MINERAL RESOURCES (SUSTAINABLE DEVELOPMENT) ACT 1990

SECTION 77I

WORK AUTHORITY 1488

I, David Boothroyd, acting as the delegate of the Minister, grant to **Dandy Premix Quarries Pty Ltd** of **21-23 Bennet Street Dandenong Victoria 3175** this Work Authority. The Work Authority is granted under section 77I of the *Mineral Resources (Sustainable Development) Act 1990.*

This Work Authority applies to the land, described in Planning Permit 120388 and the approved Work Plan, as per the attached plan.

Work may only be undertaken in accordance with the approved Work Plan or approved variation to the Work Plan and is subject to the Schedule of Conditions attached.

Signed by

David Boothroyd
Manager Earth Resources Tenements

Date: 3/9/13

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ADVERTISED PLAN

Schedule of Work Authority Conditions

PART A GENERAL CONDITIONS

1. WORKING IN ACCORDANCE WITH THE APPROVED WORK PLAN

1.1 The Work Authority holder must carry out work in accordance with the Approved Work Plan and any subsequent Approved Work Plan Variations.

1.2 Where any inconsistency occurs between an Approved Work Plan and/or an Approved Work Plan Variation or the associated Approved Work Plan conditions, and the Work Authority conditions and/or regulations, the Work Authority conditions and/or regulations have precedence.

1.3 Where requested by the Department Head, the Work Authority holder must submit a Work Plan Variation.

2. PUBLIC LIABILITY INSURANCE

2.1 Prior to commencing any work, the Work Authority holder must have public liability insurance that covers all work authorised under the Work Authority and ensure the insurance is maintained at all times while work occurs under the Work Authority.

3. WORK AUTHORITY BOUNDARIES

3.1 The Work Authority holder must erect and maintain posts along the boundary of the Work Authority so that the boundary of the Work Authority is clearly identifiable.

3.2 The Work Authority holder must ensure the posts required at 3.1 meet the following specifications:

(a) the post is not less than one metre high above the ground;

(b) the post is painted white;

(c) the Work Authority number is painted within the top 20cm of the post, is legible and in a contrasting colour to the white post;

(d) the posts must be situated so that each post is clearly visible from each post on either side of that post.

3.3 The Work Authority holder must erect and maintain a legible sign at the entrance to the Work Authority that contains the following information:

(a) the name of the Work Authority holder and the Work Authority number;

(b) the Manager of the Work Authority; and

(c) emergency contact details.

4. PUBLIC SAFETY

4.1 The Work Authority holder must ensure that public safety is maintained within the Work Authority area at all times, including through the use of fencing, gates and signage as required around the work area.

4.2 The Work Authority holder must ensure that all fences are maintained to prevent access to the work site and that all gates are locked when the work site is unattended.

5. FIRE RISK MANAGEMENT

5.1 The Work Authority holder must take all reasonable measures to prevent the ignition and spread of fire.

5.2 The Work Authority holder must ensure that all buildings, fixed plant and mobile equipment are fitted with fire-fighting equipment, such as fire extinguishers, fire blankets, knapsack spray pumps and rake-hoes.

5.3 The Work Authority holder must develop and implement a fire response and readiness plan.

6. DESIGNATED PARKING AREAS

6.1 The Work Authority holder must provide designated parking areas for employees and visitors at the work site.

6.2 The Work Authority holder must ensure that the designated parking area is of sufficient size to accommodate the expected number of vehicles that employees and visitors may bring to the work site on a daily basis.

6.3 The Work Authority holder must ensure that designated parking areas are designed and constructed to provide safe access for vehicles and people.

7. COMPLAINTS MANAGEMENT

7.1 The Work Authority holder must establish and maintain a complaints register.

7.2 In response to a complaint, the Work Authority holder must record the following information in the complaints register:

(a) the date and time of the complaint;

(b) who the complaint was from;

(c) the specific issue/s raised in the complaint; and

(d) the actions taken to address the specific issue/s raised in the complaint.

