has not been undermined.

2.5.2.3 Lower Level

The lower level extraction design has been largely based on the current approach adopted at the nearby Oceanic Westside Open Cut Mine. This mine also extracts conglomerate material, as overburden, from above worked sections of the Great Northern Coal Seam in order to access the coal pillars remaining in the seam. The approach was adopted following a comprehensive risk assessment and trials within the Teralba Quarry.


\\SERVER\RW\C\559\559912\Cad\559Base_2.4 Southern Extraction.DWG
Figure 2.4
EXISTING SOUTHERN
EXTRACTION AREA
Downer EDI
Office / Workshops
Processing Plant
Road
Rhondda
Civilake
Extraction is largely confined to the lower level
REFERENCE
Property Boundary
Project Site Boundary
Existing Southern Extraction Boundary
Current Extraction Area
58m Bench
50m Bench
42m Bench
32m Bench
Proposed Extension Boundary
Proposed Final Quarry Bench
Contour (m AHD)(Interval = 2m)
Spot Height (m AHD)
SCALE 1:6 000
100 0 100 200 300 m
Base Map Source: Geo-Spectrum (Australia) Pty Ltd
TN
MN

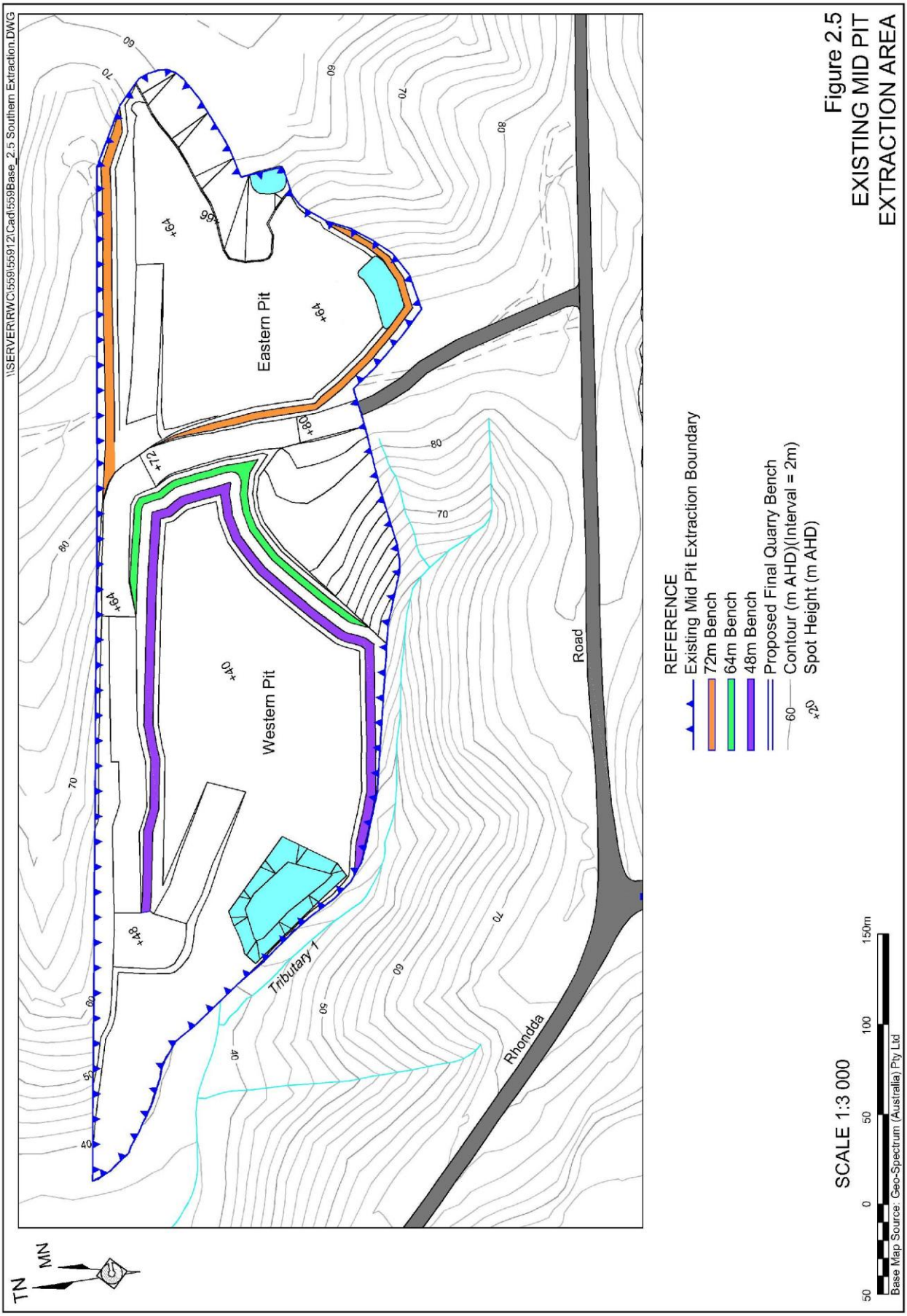
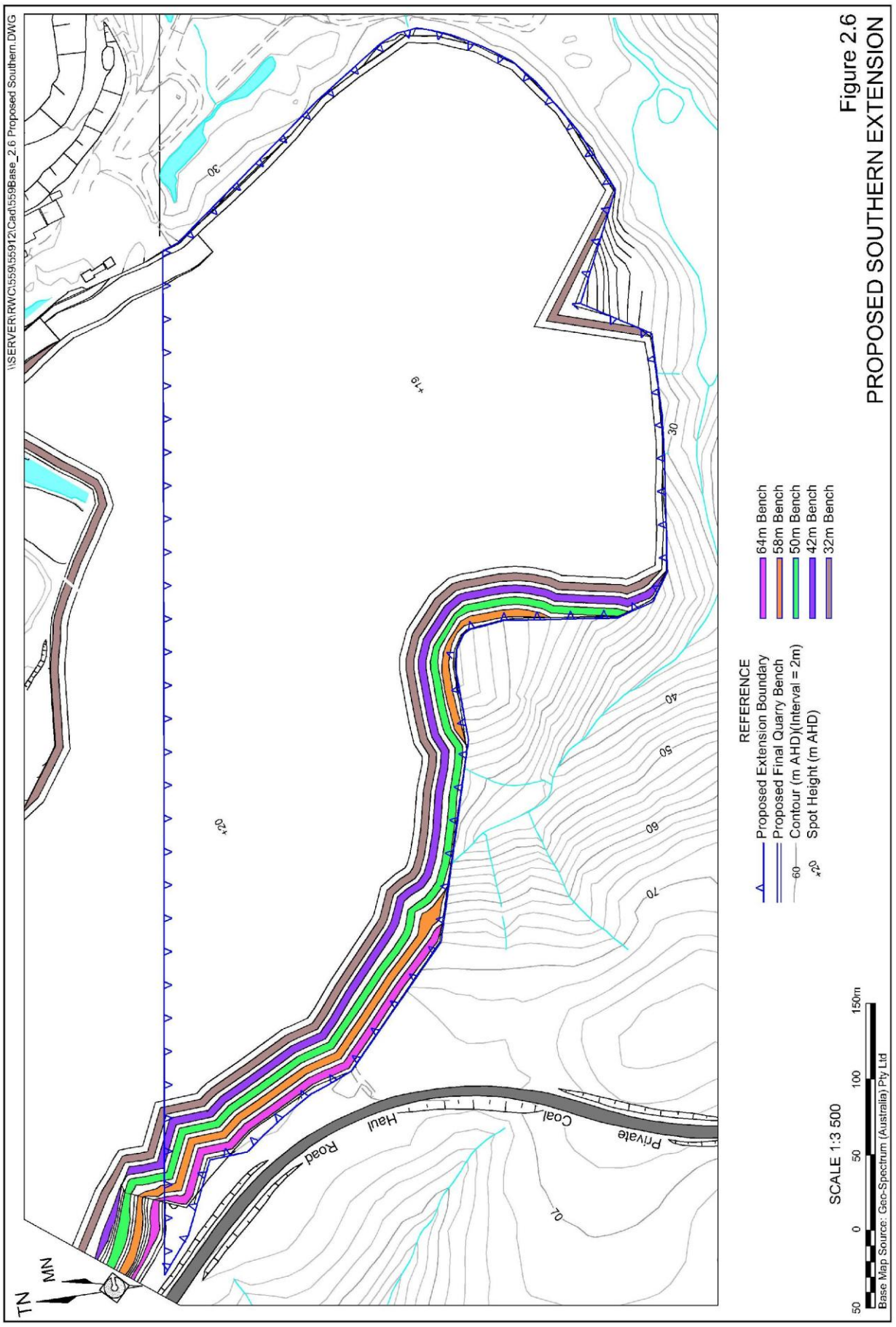


Figure 2.5
EXISTING MID PIT
EXTRACTION AREA


\\SERVER\RWC\559\55912\Cad\559Base_2.6 Proposed Southern.DWG
Figure 2.6
PROPOSED SOUTHERN EXTENSION
REFERENCE
Proposed Extension Boundary
Proposed Final Quarry Bench
Contour (m AHD)(Interval = 2m)
Spot Height (m AHD)
64m Bench
58m Bench
50m Bench
42m Bench
32m Bench
SCALE 1:3 500
Base Map Source: Geo-Spectrum (Australia) Pty Ltd
TN
MN
Private Coal Haul Road

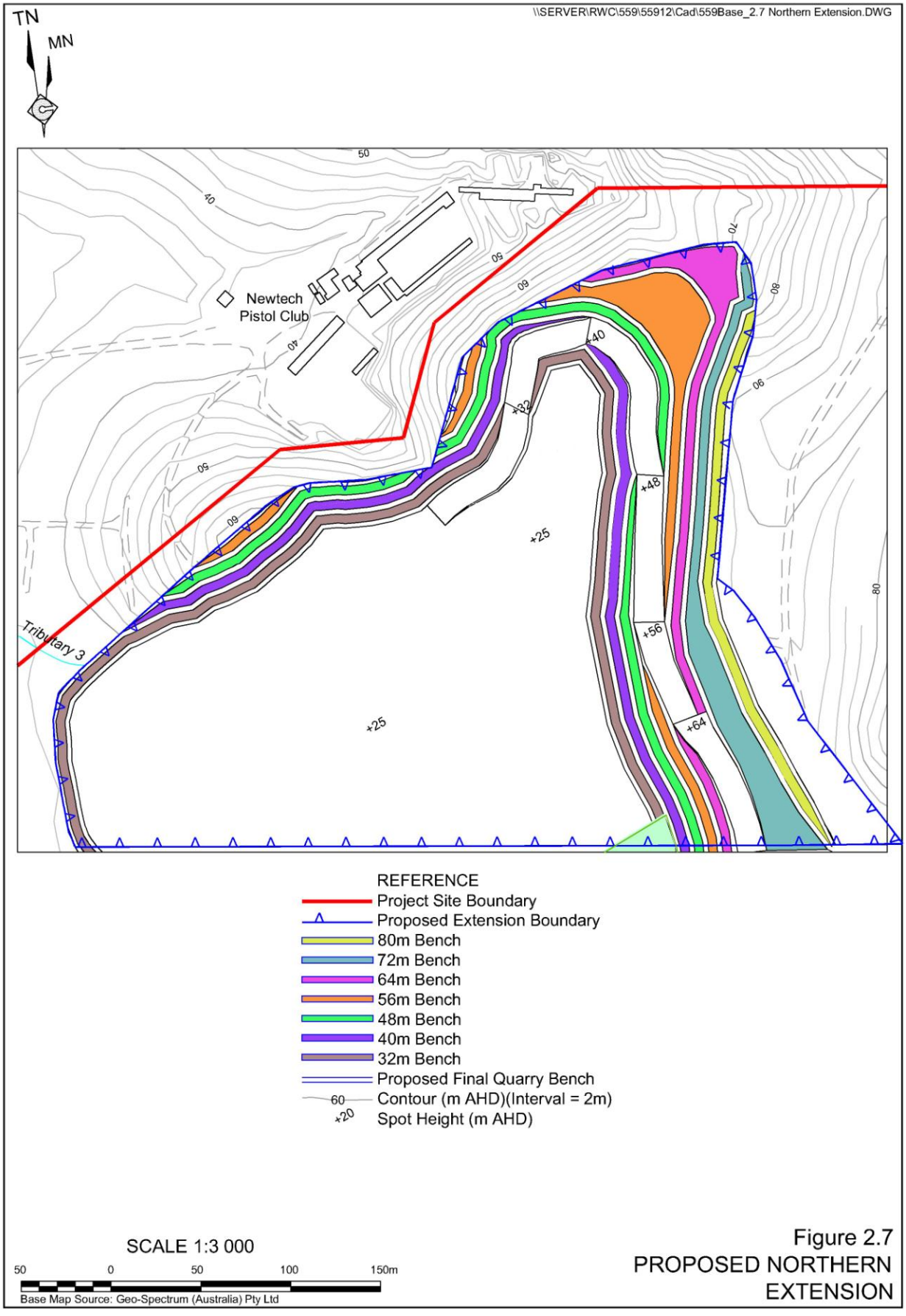


Figure 2.7
PROPOSED NORTHERN EXTENSION

The design parameters for the lower level extraction would be near vertical to 75°, 12m high operational faces. The design of both the upper level and lower level operations would provide for the creation/maintenance of a barrier in the order of 8m high between the area of activity and the direction of the closest residences. Towards the end of extraction on the lower level, within the Southern Extension the height of the outer barrier would be gradually reduced but retained sufficiently high (at least 2m) to continue to contain all surface water within the boundaries of the active/partly rehabilitated extraction area.

Figure 2.8 displays the conceptual sequence of extraction both above and below the safe working level.

2.6 EXTRACTION OPERATIONS

2.6.1 Introduction

The extraction operations involve a sequence of activities commencing with vegetation clearing followed by topsoil/subsoil removal, overburden removal (where present) and finally conglomerate extraction.

It is noted that the sequence of activities would not commence until the extraction boundaries are clearly defined to ensure that all activities are confined only to the area approved for extraction.

2.6.2 Vegetation Clearing

Clearing of vegetation would be undertaken with a bulldozer, typically a D9 or D10, depending on what equipment is available and the size of the area to be cleared. The approach to clearing would reflect whether it is undertaken on the broader flatter areas or steeper slopes approaching water courses. Clearing would be timed either with seeding of trees to ensure that the topsoil holds a large seed bank (see Section 2.16) or avoiding nesting/roosting time for birds or bats (see Section 5.5.5).

Whenever possible, vegetation would be respread on rehabilitation areas. Where there are no rehabilitation areas available, the vegetation would be pushed to the down-slope side of the cleared area and temporarily stockpiled for use as a silt barrier. This approach to sediment management has been effective to date, however, is only undertaken in those areas where further clearing is planned downslope.

In the vicinity of the well-defined drainage lines, the vegetation would be pushed over in strips in the order of 20m wide (**Figure 2.9**). The vegetation would then be pushed and stockpiled downslope of the cleared area, to act as a temporary sediment filter, i.e. unless there are no active rehabilitation areas for direct replacement. Away from the defined water courses, larger areas would be cleared.

Clearing would be conducted at least one year ahead of the area(s) being required for extraction. Invariably, the overall area cleared during any one clearing campaign would be sufficient for at least one year's production at maximum production levels. This may require clearing in more than one area at a time to provide access to raw materials of different qualities.

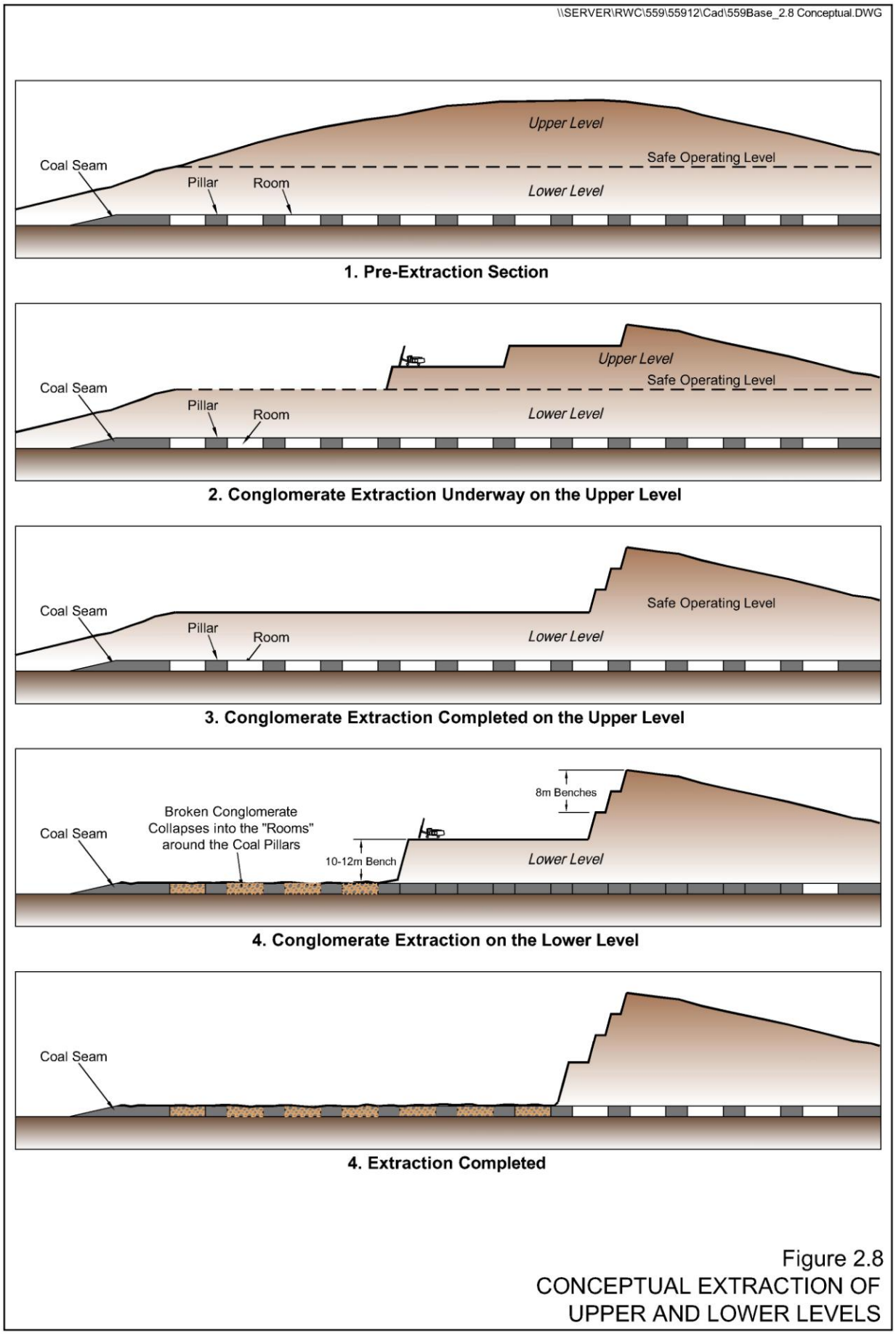


Figure 2.8
CONCEPTUAL EXTRACTION OF
UPPER AND LOWER LEVELS

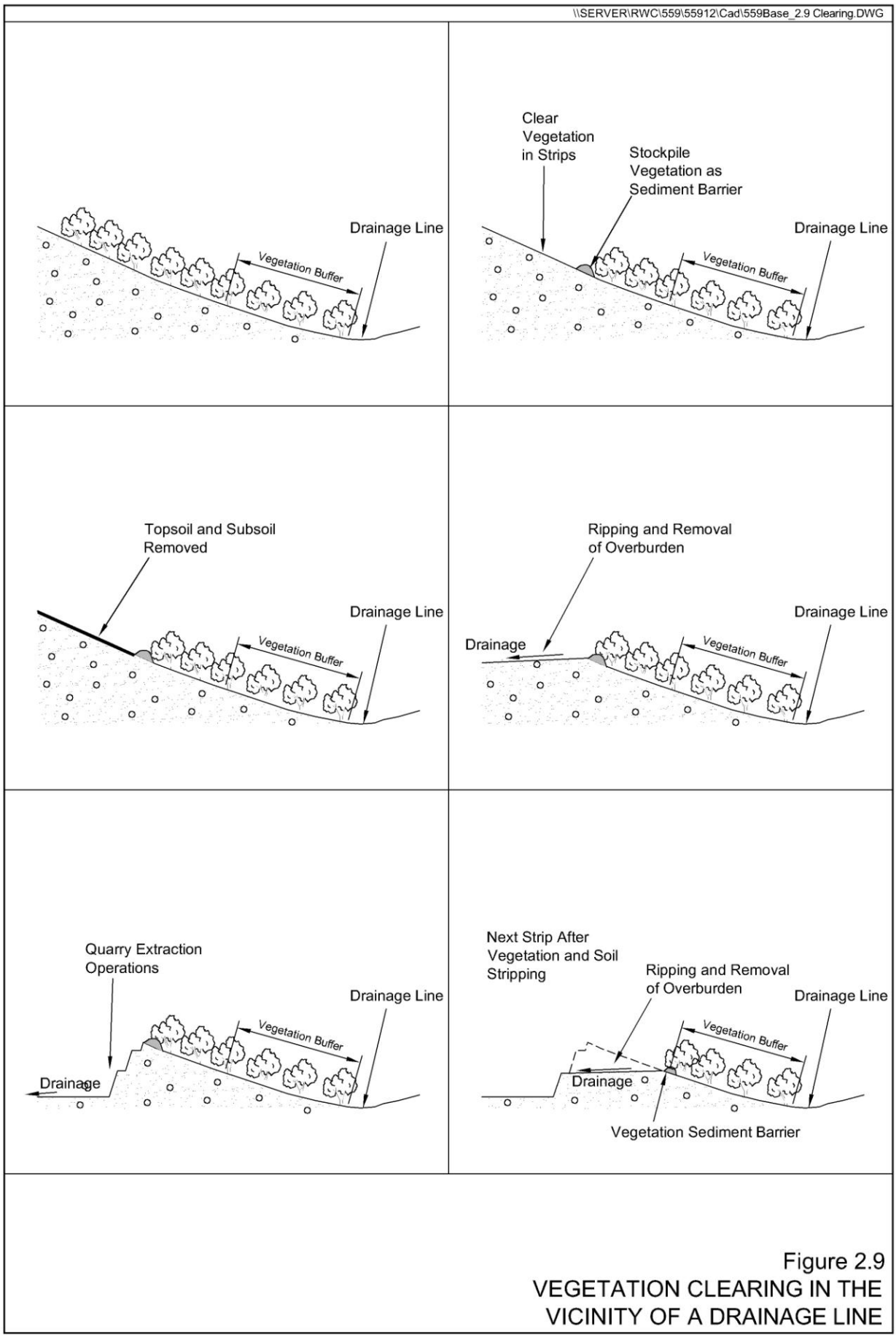


Figure 2.9
VEGETATION CLEARING IN THE VICINITY OF A DRAINAGE LINE

2.6.3 Topsoil and Subsoil Removal

Where topsoil and subsoil was present in recoverable quantities in the existing Southern Extraction Area, it was either removed for use in progressive rehabilitation of the area east of the site office (see **Plate 1.3**) or unfortunately extracted concurrently with the overburden or conglomerate and subsequently not available for rehabilitation.

Where present, in either the Mid Pit Extraction Area or the Southern or Northern Extensions the topsoil would be stripped to a depth of approximately 0.2m to 0.7m and the subsoil stripped up to 0.5m. It is recognised, particularly on the side slopes that the soil thickness is limited and it would not always be practical to recover topsoil and/or subsoil. The soil would be re-spread on areas of progressive rehabilitation as much as practicable, to fully utilise the available seed bank within the soil. This would be particularly applicable to the topsoil and subsoil removed in the area(s) with defined populations of *Tetratheca juncea.* The soil from these areas would be directly relocated to the power line easements to be decommissioned to assist with the rehabilitation of the species. Where those areas are not available, topsoil and subsoil would be stockpiled on the final floor of the existing Southern Extraction Area or within the eastern pit within the existing Mid Pit Extraction Area.

In the vicinity of the well-defined drainage lines on the southern side of the existing Mid Pit Extraction Area and the proposed Southern Extension, the topsoil and subsoil would be stripped along the contour in 20m strips, to minimise exposed areas, and immediately replaced on rehabilitation areas wherever possible. Where there are no rehabilitation areas available, the soil would be stockpiled separately away from the downslope area. Prior to the removal of the soil closest to the drainage line, a silt-stop fence would be installed downslope prior to disturbance and maintained for the duration of the disturbance.

It is noted that for some areas to be stripped of topsoil and subsoil, the soil material removed would be stockpiled either in a temporary area or on the upper surface of a bund wall or similar structure. In any event, the topsoil would not be stockpiled higher than 2m and the subsoil no higher than approximately 3m. In areas when soil storage is limited, the topsoil would be stored above the subsoil creating a total height of 5m.

2.6.4 Overburden Removal

Southern Extraction Area

To date, there has generally been no more than 1m to 2m of overburden present within the existing Southern Extraction Area.

Overburden is either sold as non-specification or specification fill product where possible or placed in the area west of the Civilake area (**Figure 2.4**). This area would be reshaped to create the western stockpile area.

Existing Mid Pit Extraction Area

The overburden within the existing Mid Pit Extraction Area has an approximate thickness of 1.5m resulting in a total quantity of overburden present of approximately 110 000m^3. The bulk of this material is planned to be sold as a fill product directly from the site.

Proposed Southern Extension

The overburden within the proposed Southern Extension has an approximate thickness of 2m, resulting in a total of approximately 340 000m^3 of overburden material to be removed.

In the southern and southeastern parts of the proposed Southern Extension, overburden would be removed in strips to minimise cleared areas prone to erosion and silt production adjacent to the well-defined watercourse, and to ensure that drainage is always directed back into the extraction area (**Figure 2.9**). The ripped overburden would be removed and sold as fill or used to construct the walls or capping of the silt cells within the Southern Extension. Any excess overburden would be used to create the final landform within the area designated as industrial land (Section 2.16).

Proposed Northern Extension

The overburden across the proposed Northern Extension also has an approximate thickness of 1.5m, resulting in a total of approximately 130 000m^3 of overburden material to be removed and either sold or managed on site. This material would be similarly removed ahead of conglomerate extraction. The opportunity would arise for this material to be placed in worked out areas of the existing Mid Pit Extraction Area.

2.6.5 Conglomerate Extraction

2.6.5.1 Upper Level

Extraction of the conglomerate at the Teralba Quarry typically differs from traditional hard rock quarrying in that the material generally requires a lower volume of explosives per tonne of blasted material and smaller blasts and benches are used. Typically, blasts are designed using 4m to 8m high benches and drilling pattern sizes of between 3m x 3m and 3.2m x 4m. The quantity of rock blasted in a single blast would typically vary between 10 000 tonnes and 35 000 tonnes, depending on operational requirements, with blasting typically once to twice per week. Subsequently, the blasted material would be loaded by an excavator into a haul truck to progressively clear the area for a further blast.

Due to the comparatively small size of the blasts, and the nature of the conglomerate, flyrock and dust would be minimised. There would generally be up to three active benches operating at any one time when extraction operations are underway in the upper level.

2.6.5.2 Lower Level

Excavation of the lower level has commenced in the northwestern section of the existing Southern Extraction Area and would progress in a southeasterly direction. As previously stated, this method of extraction has been developed in consultation with Oceanic Coal.

The drill and blast design for the lower level is contracted out to specialists in the field. Drill holes for a lower level blast are generally to the roof of the coal seam, similar to the Westside Open Cut Mine operation. Where a void or room in the coal mine is intersected by the drill hole, the hole would be fitted with gas bags positioned at the base of the hole and stemming placed in the bottom of the hole. The stemming would keep the blast energy in the conglomerate material.

Blasting to the coal seam roof ensures the conglomerate breaks and fills the worked voids or rooms. The drill pattern for the lower level extraction would typically be 3m x 3m drill spacing, with powder factor of 0.6, although this would be subject to periodic review by specialists in the field. The blast pattern would be adjusted, as required, based upon drilling results and site experience.

Typical blasts in the lower level would yield approximately 20 000t to 30 000t, of which approximately 35% would drop into the former workings and not be recovered.

The broken rock would be loaded with an excavator into a haul truck for transportation to the existing primary crusher for rock extracted south of Rhondda Road or to the re-locatable crusher to be used in the Southern or Northern Extensions (see Section 2.8).

Visual monitoring would be conducted on a daily basis to ensure there are no areas of subsidence into the mined voids within the coal mine. Where these areas are observed, machinery would be used to fill the area with conglomerate and flatten those areas for other machinery access, as is common practice at Westside Open Cut Mine.

2.6.6 Sequence of Extraction

Minarco-MineConsult has prepared detailed plans displaying the sequence of extraction in the:

- Mid Pit Extraction Area;
- Southern Extension; and
- Northern Extension.

All detailed sequences in each extraction area are displayed in **Appendix 4**. The sequence of extraction between each extraction area has been assembled to reflect a range of practical considerations and the need to limit the visual impact of the upper extraction faces within the Southern Extension. It is therefore proposed to undertake the extraction generally within the following sequence. It is noted that these periods are estimates only and could change for a range of reasons.

Years 1 and 2	Mid Pit Extraction Area
Years 3 to 10	Southern Extension (Western Area to 20m AHD)
Years 11 to 22	Northern Extension
Years 22 to 30	Southern Extension (Eastern Area to 20m AHD)

It is noted that the sequence of extraction in the Mid Pit Extraction Area ceases at 40m AHD but would resume from that level as the Northern Extension reaches that level and enables the practical completion of extraction to the planned 24m AHD level.

For those extraction areas where extraction would cease for periods of up to 10 years, Metromix would ensure adequate interim water management structures are left and that the potential for dust lift-off is minimised.

2.7 RAW MATERIAL TRANSPORTATION

Existing Southern Extraction Area

Raw material would continue to be transported to the existing primary crusher by off-road haul trucks along existing or re-located internal haul roads.

Existing Mid Pit Extraction Area

The raw material from the Mid Pit Extraction Area would be transported to the existing primary crusher using road-registered trucks via an internal haul road and a short 200m section of Rhondda Road. This method of raw material transportation would continue for up to 6 months after the receipt of project approval.