8. NON-COMPLIANCE AND ENVIRONMENT INCIDENT NOTIFICATION

8.1 The Work Authority holder must as soon as is practicable after becoming aware of any non-compliance with the conditions of the Work Authority and/or Approved Work Plan, and/or an environmental incident that will, or is likely to cause, material harm to the environment, notify the relevant District Manager of the non-compliance and/or environmental incident.

8.2 The Work Authority holder must also notify any other relevant government department or agency of the non-compliance and/or incident.

8.3 Where requested to provide a written report on the non-compliance or environmental incident, the Work Authority holder must provide a written report within 5 business days of the request that includes the following information:

(a) the date and time of the non compliance and/or environmental incident;

(b) the cause, or likely cause of the non-compliance and/or environmental incident;

(c) the impacts, or likely impacts of the non-compliance and/or environmental incident;

(d) the actions that have been taken to prevent, minimise or otherwise manage the impacts, or likely impacts of the non-compliance and/or environmental incident; and

(e) the actions that will be taken to prevent such a non-compliance and/or environmental incident from happening again in the future.

PART B ACTIVITY BASED CONDITIONS

9. GROUND DISTURBANCE

9.1 The Work Authority holder must minimise the area of ground disturbance throughout the life of the quarry operation.

9.2 The Work Authority holder must not open up any area for quarrying and ancillary operations except where approved in the Approved Work Plan.

10. TOPSOIL MANAGEMENT

10.1 At the commencement of excavation, the Work Authority holder must ensure that topsoil to a depth of 150mm below the natural surface is removed and placed in stockpiles not exceeding 2m in height.

10.2 The Work Authority holder must ensure that topsoil stockpiles are protected from erosion and compaction.

11. EROSION, DRAINAGE AND DISCHARGE CONTROLS

11.1 The Work Authority holder must design, install and maintain erosion and sediment controls to prevent erosion of areas of disturbed land and sedimentation of waterways.

11.2 Where quarry activities are being conducted in waters or on the banks of waterways with water in them, the Work Authority holder must ensure that sedimentation of the water in the water way is minimised to an acceptable level.

11.3 The Work Authority holder must prevent contaminated runoff from entering receiving waterways.

12. WATER DAMS

12.1 The Work Authority holder must ensure that the location, design, construction, operation and safety management of water dams on the Work Authority area are undertaken in accordance with the Approved Work Plan.

13. VEGETATION MANAGEMENT AND BUFFER ZONES

13.1 The Work Authority holder must avoid, minimise and/or offset the removal and disturbance of native vegetation and faunal habitats.

13.2 The Work Authority holder must erect and maintain posts or star pickets painted yellow to stand not less than 0.75 metres in height at intervals of not more than 50 metres around the final approved limits of extraction.

13.3 The Work Authority holder must not undertake any excavation work, or remove any vegetation, whether in part or in whole, within any buffer zone shown on the Approved Work Plan.

13.4 The Work Authority holder must maintain the buffer zone to ensure that an effective screen is provided between the relevant quarry works and surrounding land and/or buildings.

13.5 Unless otherwise agreed, the Work Authority holder must use species that are Indigenous to the area and are appropriate to the mine areas Ecological Vegetation Class (EVC) when establishing plants within the buffer zone.

14. NOXIOUS WEEDS AND PESTS

14.1 The Work Authority holder must establish and implement a program to control and/or eradicate noxious weeds and pest animals within the Work Authority area.

14.2 The Work Authority holder must take measures to prevent the spread of declared noxious weeds, pest animals and plant diseases within the Work Authority area.

14.3 The Work Authority holder must ensure that all mobile machinery is thoroughly cleaned prior to coming onto, or leaving a work area affected by noxious weeds and plant diseases.