Proposed Southern Extension

It is proposed that raw materials from the proposed Southern Extension would be transported either to the primary crusher by trucks along internal haul roads in a similar manner to the transportation from the existing Southern Extraction Area or by conveyor from the re-locatable primary crusher located centrally within the Southern Extension.

Proposed Northern Extension

In order to avoid any use of Rhondda Road by road-registered trucks to transport primary-crushed materials from the Northern Extension to the processing plant, a conveyor is proposed to transport primary-crushed raw materials from the Northern Extension to the processing plant on the southern side of Rhondda Road. This conveyor would be constructed in a culvert crossing beneath Rhondda Road at an elevation of between approximately 74m to 78m AHD and drop the primary-crushed material onto a raw feed stockpile located at approximately 52m AHD immediately west of the Downer EDI site. The indicative location of this conveyor is shown on **Figure 2.10**.

2.8 PROCESSING AND STOCKPILING

2.8.1 Existing Processing Plant Design and Operations

Teralba Quarry currently operates with a fixed processing plant that incorporates a combination of primary, secondary and tertiary crushing, a total of six screens are utilised as well as a washing plant. The degree of processing is dependent on the final product(s) required. The existing processing plant layout is presented in **Figure 2.11** with a simplified flowsheet for the plant displayed in **Figure 2.12**. **Table 2.2** lists the main components of the processing plant.

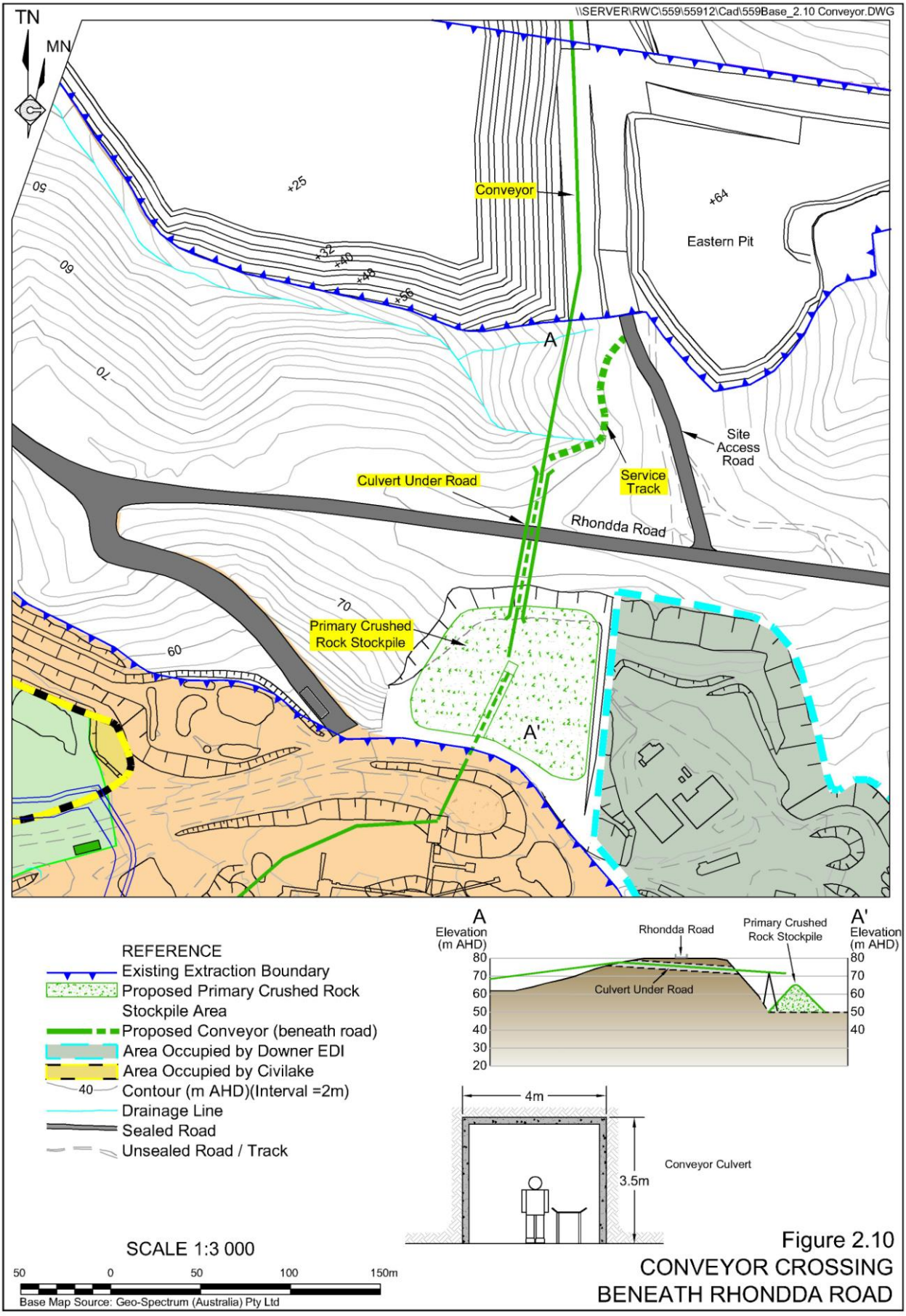


Figure 2.10
CONVEYOR CROSSING BENEATH RHONDDA ROAD

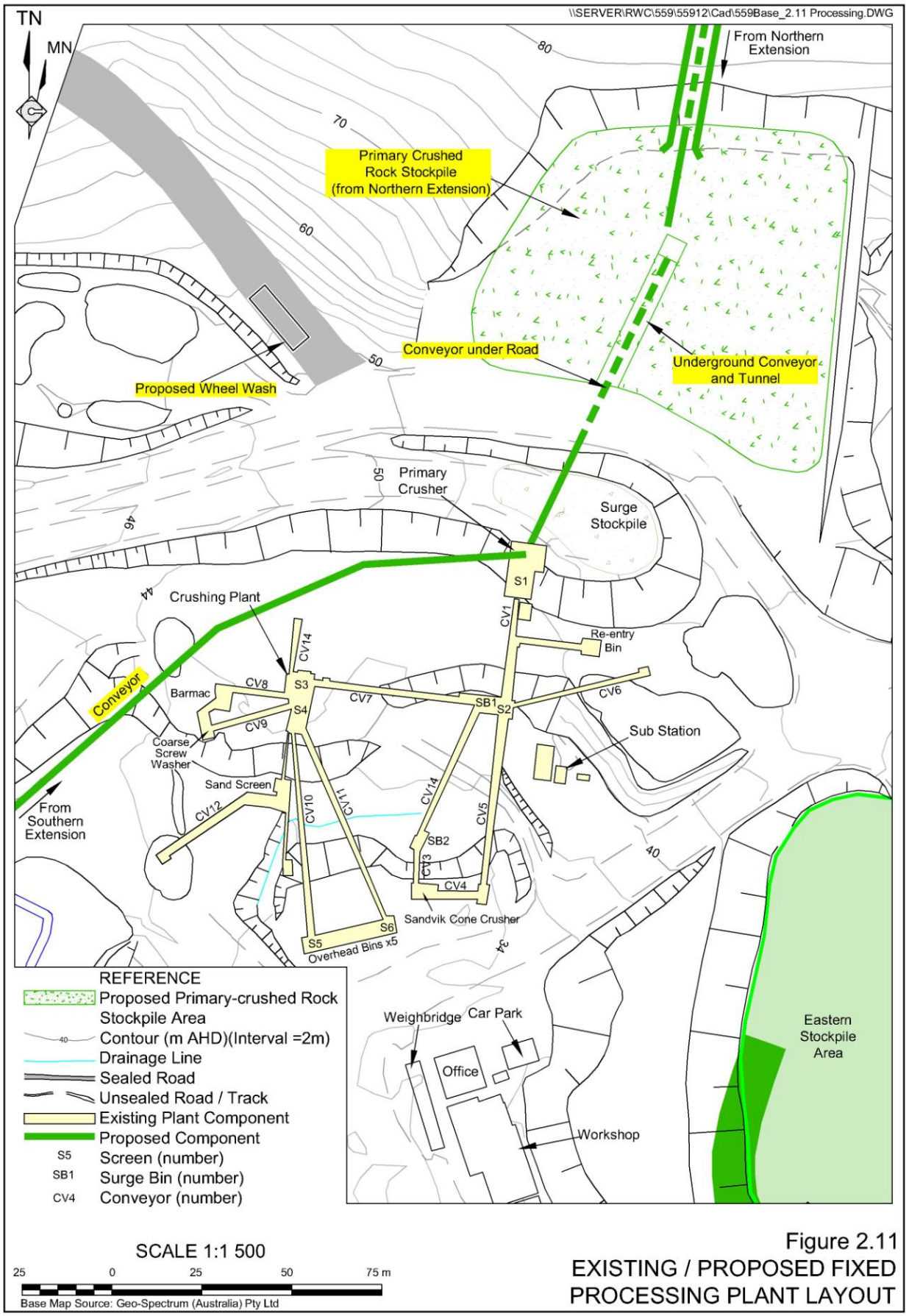


Figure 2.11
EXISTING / PROPOSED FIXED PROCESSING PLANT LAYOUT

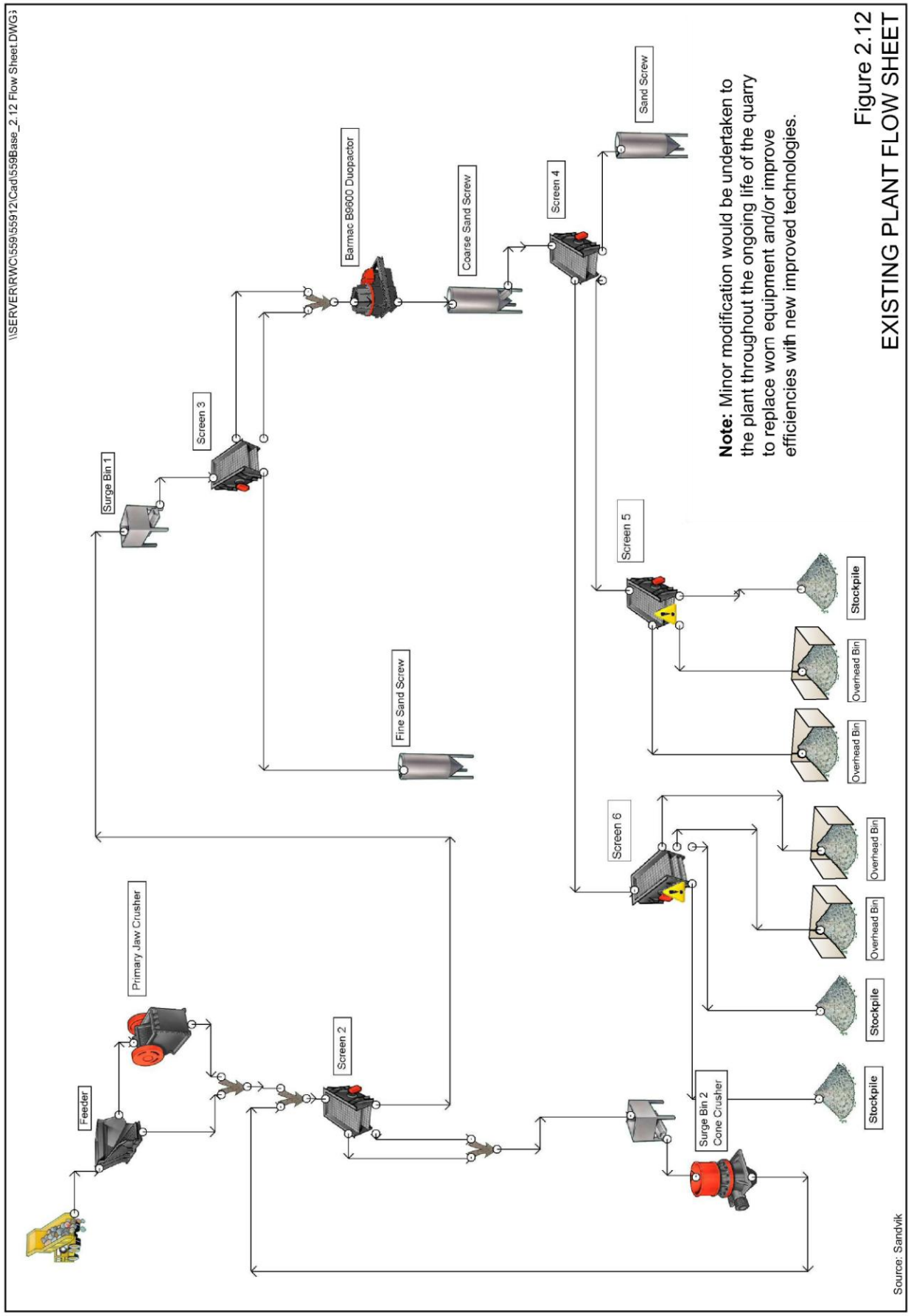

\\SERVER\RWC\559\5912\Cad\559Base_2.12 Flow Sheet.DWG
Figure 2.12
EXISTING PLANT FLOW SHEET
Note: Minor modification would be undertaken to the plant throughout the ongoing life of the quarry to replace worn equipment and/or improve efficiencies with new improved technologies.
Feeder
Primary Jaw Crusher
Screen 2
Surge Bin 1
Screen 3
Barmac B9600 Duopactor
Coarse Sand Screw
Screen 4
Sand Screw
Fine Sand Screw
Screen 5
Screen 6
Surge Bin 2 Cone Crusher
Stockpile
Stockpile
Stockpile
Overhead Bin
Overhead Bin
Overhead Bin
Overhead Bin
Source: Sandvik

Table 2.2
Existing Processing Plant Components

Equipment*	Number of Items	Use
Primary Crusher (Pegson single toggle jaw crusher)	1	Primary crushing of materials
Secondary Crusher (Sandvik)	2	Secondary crushing of materials
Tertiary crusher (vertical shaft impactor)	1	Tertiary (wet) crushing of materials
Screens (various sizes)	6	Size screening of materials
Conveyors (dry and wet)	17	Movement of materials around processing plant
* These items would be periodically refurbished/replaced, as required throughout the life of the plant.		

Raw materials are generally fed directly from the off-road haul trucks into the boot hopper or feeder at the primary crusher with some raw material occasionally loaded by front-end loader from a small surge stockpile located adjacent to the hopper. Processing of raw materials commences with a dry process (with dust suppression), i.e. through the primary crusher and onto a secondary crusher and screen followed by a wet circuit. A re-crush stockpile from the secondary crusher circuit is maintained so that it can be reloaded into the boot hopper when the primary crusher is not operational. The dry crushed material is screened and oversize is directed to a wet vertical shaft impactor and aggregate screw washer where agglomerations of sand grains and/or pebbles are broken down. Material is then screened again and directed to the appropriate sizing screens and product bins.

Approximately 35% of the raw material is processed dry with the remaining 65% processed through the wash plant.

2.8.2 Proposed Process Plant Design and Operations

Metromix proposes to introduce the use of a re-locatable primary crusher to operate in conjunction with the existing fixed processing plant. The use of the re-locatable primary crusher would also involve the introduction of a conveyor to replace the off-road haul trucks. The existing fixed plant would continue to be used in the existing manner although throughout its operational life plant components would be re-furbished / upgraded. Any new items of equipment would have a sound power level comparable with or less than the existing equipment.