14.4 The Work Authority holder must ensure that all soil that is imported into and exported out of the Work Authority area is free of disease and noxious weeds.

15. DUST EMISSIONS

15.1 The Work Authority holder must prevent a dust release that causes adverse impacts to the surrounding area and residents.

16. NOISE EMISSIONS

16.1 The Work Authority holder must ensure that noise emissions are minimised as far as is practicable and comply with the requirements of the approved Work Plan.

16.2 The Work Authority holder must avoid causing unacceptable noise.

17. VISUAL AMENITY

17.1 The Work Authority holder must take ensure that the colour of fixed plant and buildings do not cause an unwarranted negative impact on surrounding visual amenity.

17.2 The Work Authority holder must consult with the relevant Inspector and the Crown Land manager or the responsible authority on private land prior to painting any fixed plant and/or buildings.

18. HERITAGE SITES

18.1 The Work Authority holder must ensure that no work is carried out, without appropriate consent, within 100 metres laterally of a registered Aboriginal place recorded in the Victorian Aboriginal Heritage Register, or within 100 metres below that place.

18.2 The Work Authority holder must ensure that no work is carried out, without appropriate consent, within 100 metres laterally of an archaeological site on the Heritage Inventory or a place or object included in the Heritage Register or within 100 metres below that site, place or object.

19. HAZARDOUS MATERIALS MANAGEMENT

19.1 The Work Authority holder must prevent contamination of the environment by the release of fuels, lubricants and/or hazardous materials.

19.2 The Work Authority holder must ensure that all fuels, lubricants and/or hazardous materials are stored in accordance with the relevant requirements of AS1940: 2004 The Storage and Handling of Flammable and Combustible Liquids.

19.3 The Work Authority holder must ensure that any drainage from an area where fuels, lubricants and/or hazardous materials are stored, and/or used is directed to a sump or interceptor trap.

19.4 The Work Authority holder must ensure that spill prevention and clean up equipment is readily available in the vicinity of all plant and machinery, including mobile and fixed fuel storages.

19.5 The Work Authority holder must ensure that spills of fuels, lubricants and/or hazardous materials are cleaned up as quickly as practicable. Such spillage must not be cleaned up by hosing, sweeping or otherwise releasing such contaminant into waterways. Equipment and soil contaminated by fuels, lubricants, hazardous materials and clean up substances which cannot be salvaged must be disposed of in an approved waste facility.

20. SLOPE STABILITY

20.1 The Work Authority holder must ensure that all slopes/batters including excavations, roadways, stockpiles and dumps must be designed, constructed and maintained to ensure stability.

20.2 If there is a significant slope failure event, the Work Authority holder must cease all operations, notify the relevant District Manager and not recommence operations until authorised to do so by the relevant District Manager.

21. INTERNAL ROADS

21.1 The Work Authority holder must consult with the relevant DPI Inspector, the Crown Land manager or private land owner/occupier prior to establishing any roads and access ways on the Work Authority area.

21.2 The Work Authority holder must construct any roads on the Work Authority area in accordance with the direction provided by the DPI Inspector, the Crown Land manager or private land owner/occupier.

21.3 The Work Authority holder must ensure that an internal road is only used by:

(a) employees of, or persons authorised by, the relevant Crown land manager, or persons engaged in fire control where the Work Authority covers Crown land; or

(b) the landowners or their agent/s where the Work Authority covers private land.

21.4 The Work Authority holder must ensure that all roads on the Work Authority area are properly formed, surface treated, drained and maintained to provide for the safe operation of the road.

22. DERELICT AND REDUNDANT PLANT

22.1 The Work Authority holder must ensure that all derelict and redundant plant, vehicles, machinery and equipment be removed from the Work Authority area and deposited at an appropriate waste disposal site or otherwise stored or disposed of in accordance with the Approved Work Plan.

23. REHABILITATION

23.1 The Work Authority holder must ensure that progressive rehabilitation of disturbed land is carried out as soon as possible.

23.2 The Work Authority holder must ensure that, as required, Indigenous species used in rehabilitation must be sourced from the local area, be of local provenance and be appropriate to the site's Ecological Vegetation Class (EVC).

23.3 The Work Authority holder must ensure that final rehabilitation is in accordance with the Approved Work Plan.

24. WORKING HOURS

24.1 The work authority holder must conduct all works in accordance with the working hour requirements of the planning consent or the Approved Work Plan or Work Plan Variation or Work Plan Conditions. Where any inconsistency occurs between the planning consent and the Approved Work Plan or an Approved Work Plan Variation or Work Plan Conditions, the working hour requirements of the planning consent have precedence.

24.2 The work authority holder may apply to the relevant District Manager to vary, or work outside of, the working hours requirements.

PLAN OF AREA
Extractive Work
Authority Number: 1488

Mineral Resources (Sustainable Development) Act 1990

State Government Victoria
Department of State Development Business and Innovation

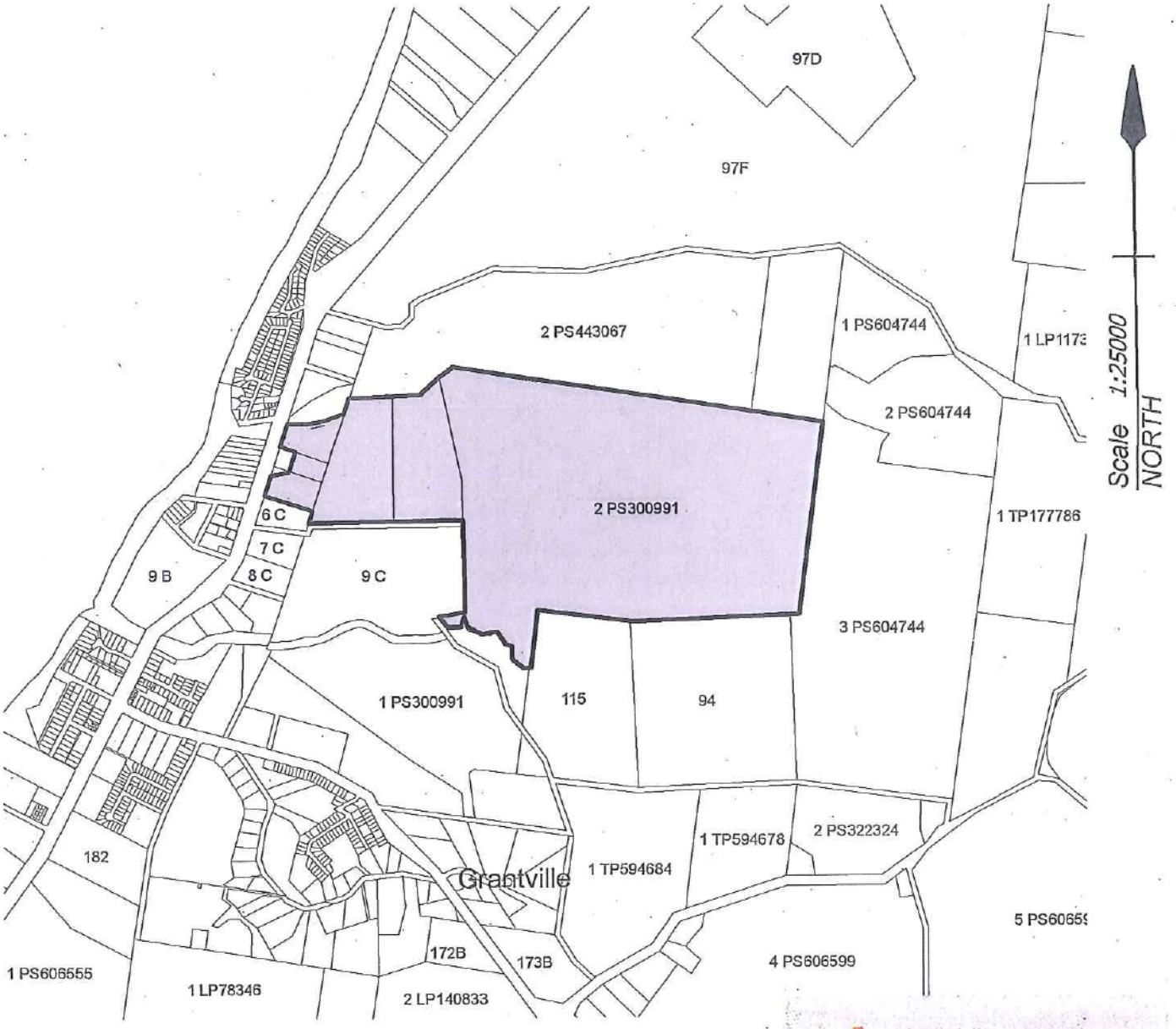
Issued to:
Dandy Premix Quarries Pty Ltd