It is proposed to place the re-locatable primary crusher centrally within the proposed Southern Extension at the lowest possible elevation during the second stage of extraction, i.e. in the eastern section of the Southern Extension. The crusher may be relocated, as required to optimise travel distances from active extraction faces.

North of Rhondda Road, the re-locatable primary crusher would be located near the boundary of the Mid Pit Extraction Area and the proposed Northern Extension. It would be located near the end of the fixed conveyor used to transport the primary crushed rock to the fixed processing plant.

When primary-crushed rock is being sourced from the Northern Extension, a stockpile of primary-crushed rock would be located in the areas displayed on **Figure 2.1** and **Figure 2.11**, i.e. immediately west of the Downer EDI site and immediately adjacent to the primary crusher building (surge stockpile). The primary-crushed rock would be conveyed from the base of the primary-crushed rock stockpile to the existing primary crusher boot hopper or feeder in a tunnel conveyor constructed beneath the site entry/exit road.

The operation of the processing plant would be very similar to the existing operation when the primary-crushed material is sourced from the Southern Extension.

Metromix proposed to introduce two further items of processing equipment throughout the life of the quarry.

- A pugmill to produce a range of roadbase products. The introduction of the pugmill for use on site would depend upon whether Civilake continues its operation on site. Metromix would only introduce a pugmill in the event the Civilake pugmill and operations are removed from site.

  Metromix's pugmill would be located near the entrance to the eastern stockpile area. The new location of the pugmill would be provided to the OEH for inclusion on EPL536.

- A dedicated sand dewatering plant with a capacity to yield up to 200 tonnes of sand products per hour would be constructed at the western side of the Western Stockpile area. This plant would effectively produce the range of products currently produced in the existing fixed processing plant in an area with considerably greater surrounding stockpiling capacity.

2.8.3 Production Rates

The average throughput of the processing plant is typically 400tph through the dry process and 250tph to 300tph through the wet process. The existing plant operates 5½ days per week, typically between 6:00am and 6:00pm Monday to Friday and 6:00am to 2:00pm Saturdays, although during some periods of above average production, the plant has operated on weekdays until 10:00pm at night.

Throughout the remaining life of the quarry, the re-locatable primary crusher would operate at a rate of up to 700tph whilst the hourly production rates for the fixed processing plant would remain comparable to existing levels.

The two products from the dry circuit, namely, the <25mm roadbase (screened gravel) and the <100mm fill would be produced for only six days per month, on average. For 5 to 5½ days per week, all dry circuit material is forwarded to the wet process to produce the remainder of the products, as listed in Section 1.4.5.

2.8.4 Product Stockpiling

All products produced within the fixed processing plant are collected either in active stockpiles at the end of the final conveyors or the overhead bins at the western side of the existing office. The products would continue to be transferred from either the active stockpiles or overhead bins to the relevant area within the stockpile area. For some products, multiple stockpiles are required for Quality Assurance purposes. The bulk of the existing product stockpiles are currently located to the east of the fixed processing plant (**Figure 2.1** and **Figure 2.11**). Metromix proposes to retain the eastern stockpile area long term principally for its various road base products. As discussed in Section 2.8.2, Metromix may erect a pugmill within the Eastern Stockpile Area in the event the Civilake pugmill is removed from site.

Metromix proposes to modify its existing stockpiling arrangement and formalise a western stockpile area for the washed aggregate and sands. Washed aggregates would be transported by truck to this area whereas the sand products would be pumped in a slurry pipeline and dewatered, then stockpiled in the western stockpile area. The 10mm/7mm and 20mm/14mm aggregates are the most demanded products. Hence, these stockpiles would continue to be maintained at approximately two months' supply. The majority of the stockpiles in the western stockpile area would be damp due to the wet process, hence minimising production of dust.

2.9 WASTE MANAGEMENT

2.9.1 Overburden

The quantity of overburden extracted invariably exceeds the demand for the <100mm screened product Metromix produces from the overburden. To date, if the market demand for fill material is high, all of the overburden extracted has been processed to <100mm product for sale. If demand for the <100mm product has been low, overburden has been placed in a depression behind the Civilake area. This area is to be re-shaped and used for the western stockpile area.

This current approach to overburden sale and/or on-site placement would continue for the remainder of the quarry life. For the purposes of sales of overburden and management of unsold overburden, it is assumed that an average of 50 000t of overburden would be sold annually and the remaining overburden would be stored or used in rehabilitation projects on site. Once the new system for managing processing plant fines is in place (in late 2011), there would be a greater requirement for overburden (and coarse processing plant rejects) to construct the cell walls and progressively cover the completed silt cells.

2.9.2 Processing Plant Fines

Processing plant fines consist of the <75μm fraction from the washed products (silt) and wash water from the wet section of the processing plant. The silt content of the conglomerate is approximately 8% to 10%. The slurry containing the fines typically has a specific gravity of approximately 1.1 whilst the settled fines have a specific gravity of approximately 1.3. The processing plant fines have been previously subjected to leach tests and it was determined that the solid fraction can be classified as "inert wastes" under the NSW DECC (EPA) *Guidelines for Assessment Classification and Management of Non-liquid Wastes* (Egis Consulting Australia, 1999).

From 1994, the fines were pumped from the silt tank within the processing plant to a holding tank at the Rhondda Colliery where they were then used to extinguish a long term fire in the underground workings in that colliery. In recent years, as the requirement for fines at Rhondda Colliery decreased, Metromix re-directed the fines into the underground Great Northern Coal Seam workings. This method of fines disposal has been very effective as the silt component has settled and the water recovered from the adit has been of excellent quality. Metromix proposes to continue this method of fines management until late 2011.

Beyond late 2011, Metromix proposes to adopt the use of conventional above-ground silt cells. This would involve the construction of cell walls, typically approximately 3m to 4m in height from overburden and imported VENM or ENM. Each cell would cover an area of approximately 1ha. **Figure 2.13** displays the indicative layout of the proposed silt cells on the southern side of the existing Southern Extension. At any one time, Metromix would operate the fines management system typically with two or three cells. The first cell would receive the fines whilst the second and/or third cell would provide additional residence time for the settling of the fines. As each cell is filled, the remaining water on the surface would be pumped off and the fines allowed to settle and further dewatered. Once sufficiently consolidated, the surface of the settled silt cell would be progressively covered with approximately 2m of overburden and/or VENM/ENM.

The sequence of filling silt cells would continue throughout the quarry life with each cell designed to contain approximately 40 000m^3 of silt or approximately one years silt production. New cells would be progressively constructed on the previously capped cells with the cells gradually increasing in height against the Southern Extraction faces of the Southern Extraction Area. The initial silt cells would be constructed on the western side of the Southern Extraction Area and progressively advance eastward. Additional silt cells would be constructed and used above those established on the extraction floor in the manner shown on the typical Section shown on **Figure 2.13**. The outer surface of each completed silt cell would be contoured with overburden and VENM/ENM to achieve part of the final landform (see Section 2.16).

2.9.3 Solid and Liquid Waste

A number of other solid and liquid wastes are produced on site. Metromix proposes to continue to manage the wastes in the manner adopted as detailed below.

- Sewage: Metromix has installed an Envirocycle sewage treatment system on the Project Site and has received approval from Lake Macquarie City Council to operate the system. Metromix has an agreement for the regular maintenance of the system by a licenced contractor.
- Waste Oil: Waste oil is collected from the workshop sump and other locations and is regularly removed on a monthly or as needs basis for recycling.

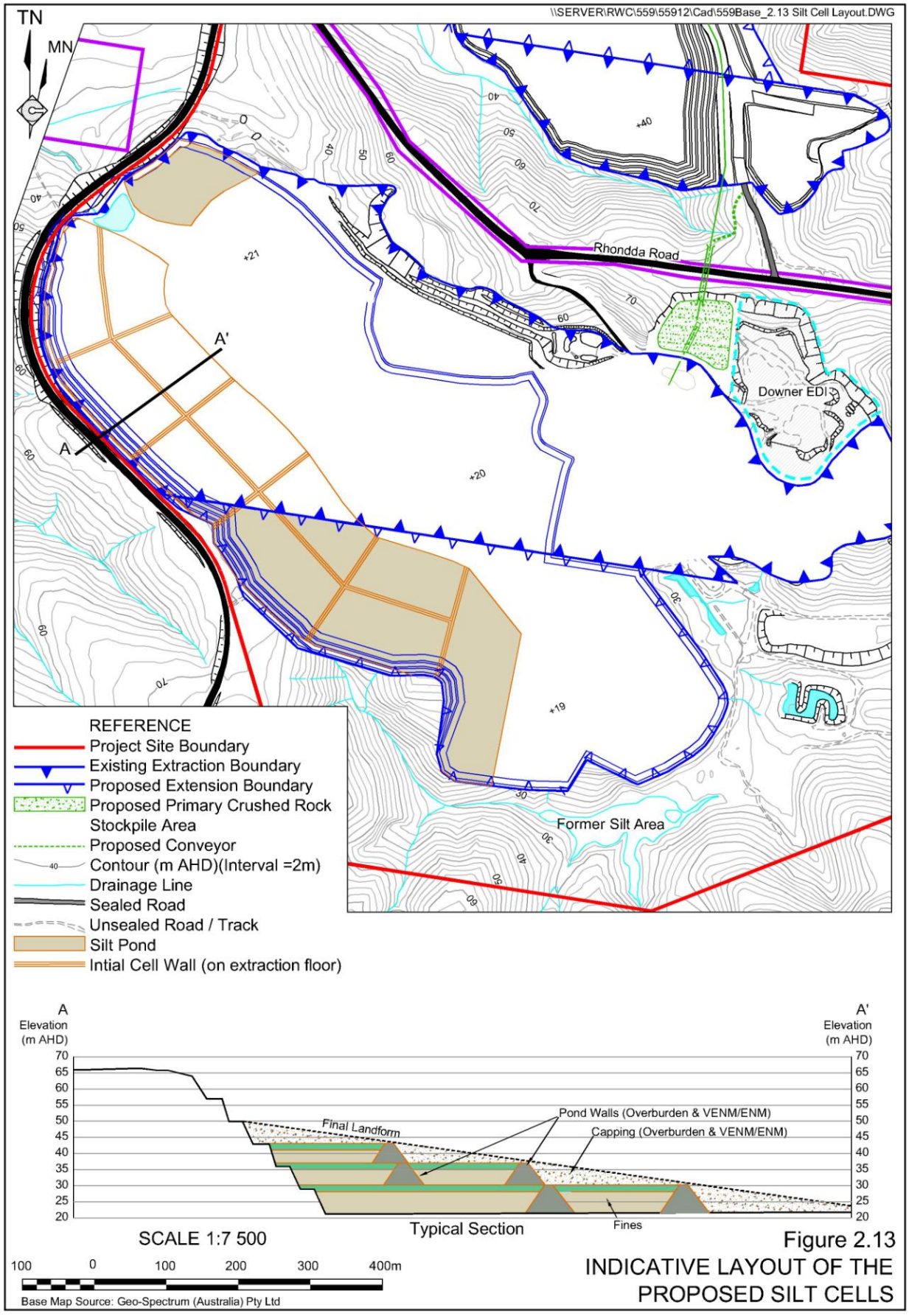


Figure 2.13
INDICATIVE LAYOUT OF THE PROPOSED SILT CELLS

- General Solid Waste: Metromix uses a 3m skip bin for the disposal of general rubbish. This bin is covered to minimise vermin attraction and is emptied on a weekly basis. Metromix also recycles all paper wastes with monthly collections by paper recyclers. Glass, aluminium and tins are also segregated and collected fortnightly for recycling.
- Scrap Metal: A small amount of scrap metal is produced at the quarry, primarily as a result of plant maintenance and part replacement. Scrap metal bins are removed on a regular basis by a licenced metal recycler.

2.9.4 Imported Waste

In addition to the wastes produced at the quarry, Metromix proposes to continue to accept up to 30 000tpa of concrete returns from pre-mixed concrete companies principally for recycling and incorporation into various products produced on site. This material is typically placed in the active extraction area in front of the next blast or added to the raw feed at the raw feed bin. Following the blast, it is extracted along with the conglomerate material and fed through the plant, ending up as product. It is proposed that this practice would continue in the existing Southern Extraction Area and the proposed Southern Extension. When extraction activities are underway north of Rhondda Road, the concrete returns would be delivered solely to the raw feed stockpile and incorporated with the raw feed with a front-end loader.

All VENM or ENM would be accepted on site only with the pre-requisite documentation. The materials would be placed preferably in the final landform or used to construct cell walls or cap the silt cells. The quantity of VENM or ENM accepted would vary, however, for planning purposes, it is envisaged the average receipts would be 50 000tpa with a maximum of 100 000tpa. The rate of acceptance of VENM/ENM would be dictated by Metromix as they would only bring VENM/ENM onto site with its trucks and trucks of approved contractors. This approach would enable Metromix to firstly ensure the VENM/ENM is originating from the approved source and secondly the Company can ensure traffic levels are staggered to satisfy both hourly and daily limits, particularly through Teralba. In most cases, the VENM/ENM would effectively be backloads following product deliveries.

2.10 PRODUCTION LEVELS

Production levels at Teralba Quarry have steadily risen over the last 5 years in response to an increase in market demand for products from the quarry. Annual production is currently marginally above 1 million tpa which includes overburden product sales.

Metromix proposes to maintain sales throughout the remaining life of the quarry between 700 000tpa and 1 million tpa. The higher level of sales is likely to occur in Sydney market areas, particularly following the cessation of gravel production at Penrith Lakes. For the life of the Project, Metromix anticipates the average annual production would be in the order of 900 000tpa.

A sales level of 1 million tpa of products given the losses due to overburden, oversize and processing plant fines removed from the quantity of material extracted would require the extraction/ removal of approximately 1.2 million tpa of conglomerate.

During a year of maximum production, i.e. 1 million tpa, an average sales day would result in approximately 3 800 tonnes leaving the quarry on weekdays and 1 200 tonnes on Saturdays. Given the variation in customer requirements, days of poor weather etc., the quantity of materials despatched would vary. On a busy day, when operating at maximum annual production, Metromix could despatch in the order of 5 500 tonnes of product.

2.11 EXTRACTION EQUIPMENT

The Teralba Quarry operations use both fixed and mobile plant. **Table 2.3** lists the mobile equipment fleet currently used at the existing quarry and proposed for use throughout the ongoing operations at the quarry. All plant and equipment would be periodically replaced with comparable items. Metromix would ensure that the noise level of the replacement equipment is comparable to or less than that being replaced.

Table 2.3
Mobile Equipment Fleet

Equipment	Use	Number of Items	Indicative Frequency of Use	Proposed Hours of Operation
Komatsu 405-B Water Truck	Dust suppression	1	18hrs/mth	6:00am – 10:00pm
Road Water Truck	Dust suppression	1	18hrs/mth	7:00am – 10:00pm
Cat 775B Dump Truck	Raw feed and overburden haulage	1	≈ 180 – 200hrs/mth	6:00am – 10:00pm
Komatsu 405-B Dump Truck	Product haulage	1	≈ 180 – 200hrs/mth	6:00am – 10:00pm
	Overburden haulage	1		
Road Truck	Raw feed transportation	3	≈ 180 – 200hrs/mth	7:00am – 6:00pm[+]
Hitachi 450 Excavator	Raw feed and overburden extraction	1	≈ 180 – 200hrs/mth	6:00am – 10:00pm[@] 7:00am – 8:00pm[Ω]
Hitachi 650 Excavator	Raw feed and overburden extraction	1	≈ 180 – 200hrs/mth	6:00am – 10:00pm 7:00am – 8:00pm[Ω]
Bobcat 763	Small earthworks	1	≈ 30hrs/mth	24 hours*
Komatsu WA500 Front-end Loader	Stockpile product loading	2	≈ 150hrs/mth each	6:00am – 10:00pm (x3) 10:00pm – 6:00am (x1)
Toyota Forklift	Supply Movement	1	As required	24 hours*
Gardner - Denver - 402C Drill Rig	Blast hole drilling	1	≈ 120hrs/mth	6:00am – 5:00pm[@] 7:00am – 5:00pm[Ω]
Fuel Truck (500L)	Refuelling other mobile plant	1	As required	6:00am – 10:00pm[@] 7:00am – 8:00pm[Ω]
Nissan work truck	General site maintenance	1	As required	6:00am – 10:00pm[@] 7:00am – 8:00pm[Ω]
Various quarry Light vehicles	General transport	Various	As Required	6:00am – 10:00pm[@] 7:00am – 8:00pm [Ω]
Truck and Dogs	Product transportation	7	At least 20hrs/day	24 hours[#]

* Standard hours for on-site activities would continue to be 6:00am to 10:00pm with additional hours reflecting use during maintenance periods.

[#] See Section 2.14 for distribution of operational hours for product transportation

[@] For operations south of Rhondda Road [Ω] For operations north of Rhondda Road

[+] Mid Pit Extraction Area Only

Source: Metromix 2011

2.12 PRODUCT TRANSPORTATION

2.12.1 Transport Routes

Metromix proposes that the ongoing distribution of products from Teralba Quarry would be undertaken in a manner comparable to the existing product distribution discussed in Section 1.4.4.5. All products would be transported via the existing product distribution route corridors (see **Figure 2.14**). In order to more accurately define the product transport routes, Halcrow (2011) nominates seven individual transport routes and refers to outgoing routes as Routes 1 to 7 and incoming or return routes as Routes 11 to 17, i.e. corresponding to the outgoing routes. The four route corridors and the respective transport routes are as follows.

- Northwestern corridor – Product trucks exit the quarry at the top gate onto Rhondda Road, travel westwards and then turn northwards along Wakefield Road to travel towards Barnsley.
  - Routes 1/11 to and from West Wallsend via George Booth Drive.
  - Routes 2/12 to and from Edgeworth via George Booth Drive
- Southwestern corridor – Product trucks exit the quarry at the top gate onto Rhondda Road, travel westwards and then turn southwards along Wakefield Road to travel towards the F3 freeway.
  - Route 6/16 to and from the F3 Freeway via Wakefield Road.
- Northeastern corridor – Product trucks exit the quarry at the bottom gate and enters the public road network at the southern end of Railway Street. The route travel through Teralba and northward along Five Islands Road where after it turns east along The Esplanade or continues northwards.
  - Routes 4/14 to and from Glendale via Five Islands Road/Lake Road.
  - Routes 7/17 to and from Speers Point via The Esplanade.
- Southeastern corridor – Product trucks exit the quarry at the bottom gate and enter the public road network at the southern end of Railway Street. The route travels through Teralba and then turns southwards along Toronto Road towards Toronto.
  - Routes 3/13 to and from Teralba via York Street.
  - Routes 5/15 to and from Fennel Bay via Toronto Road.

The typical distribution pattern of traffic along each of these product distribution corridors was determined through traffic counts at the locations identified on **Figure 2.14** (see also Section 2.12.3).

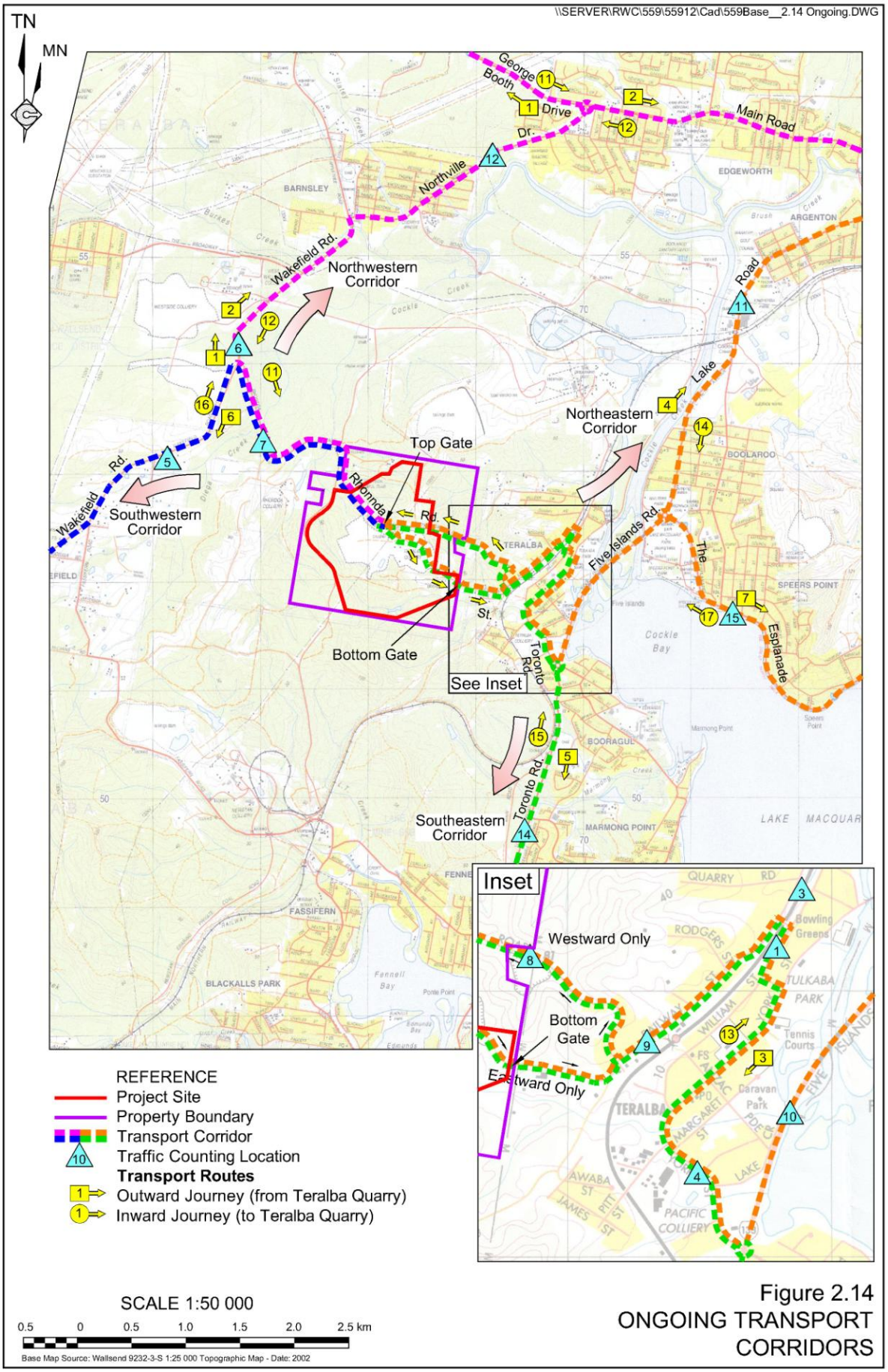


Figure 2.14
ONGOING TRANSPORT CORRIDORS

2.12.2 Heavy Vehicle Types

The trucks used to distribute the bulk of the products from Teralba Quarry are referred to as a "truck and dog", a configuration involving a rigid six or eight wheeled truck with a six wheeled trailer. This configuration enables up to 33 tonnes of product to be despatched in each truck. Metromix's records indicated approximately 60% of its products are despatched by truck and dog.

The remaining products are despatched by a range of vehicles. **Table 2.4** lists the vehicle types used for product despatch.

Table 2.4
Transport Trucks Accessing Teralba Quarry

Truck Type	Payload (t)	Gross Weight (t)
Truck and dog	33	48
Semi-trailer or truck & dog	27	42.5
8 Wheelers	15	27
6 Wheelers	13	23
Small Rigids	1+	1+
Source: Metromix 2011		

Overall, the average product payload despatched from Teralba Quarry is approximately 30t.

2.12.3 Product Distribution and Traffic Levels

Metromix despatches its products from Teralba Quarry to customers for a wide range of purposes. Hence, the routes used reflect the destination of the customer or the project (e.g. road re-construction) and the traffic levels reflect the quantity of the products required by the customer for their project. Consequently, traffic levels constantly vary on daily and hourly basis although patterns are evident.

In order to assess the impacts of quarry-related traffic impacts on the surrounding road network, reliance is placed upon a statistical approach to describe truck movements on a busy day or during a busy hour as well as an average day or hour. Traffic levels on a busy day or during a busy hour typically occur when the traffic level reaches a level approximating the 85th percentile level.

It is proposed that products from Teralba Quarry are distributed at current levels, i.e. as listed in **Table 2.5**.

Table 2.5
Existing Metromix Heavy Vehicle Movements$^{@}$

Page 1 of 2

	Type of Sales Day	700 000tpa			1 million tpa		
		Eastward*	Westward	Total	Eastward*	Westward	Total
Average Daily Movements	Average and Likely	81	107	188	81	222	303
85th Percentile Daily Movements	A busy day which occurs once or twice per month	127$^{\#}$	156	283	127$^{\#}$	325	452

Table 2.5 (Cont'd)
Existing Metromix Heavy Vehicle Movements[@]

	Type of Sales Day	700 000tpa			1 million tpa		
		Eastward*	Westward	Total	Eastward*	Westward	Total
Average Peak Hour Movements	Average Likely	10	13	23	10	26	37
85th Percentile Peak Hour Movements	A busy hour which occurs at least weekly	15	17	32	15	35	50

[@] Based on annual production of 700 000tpa and traffic distribution recorded in July 2008. * Through Teralba

An 85th percentile level of 127 trucks per day is comparable to a maximum level of 170 trucks per day, albeit on only one or two days per year.

Source: Modified after Halcrow (2011) – Table 3.2 and 3.3.

Table 2.5 presents the relative distribution of heavy vehicle traffic travelling to the east and west and from Teralba Quarry and **Figure 2.15** displays a typical distribution pattern on the surrounding road network. The actual number of truck movements per day at any one section of the road network would reflect the sales and delivery location on the particular day.

Typical truck movements on a daily basis are presented in **Table 2.6** irrespective of the annual tonnage despatched. The truck movements listed in **Table 2.6** reflect the range of movements that could occur on any day, particularly if it is a busy day.

Table 2.6
Ongoing Daily Traffic Distribution

Proposed Traffic Movements	
Daily Routine	**Truck Loads**
4:00am – 6:00am	Up to 12 pre-loaded trucks leave site [*1] [*2]
6:00am – 7:00am	Up to 28 trucks loaded and dispatched (56 truck movements)
7:00am – 6:00pm	Up to 20 trucks loaded and dispatched per hour (40 truck movements)
6:00pm – 10:00pm	Up to 6 trucks loaded per hour [*1] (12 truck movements)
10:00pm – midnight	Trucks returning and loading of empty trucks
Midnight – 4:00am	Occasional trucks (gates may be closed) and loading of empty trucks [*1] [*2]

[*1] Only Metromix owned trucks [*2] Not through Teralba

Source: Metromix 2011

2.13 INFRASTRUCTURE AND SERVICES

2.13.1 On-site Road Network

Existing haul roads within the Teralba Quarry would be extended into the proposed Southern Extension to allow transportation of raw material to the processing plant. Internal haul roads would be developed in the proposed Northern Extension to transport raw material to the feed hopper for the conveyor system.

Transportation of products would continue to be via the road from Rhondda Road entrance gate (top gate) and through Teralba Engineering property (bottom gate).

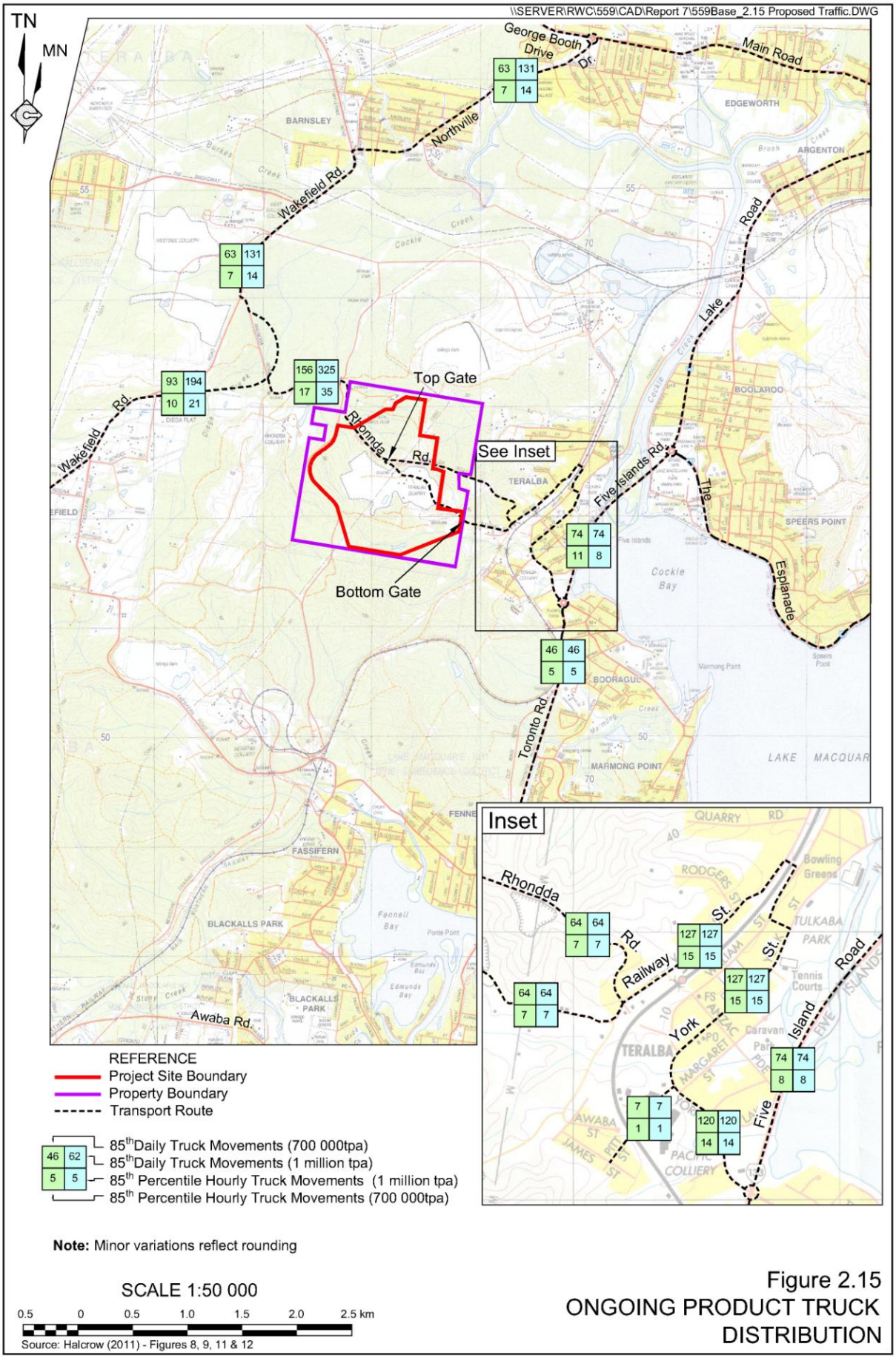


Figure 2.15
ONGOING PRODUCT TRUCK DISTRIBUTION

A wheel wash is currently being constructed near the new site office (the "eastern wheel wash") for trucks departing via the bottom gate. A second wheel wash would be constructed on the exit lane (the "western wheel wash") for trucks departing via the top gate.