MUNICIPALITY OF Bass Coast Shire

PARISH OF CORINELLA

TOTAL AREA ± 156.1 Hectares

NET AREA Hectares



Private Land (no depth lmit)

ALL MEASUREMENTS ARE IN METRES

Prepared John ANASTASIOU

Checked Christy THIAGARAJAH

Date 02 September 2013 Record plan Warragul

WA1488 - SCHEDULE OF SITE SPECIFIC WORK PLAN CONDITIONS

MINERAL RESOURCES
(SUSTAINABLE DEVELOPMENT) ACT 1990
Tenement No WA 1488
Work Plan Approved
Delegate of the Department Head
Date: 22/8/15

DSDBI (FORMERLY DPI)

1 FIXED PLANT & SITE BUILDINGS

1.1 The Work Authority holder will seek and obtain any necessary approvals from the Responsible Authority for any fixed plant and or site buildings.

2 GROUNDWATER

2.1 The groundwater will not be intersected without firstly obtaining:
1) any necessary approval(s) from the relevant Rural Water Authority, and
2) a Work Plan Variation.

3 ACCEPTANCE OF CLEAN FILL FOR REHABILITATION

3.1 Clean fill must meet the requirements of the EPA Publication 448 Classification of Wastes

3.2 The Work Authority holder must prepare a Clean Fill Management Plan (CFMP) to the satisfaction of DPI if deemed necessary by DPI.

4 VISUAL IMPACT

4.1 DPI reserves the right to require additional screening measures to minimise visual impact if necessary.

5 BLASTING

5.1 No blasting will be undertaken without the written authorisation of an Inspector.

6 SPILLAGE

6.1 Good truck loading techniques are to be employed so as to ensure extracted material is not spilled onto public roads.

7 COMMUNITY ENGAGEMENT

7.1 The Work Authority holder will participate in the Grantville Environmental Review Committee and consult with the local community regarding environmental performance as required and to the satisfaction of DPI and the Responsible Authority.

8 OVERBURDEN STORAGE

8.1 All overburden not used immediately for reclamation shall be placed in tidy dumps and shall be graded, drained and vegetated to prevent erosion.

9 SAND PROCESSING

9.1 No sand washing will be undertaken without seeking and obtaining a Work Plan Variation which details this activity.

10 SITE MANAGEMENT

10.1 The Work Authority holder must develop and maintain systems of work to ensure that all issues (relating to public safety, the environment and infrastructure [including slope stability implications]) are effectively monitored and controlled.