A new road with a suitable intersection with Rhondda Road has been constructed to provide access to the extraction areas north of Rhondda Road. This road has also been constructed with a wheel wash.

2.13.2 Buildings and Structures

The principal existing buildings on site are the existing office and maintenance workshop.

- Office and weighbridge.

  The existing weighbridge and office is to be replaced. It is proposed to ultimately construct two new weighbridges, one at each of the entrances to the eastern and western stockpile areas (**Figure 2.16**).

  The proposed office would be located approximately 350m east of the existing office and would be approximately 400m^2 and incorporate offices, amenities and a training room. The building would be a portable building. Details of the building would be incorporated in Metromix's application to Lake Macquarie City Council for a construction certificate. Metromix anticipates relocating the existing office within 3 years of receipt of a project approval for the extensions to the quarry.

  The new office would incorporate an adjoining light vehicle car park for employees and visitors as it is intended that all light vehicles would enter Teralba Quarry from Railway Street and do not proceed beyond the car park.

- Maintenance workshop.

  Maintenance would continue within the existing workshop immediately adjacent to the existing office.

It is proposed that the conveyor to be used to transport the primary-crushed rock from the northern side of Rhondda Road to the fixed processing plant would be constructed on a series of supports within the existing Mid Pit Extraction Area extending to a clearing on the natural land surface between the existing Mid Pit Extraction Area and Rhondda Road. The conveyor would be positioned within a 4m x 3.5m culvert positioned approximately 1m below the surface of Rhondda Road and would enter above the proposed primary-crushed rock stockpile and finish on a central support in that area (see **Figure 2.10**).

The culvert beneath Rhondda Road would be constructed prior to the commencement of extraction operations within the Northern Extension, i.e. after the first stage of extraction operations in the Southern Extension (see Section 2.6.6). The method of construction would be detailed in Metromix's application to Lake Macquarie City Council for a Section 138 Permit under the *Roads Act 1993*. In brief, construction would involve the temporary deviation of Rhondda Road whilst the culvert is installed to allow through traffic to travel safely through the construction site.

The existing smaller structures and buildings on site would be retained throughout the remaining life of the Teralba Quarry.

2.13.3 Water

Metromix sources the water requirements for the existing quarry from two sources, namely:

i) a potable water line to the office (buried) from reticulated town supply; and

ii) the Mine Adit Dam approximately 600m east-southeast of the existing office at an adit of the former workings in the Great Northern Coal Seam (see **Figure 2.16**).

The existing operation currently uses approximately 2ML of reticulated town water annually for ablutions, potable water etc.

Approximately 98L/s of processing water is pumped from the existing Mine Adit Dam (the Mine Adit Dam) (**Figure 2.16**). Water for the wet processing circuits within the processing plant and dust suppression is sourced from Dam G.

The site water balance displayed in Section 5.3 indicates the water recovered from the silt cell(s) and the Mine Adit Dam would be sufficient for on-site requirements.

2.13.4 Power

Two sets of power transmission lines traverse the Project Site.

- 33kV transmission line. This transmission line traverses the Metromix Project Site but is not used by Metromix.

  Figure 2.17 displays the existing network of power transmission lines that traverse the Project Site and the proposed alignment of the 33kV transmission line to the west of the extraction areas both north and south of Rhondda Road. As extraction approaches 10m of any of the power poles within the proposed Southern Extension the existing 33kV power transmission line would be re-aligned. The 15m wide corridor (with up to 13m of vegetation clearance) for the re-aligned power lines has been identified in conjunction with Energy Australia and has been the subject of ecological and Aboriginal heritage surveys, both with the leased property and the land immediately to the north.

- 11kV transmission line. This transmission line connects to a small on-site substation and supplies Downer EDI and the Metromix offices, water supply pump and the processing plant.

  Minor transmission line relocations would be required to supply power to the new office, pug mill (if required) and sand dewatering plant. Where necessary, and for safety purposes, some of new 11kV and related lines would be placed underground.

\\SERVER\RWC\559\55912\Cad\559Base_2.16 Infrastructure.DWG

TN
MN

REFERENCE
- Property Boundary
- Project Site Boundary
- Existing Extraction Boundary
- Proposed Extension Boundary
- Proposed Primary Crushed Rock Stockpile Area
- Proposed Conveyor
- 40 Contour (m AHD)(Interval =2m)
- Drainage Line
- Sealed Road
- Unsealed Road / Track
- Proposed New Infrastructure.
- Product Stockpile Area
- Existing 11kV Power Line to Remain
- Existing 11kV Power Line to be Removed
- Proposed 11kV Power Line to be Constructed
- Existing 33kV Power Line to be Removed
- Proposed 33kV Power Line to be Constructed
- Proposed Component

Dewatering Plant
Western Stockpile Area
Sand and Aggregates
Top Gate (locked when Required)
Conveyor
Culvert under Road
Service Track
Site Access Road
Rhondda Road
Primary Crushed Rock Stockpile (from North of Rhondda Road)
Underground Conveyor and Tunnel
Western Wheel Wash
Surge Stockpile
Primary Crusher
Crushing Plant
Weighbridge
Workshop
Office
Asphalt Plant
Sub Station (Energy Aust.)
Weighbridge
Office
Workshops
Eastern Stockpile Area
Roadbase Products
Pug Mill
Dam H - Sediment Basin
Diesel Tanks
Storage Sheds
Dam G - Water Storage Dam
Dam E - Sediment Basin
Dam F - Sediment Basin
Eastern Wheel Wash
New Office
New Carpark
Bottom Gate (Locked when Required)
Dam C - Sediment Basin
Dam B - Sediment Basin
Dam D - Runoff Retention Basin
Mine Adit Dam
Adit

SCALE 1:4 000

50 0 50 100 150 200 m

Base Map Source: Geo-Spectrum (Australia) Pty Ltd

Note: Wherever practicable, the 11kV transmission lines would be installed on the same pole

Figure 2.16
INFRASTRUCTURE AND SERVICES

This page has intentionally been left blank

This page has intentionally been left blank

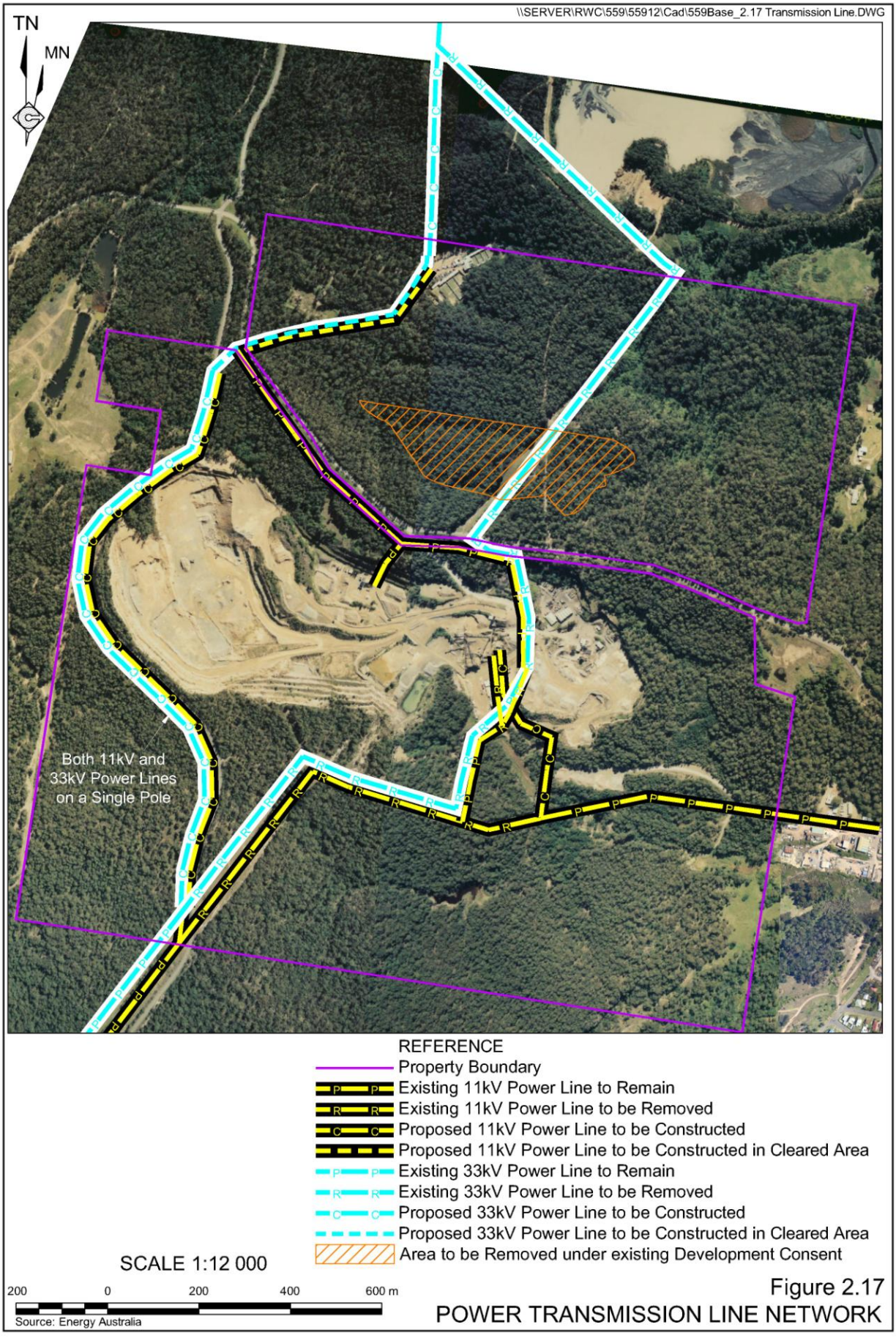


Figure 2.17
POWER TRANSMISSION LINE NETWORK

The Teralba Quarry currently uses the following electricity (approximately):

- 260 000kWh per annum for the processing water supply pump;
- 1 300 000kWh per annum for the processing plant and other activities. The re-locatable crusher would be electrically powered using approximately 230kW per hour.

2.13.5 Communications

Telstra maintains five phone lines to the office (buried).

The number of lines would remain unchanged for the continuation of the quarry life. The lines would ultimately be relocated to the new office. Upgrades to the Telecom system at the quarry would be undertaken as technology develops.

2.13.6 Hydrocarbon Storage

The existing fuel bay, incorporating one 15 800L and one 27 400L diesel fuel tank, would be retained.

Approximately twenty 205L oil drums (full and used) would continue to be stored in bunded building and fuel bay adjacent to the truck parking area.

2.14 HOURS OF OPERATION

The proposed hours of operation are presented in **Table 2.7**. These hours are essentially the same as those already worked at the quarry. Metromix has always been customer-focused and committed to providing the required quality and quantity of raw materials to customers on demand. This has been possible with very little impact on the surrounding neighbourhood given the quarry's excellent location.

Table 2.7
Proposed Hours of Operation

	Extraction and Processing Operations South of Rhondda Road	Extraction and Processing Operations North of Rhondda Road	Product Sales^	Maintenance
Monday to Friday	6:00am – 8:00pm#	7:00am – 8:00pm	24 hours	24 hours@
Saturday	6:00am – 2:00pm	7:00am – 2:00pm	24 hours	24 hours@
Sunday	Occasional *	Occasional	Occasional *	24 hours@

* Occasional Sundays are worked, primarily in response to demand from specific infrastructure projects.
\# Occasionally, the quarry operates until 8:00pm in response to high demand.
@ The work undertaken of an evening/night is generally inaudible at the nearest residence.
^ See **Table 2.3** for further detail.

Source: Metromix 2011

The extension of operational hours occurs infrequently and only in response to high demand and/or local/regional infrastructure projects. The quarry does not operate on public holidays. As noted in **Table 2.7,** Metromix does not intend to commence any activities on the northern side of Rhondda Road prior to 7:00am.

The typical distribution pattern of truck movements throughout each 24 hour period has previously been outlined in **Table 2.6**. The truck movements on any one day directly reflect the extent and location of sales from the quarry.

2.15 EMPLOYMENT

Employment at the Teralba Quarry, is presented in **Table 2.8**. Distinction is made between the number of employees when annual production levels are either 700 000tpa or 1 million tpa.

Table 2.8
Teralba Quarry Employment

Position	Number of Employees	
	700 000 tpa	**1 million tpa**
Quarry Manager	1	1
Office Personnel	4	5
Quarry Workers*	12	14
Full Time Contractors	2	2
Company Road truck drivers	7	12
Total	**26**	**34**
* Extraction Area and Processing Plant		

In addition to Metromix's existing and proposed employee numbers presented in **Table 2.8**, at any one time there would be approximately 25 contractors employed indirectly at Teralba Quarry for activities relating to drilling and blasting, and equipment maintenance. Based upon the experience to date, this would amount to an additional 6 full-time equivalent employees. A further 20 truck drivers would be employed by other companies for product deliveries.

In total approximately 60 persons would be employed throughout the ongoing life of the Teralba Quarry. The extended life of the quarry would result in ongoing employment for local persons for up to 30 years.

2.16 REHABILITATION

2.16.1 Introduction

Rehabilitation of the Project Site is a progressive activity that requires Metromix to undertake a planned program of final landform construction and revegetation focused upon achieving an acceptable final land use. The final rehabilitation activity would involve site decommissioning and the completion of landform construction and revegetation. This sub-section reviews Metromix's plans for each of these activities.

2.16.2 Final Land Use

The final land use of the Project Site would reflect the intended industrial and environmental zonings (see Section 3.3.4). The area zoned for industrial use, which encompasses the Civilake operations, would be levelled and leased or sold for industrial purposes. It is feasible that the asphalt plant currently operated by Downer EDI would remain operational after Teralba Quarry closes and be incorporated into an industrial area to be developed within the former quarry. The remainder of the area south of Rhondda Road not zoned for industrial uses would be rehabilitated to native vegetation for nature conservation. The final boundary of the industrial area south of Rhondda Road would reflect the final landform following the cessation of all activities (**Figures 2.18**).

The proposed final land use of the area north of Rhondda Road has not been finalised, however, Metromix envisages the site would become as excellent location for the existing Newtech Pistol Club to relocate to. The actual final slopes in sections of the final landform could be excavated/left to achieve the optimum landform for its ongoing use as a pistol range.

2.16.3 Final Landforms

Past and present Metromix management have made considerable effort in progressive rehabilitation on site to ensure that the area of disturbance is minimised and a high level of species diversity is achieved in those areas returned to native bushland. Metromix has displayed a high degree of commitment, particularly to monitor the effectiveness of the rehabilitation within the Project Site since 1995 (see **Plates 1.5** and **1.6**).

South of Rhondda Road

The eastern section of the Southern Extraction Area, currently zoned 4(1) Industrial (Core) would be completed with at least two final level areas. Drainage lines would be installed and the area compacted to a suitable stable state for use as constructions pads for future industrial purposes, similar to the land use by Civilake and Downer EDI.

Figure 2.18 displays the proposed final landform south of Rhondda Road.

The final landform in the western and southern side of the Southern Extraction Area would comprise a relatively flat central floor with a slight slope to the southeast, generally following the coal seam dip. The southern edges of the final landform would have silt/overburden built up against the terminal faces in the manner described in Section 2.9.2 and displayed in **Figure 2.13**. The final slope would typically be between 1:4 and 1:6 (V:H) with a runoff collection drain across the slope positioned to allow all collected runoff to flow at non-erosive velocities to the dam on the western side of the completed extraction area.

Virgin Excavated Natural Material (VENM) and Excavated Natural Material (ENM) would be regularly imported and placed against the quarry walls to reduce the grade and to achieve a better final landform. A layer of topsoil would be placed on the final slopes and then stabilised by seeding with quick cover crops such as sterile exotic grasses or direct-seeded native plants.

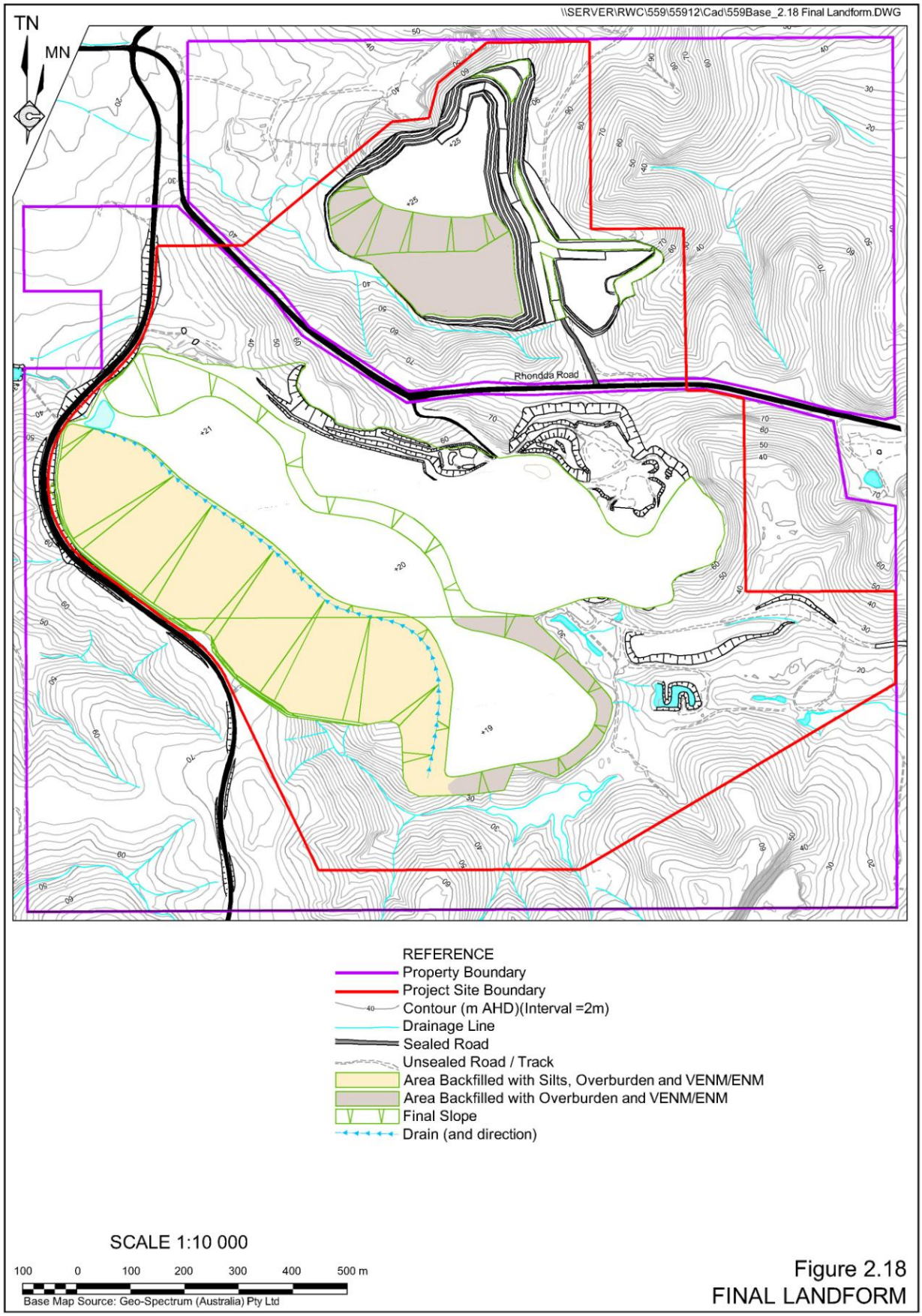


Figure 2.18
FINAL LANDFORM

North of Rhondda Road

Figure 2.19 displays the proposed final landform north of Rhondda Road. It is proposed that this area would be left with a landform with a series of stepped 8m x 8m benches. The stepped benches, floor and lower slopes within the extraction area would all be covered with overburden and any recovered topsoil to provide a substrate for the long term vegetation on the site. Overburden would be progressively placed within the southern side of the completed extraction areas and would be shaped with a relatively flat area with profiled side slopes of between 1:3(V:H) and 1:5(V:H).

2.16.4 Revegetation

The eastern section of the Southern Extraction Area currently zoned 4(1) Industrial (Core) would not be revegetated immediately following land profiling, although the battered slopes between the various operational areas would be vegetated. It is envisaged that the land would be progressively developed for a range of industrial uses which would effectively achieve the stabilisation required.

Final revegetation of the Project Site, with the exception of the industrial area, would be conducted using similar methods to those already used by Metromix (see Section 1.4.7). Emphasis would be placed on the long term re-establishment of wildlife corridors around the area planned for the industrial land and the improvement of any native vegetation fragmentation.

Where possible, topsoil and subsoil would continue to be directly transferred during soil stripping campaigns onto available rehabilitation areas to maximise the use of the resident seed bank. Where this is not possible, the topsoil and subsoil would continue to be stockpiled separately, away from active extraction operations. Cleared vegetation and plant biomass would also continue to be transferred directly from areas being cleared to rehabilitation areas where possible. Particular emphasis would be placed upon the direct transfer of biomass in the vicinity of the *Tetratheca juncea* plants to be removed to enable the plants to regenerate in rehabilitation areas (as they have in the past on the eastern side of the Project Site – see Section 1.4.7 and **Plate 1.6**).

The rehabilitation already conducted on the Project Site indicates that this transfer of material accompanied by bush regeneration has been relatively successful in the re-establishment of an open forest vegetation community with respect to both species present and general vegetation structure (see **Figure 5.10**).

The success of the current rehabilitation program is attributable to the following factors.

- On-going weed removal which reduces competition, hence aiding germination and establishment of the native species.
- The transfer of biomass including large logs, branches and fine twigs which provide shade for the emerging seedlings.
- The transfer and placement of topsoil and biomass which provides food and habitat for the active soil flora and fauna, leading to increased nutrient availability for the native vegetation, as well as plant seed and other propagules.

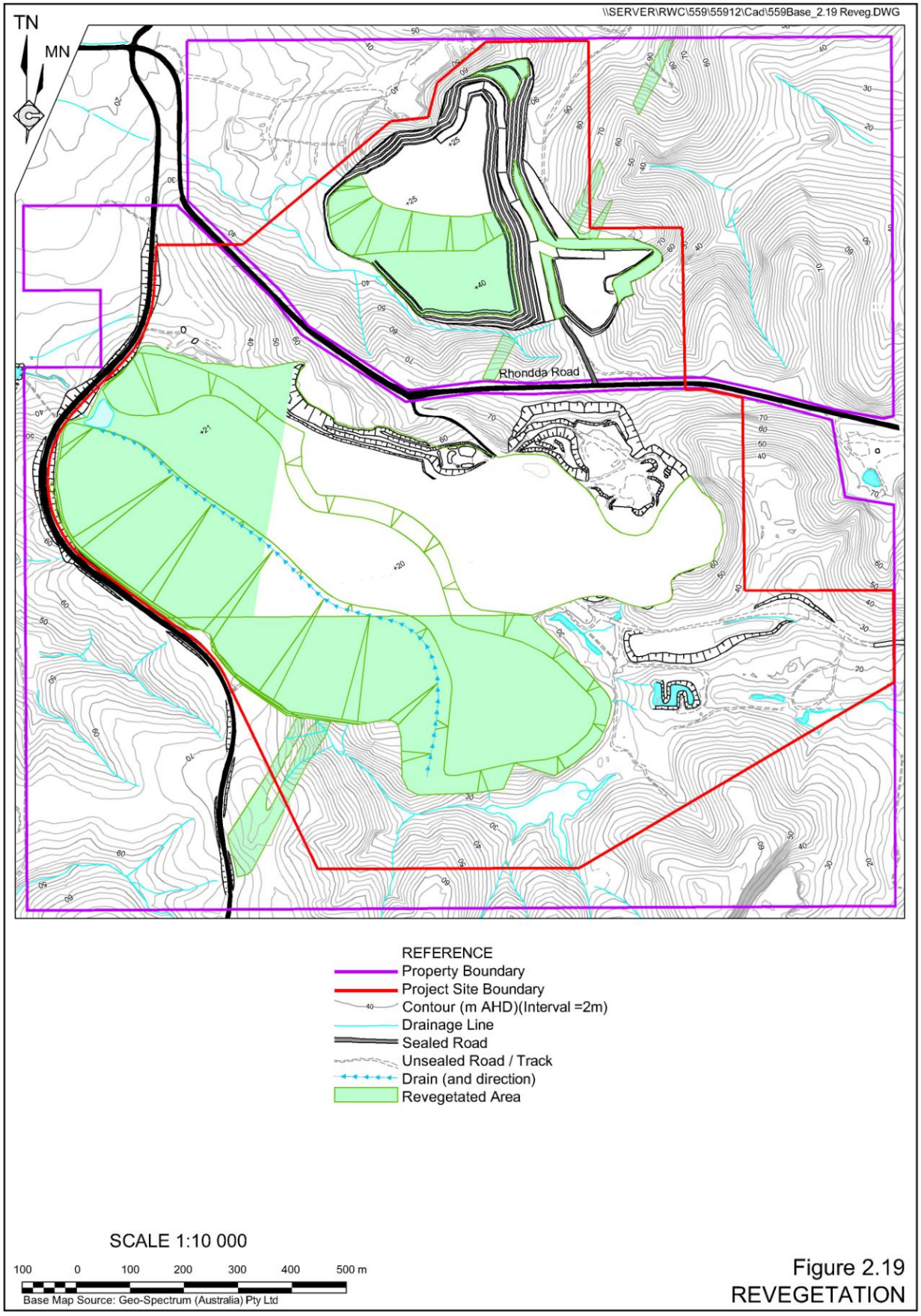


Figure 2.19
REVEGETATION

- The depth of subsoil provides the natural medium for native plant roots.
- The climatic conditions, with an average rainfall of about 1 000mm and mild temperature throughout the year, is conducive to the growth of the regenerating and plant vegetation.

Rehabilitation of the Project Site would be conducted on all terminal benches, disturbed areas and the final quarry floor in the area designated for nature conservation. **Figure 2.19** displays the revegetation across the entire Project Site.

Metromix proposes to revegetate the final slopes above the completed silt cells and other backfilled sections of the extraction areas through a combination of natural regeneration and selective direct seeding. Seed collected from the principal tree and shrub species on site would be used in direct seeding programs.

The final benches retained around the perimeter of the Northern Extension and Mid Pit Extraction Area would be revegetated following the placement of an average of 1m of subsoil/overburden and limited topsoil on each bench. The placement of subsoil and topsoil would be undertaken prior to the final bench area being isolated as the extraction face approaches the terminal extraction face.

The overburden used to create the final landform (see Section 2.16.3) would be shaped with an uneven surface to assist in retaining surface water/rainfall. The tree and shrub species on the final benches would be established mainly through direct seeding.

The presence of *Tetratheca juncea* on the Project Site and in the regional area provides Metromix with the opportunity to trial propagation of the species. The re-creation of an Open Forest ecosystem (with species diversity equivalent to the existing vegetation communities of the Project Site) in the existing and future rehabilitation areas would provide suitable habitat for the relocated plants.

- Cuttings would be collected from the *Tetratheca juncea* within the proposed Southern Extension. The cuttings would be taken by experienced bush regenerators in accordance with the appropriate permits and grown into tubestock.
- The tubestock grown from the cuttings collected would be planted in the existing rehabilitation areas in the Existing Southern Quarry and, progressively, in the proposed rehabilitation areas of the proposed Southern and Northern Extensions.
- The 45 individuals of *Tetratheca juncea* that would be removed from the proposed Southern Extension would be translocated in the existing rehabilitation areas within the eastern side of the Project Site. This translocation would be undertaken by experienced bush regenerators. Translocation methods would follow the Australian Network for Plant Conservation Guidelines (ANPC: 1993) and the success of the translocation would be monitored and documented as part of the regular rehabilitation flora assessments.

Rehabilitation within the Project Site would continue to be regularly assessed by suitably trained and/or experienced botanists and the methods adapted to reflect the results of these assessments.

2.16.5 Site Decommissioning

Following the completion of all production activities, Metromix would commence a program to decommission the site, i.e. removing all items of plant and equipment (and buildings) not required for a subsequent land use.

The processing plant would be dismantled and useful components sold for re-use whilst all remaining steel would be removed for recycling. All pumps and pipelines not required would be removed and the ground level contoured. All mobile equipment would be progressively removed from site as it is no longer required.

It is proposed to retain all surface water dams that Metromix has been responsible for given they are likely to be of use for the subsequent land use. All power infrastructure would also be retained given the planned long term industrial nature of section of the Project Site.

Following the removal of all equipment and unwanted materials, all concrete foundations would be broken up and removed from site for recycling. Any areas that display an accumulation of hydrocarbons would be remediated and all final surfaces would be shaped and revegetated.

2.17 BIODIVERSITY OFFSET STRATEGY

Metromix proposes to adopt a biodiversity offset strategy that focuses on the provision of an offset of like-for-like vegetation within the property and the progressive rehabilitation of areas no longer required for quarry-related activities.

Metromix proposes to remove a total of 25.9ha of forest/woodland vegetation and in turn set aside through a covenant on the land title an area of 118ha of the same Spotted Gum – White Mahogany – Grey Ironbark Open Forest and woodland community that is to be removed as a result of the clearing of the Southern and Northern Extension. This area represents a ratio of 4.6:1 for the area of vegetation within the biodiversity offset compared with the proposed area of forest/woodland vegetation to be removed.

The area of land to be set aside as an offset is displayed on **Figure 2.20**. The proposed value of this offset is presented in Section 5.4.6.1.

2.18 CONSIDERATION OF ALTERNATIVES

2.18.1 Introduction

The Director-General's Requirements nominate that this document address the alternatives considered by Metromix during the design of the Project. At the outset, it is recognised that because the Project involves the extension of existing extraction areas and the ongoing operation of the existing operations, particularly processing, that there are a range of activities/operations on site for which no alternative needs to be considered. Specifically, the need to consider potential alternatives for the proposed quarry extensions has not been necessary given the process to design project components that has achieved an optimum outcome for both the Southern and Northern Extensions.

The key alternatives that are considered relate to alternative sources of products (for customers) and transport routes.

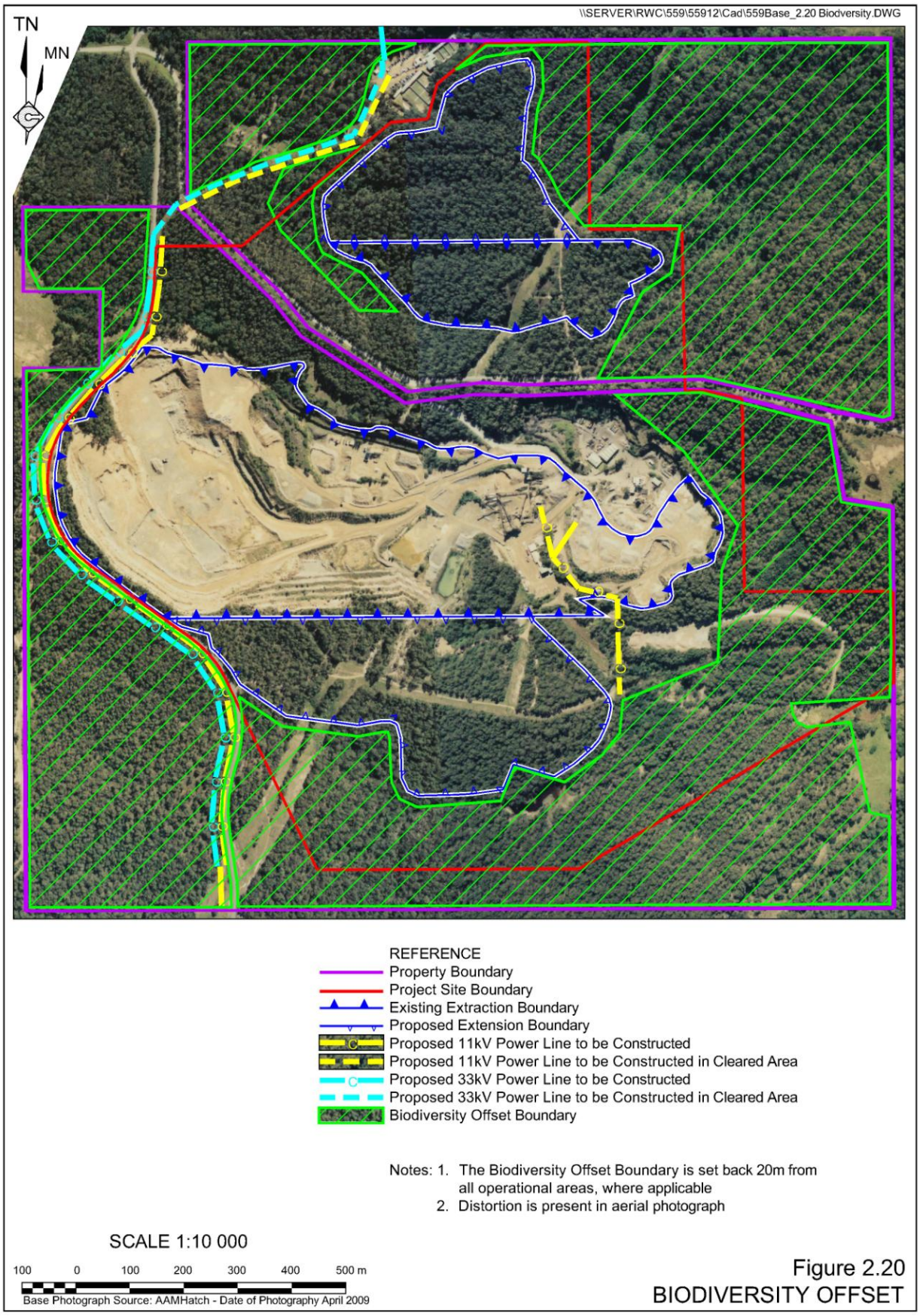


Figure 2.20
BIODIVERSITY OFFSET

2.18.2 Alternative Product Sources

Table 2.9 is the Newcastle/Lower Hunter/Central Coast area that could potentially supply products similar to those generated by Metromix at Teralba Quarry.

Table 2.9
Alternative Sources of Quarry Products

Quarry Name	Location	Operator	Approximate Distance to LMCC	Approved Max Production
ROADBASE PRODUCTS				
Brandy Hill Quarry	Seaham	Hanson	47km	500kt
Buttai Gravel	Buttai	Daracon	30km	NK
Hunter Quarry	Karuah	Hunter	60km	500kt
Martins Creek Quarry	Martins Creek	Daracon	60km	500kt
Seaham Quarry	Seaham	Boral	47km	NK
Stockrington Quarry	Stockrington	Daracon	23km	NK
CONCRETE AGGREGATES (Fine and Coarse)				
Brandy Hill Quarry	Seaham	Hanson	47km	500kt
Hunter Quarry	Karuah	Hunter	60km	500kt
Martins Creek Quarry	Martins Creek	Railcorp	60km	500kt
Seaham Quarry	Seaham	Boral	47km	NK
OTHER AGGREGATES				
Brandy Hill Quarry	Seaham	Hanson	47km	500kt
Hunter Quarry	Karuah	Hunter	60km	500kt
Martins Creek Quarry	Martins Creek	Daracon	60km	500kt
Seaham Quarry	Seaham	Boral	47km	NK
OTHER SANDS				
Rosebrook Sands & Soil	Maitland Vale	Colin Jackson	60km	NK
FILLING MATERIALS				
Brandy Hill Quarry	Seaham	Hanson	47km	500kt
Buttai Gravel	Buttai	Daracon	30km	NK
Black Hill Quarry	Black Hill	Woodbury's	28km	NK
Hunter Quarry	Karuah	Hunter	60km	500kt
Martins Creek Quarry	Martins Creek	Daracon	60km	500kt
Seaham Quarry	Seaham	Boral	47km	NK
Stockrington Quarry	Stockrington	Daracon	23km	NK
NK = Not Known				
Source: Metromix 2011				

Whilst the alternative sources of quarry products nominated in **Table 2.9** exist within the market place, the key advantages for the ongoing operation of the Teralba Quarry are as follows.

1. Teralba Quarry is considerably closer to all construction sites throughout Lake Macquarie LGA than other sources, thereby providing to home owners, businesses and ratepayers the opportunity to obtain high quality products without incurring the costs of the additional transport distance from the alternative sources.
2. Teralba Quarry is well located from an environmental perspective and its ongoing operation would occur without any noticeable change to the environmental impacts within the surrounding community.
3. Metromix operates Teralba Quarry with a skilled workforce experienced in producing the high quality products available from the quarry. It would be an advantage to retain the current workforce providing ongoing employment in the Teralba area.

2.18.3 Alternative Transport Routes

Throughout the community consultation component for the Project undertaken during the preparation of the *Environmental Assessment*, some residents questioned Metromix on its consideration of alternative routes.

Eastwards through Teralba

Metromix, residents and Lake Macquarie City Council all recognise there needs to be ongoing distribution of quarry products to the east of Teralba Quarry and that the only route is via Teralba. Lake Macquarie City Council itself also uses the road network through Teralba for the delivery of its products from its pugmill within Teralba Quarry operated by Civilake. The key issue for which alternatives have been considered related to the number of trucks travelling through Teralba and at what time.

Metromix has received broad support for its decision not to direct product trucks through Teralba between 6:00pm and 6:00am, a practice that would continue. From the perspective of the number of truck movements through Teralba, three alternatives exist, namely:

i) a reduction in total truck traffic levels equivalent to the annual production rate of 700 000tpa;

ii) retention or capping of truck traffic levels through Teralba equivalent to the annual production rate of 700 000tpa; or

iii) an increase in traffic levels to reflect the higher sales level of 1 million tpa.

Metromix has selected option (ii) given the level of traffic both on an hourly/daily basis is known to local residents and is currently not causing a high level of concern in the community. The critical issue relating to trucks travelling through Teralba has not been the number of trucks but the manner in which they were being driven e.g. speeding. Hence, the Code of Conduct for drivers will be introduced to assist in improving driver behaviour.

Southwards towards F3

Wakefield residents have questioned why Metromix does not use the existing private coal haul road that traverses the property leased by Metromix and provides access southwards across Awaba Road and onto Eraring Power Station. **Figure 2.21** displays the alignment of the current transport route through Wakefield and to the F3 and the alternate route via the private coal haul road and Awaba Road.

On/off ramps would be required to be constructed at the existing overpass above Awaba Road to provide a safe entry onto/existing from the coal haul road. Some road works would be required at the northern end of the road at the agreed location for trucks entering the private coal haul road either from Rhondda Road or directly from Teralba Quarry.

Metromix has discussed the possible use of the private coal haul road with the two companies who own/control the section of road considered as an alternative route (Oceanic Coal and Eraring Energy) and established neither Company is supportive of Metromix's use of the route.

Whilst both companies have identified the need for a new on/off ramp at Awaba Road and a new intersection at Teralba Quarry, the key issue relates to security. The existing road provides access to Eraring Power Station and the Newstan Coal Mine and its rail siding. The introduction of ramps (with gates) onto Awaba Road and the substantial periods when gates would be open (typically 4:00am to 10:00pm) would provide a level of public access that neither company supports.

It remains paramount to both Companies that public access to the private haul road is denied for issues of security and safety. The two Companies (and Centennial Coal) do not wish to increase their level of security nor create a reduced level of safety arising from interaction between coal trucks and trains entering the Fassifern train loop which traverse the private coal haul road.

Metromix has also investigated the number and proximity of residences set back from the Wakefield Road and Awaba Road and established the following.

- Both roads have residences set back approximately 15m from the road edge.
- Nine residences are located within 50m of Wakefield Road, compared with five residences within 50m of Awaba Road.
- A further six residences are located between 50m and 100m from Wakefield Road compared to 13 residences set back a similar distance from Awaba Road.

Overall, a total of 22 residences are located within 200m of Wakefield Road and 30 residences are located within 200m of Awaba Road between the private coal haul road and the F3.

Based on this information, Metromix has established that even if access to the private coal haul road is available, there would be few advantages in terms of noise impact as a similar, and in fact higher, number of residences occur within 200m of Awaba Road compared with Wakefield Road.

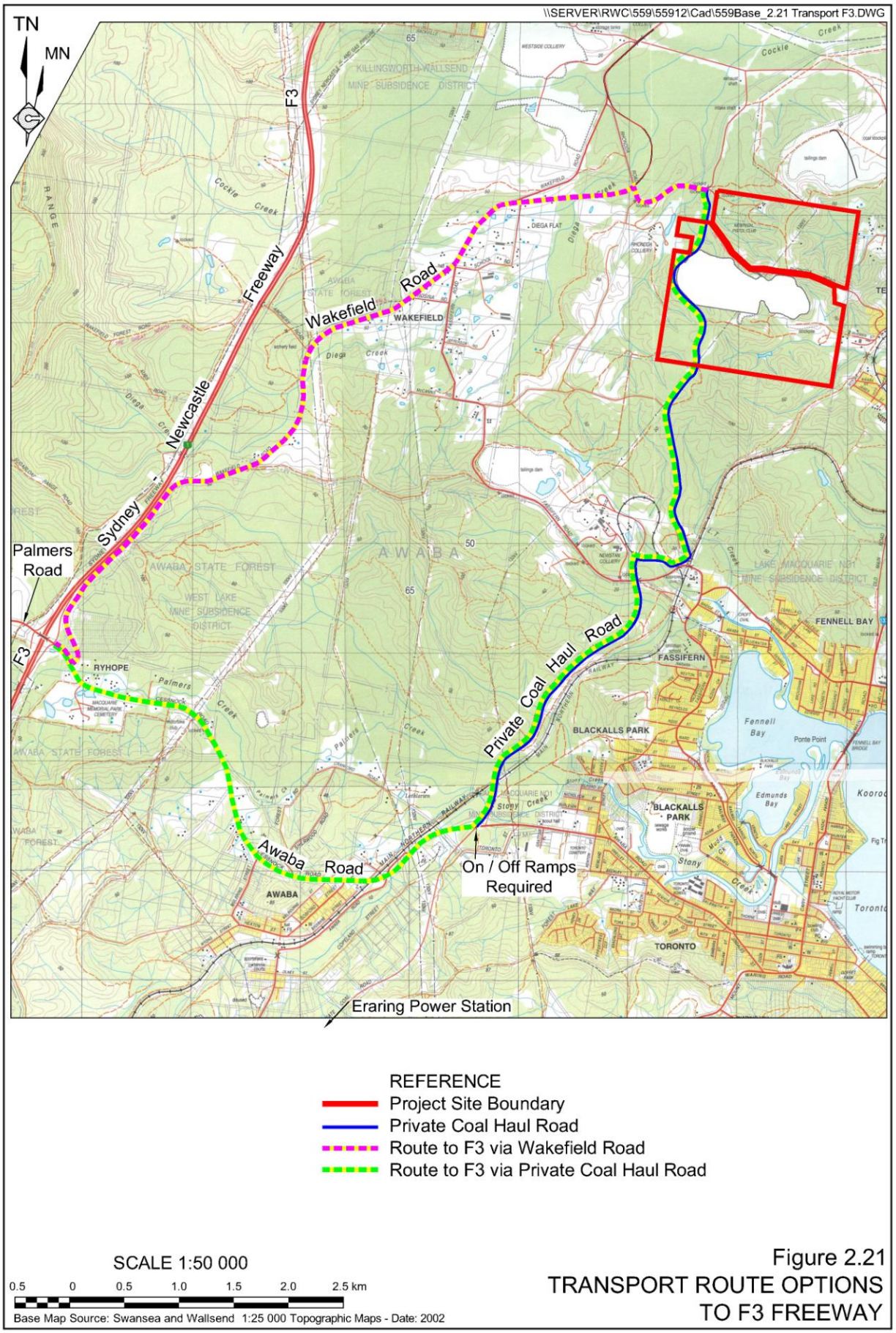


Figure 2.21
TRANSPORT ROUTE OPTIONS
TO F3 FREEWAY

In light of the above, Metromix has determined to continue its use of Wakefield Road, as many other operators do, to gain access to the F3 Freeway.

Given the concerns of Wakefield residents relate mainly to truck movements between 6:00pm and 6:00am, Metromix has initiated a policy that would ensure that the only trucks that are despatched during that period and destined to the F3, via Wakefield Road, incorporate air bag suspension.

This page has intentionally been left blank