11 OPERATING HOURS (Supersedes work plan condition 6.1)

11.1 The permitted use (including arrival and departure of heavy vehicles) must operate only between the following hours, except with the future consent of the Responsible Authority:

Activity	Monday to Friday	Saturday
Site establishment / construction	6am-6pm	6am-1pm
Excavation	7am-6pm	7am-1pm
Processing	6am-6pm	6am-1pm
Product loading and dispatch	6am-6pm	6am-1pm
Repairs and maintenance	6am-6pm	6am-1pm

Notes: Public holidays excluded except for maintenance operations.

12 EXCAVATION

12.1 The base of the pit must not be excavated below RL10 without further written consent from Southern Rural Water and the Bass Coast Shire Council

DEPI (FORMERLY DSE)

1 NATIVE VEGETATION

1.1 The Work Authority holder must take all reasonable measures to ensure that significant stands of remnant native vegetation on the Work Authority site are managed in accordance with the Native Vegetation Management Framework (2004). Any future plans to clear remnant native vegetation on the Work Authority site must be discussed with DSE and DPI prior to any work commencing.

2 BUFFERS

2.1 The Work Authority holder must ensure that the buffer width is sufficient so that works do not adversely impact on the adjacent Grantville Bushland Reserve.

2.2 Fencing on the boundary of the Grantville Bushland Reserve is to be of a standard that will preclude accidental or inquisitive public access and also reduce the transit of larger mammal species into the pit area.

3 CAR PARKING

3.1 The designated car parking and visitor access location for the Work Authority must not impact on the amenity of the adjoining bushland reserves.

4 FIRE MANAGEMENT

4.1 The Work Authority holder must ensure that management of private land in relation to fire is consistent with public fire management plans for the area.

HERITAGE VICTORIA

1 **HISTORICAL OBJECTS** (to be read in conjunction with standard condition 18)

1.1 The Work Authority holder must ensure that if any historical archaeological features or deposits are exposed at any time during works, it is necessary for all works to cease immediately, and for the office of Heritage Victoria to be contacted.

SOUTHERN RURAL WATER (SRW)

1 **GROUND AND SURFACE WATER**

1.1 The interception of groundwater at any time during operations must be immediately reported to SRW;

1.2 The applicant shall implement controls to ensure that there is no polluted seepage from the work site into the groundwater or surface water resource. Controls must include an appropriate monitoring program. Monitoring results must be interpreted by a qualified person and the results forwarded to SRW and other responsible agencies;

1.3 The applicant must prepare a contingency plan to deal with surface water or groundwater pollution and clean up should it occur;

1.4 The works shall not interfere or impact on any waterway without Responsible Authority approval;

1.5 Sediment runoff from the site shall be retained on site during and after operations. Controls particularly on steep slopes are to be in accordance with the *Environment Protection Authority (EPA recommendations detailed in the construction techniques for sediment pollution controls No 275, May 1991.* Sediment control structures such as sediment basin, sediment fences and sediments traps must be installed prior to the commencement of operations and maintained post development;

1.6 Fuels/Oils or other deleterious substances are prevented from entering the groundwater resource and any waterway.

1.7 If any works will impact on groundwater or will include the use of water from both surface water and groundwater or from a catchment dam, soak or spring for commercial or industrial purposes from these resources, it will be necessary for the Work Authority holder to apply to SRW for a licence to take and use water in accordance with Section 51 or 67 Water Act 1989.

1.8 Prior to the commencement of the development a groundwater management plan must be submitted to and approved by Southern Rural Water and the Responsible Authority. The groundwater management plan must make provision for the ongoing monitoring of groundwater quality, flow and level for the life of the quarry.

1.9 The base of the extraction pit must not be excavated below RL10 without further written consent of Southern Rural Water and the Responsible Authority.

1.10 Southern Rural Water and the Responsible Authority must not consent to the excavation below RL10 unless they are satisfied that excavation will not occur below the upper level of groundwater (including likely variations to groundwater level).

MELBOURNE WATER

1 DRAINS AND WATERWAYS

1.1 No polluted and / or sediment laden runoff is to be discharged directly or indirectly into Melbourne Water's drains or watercourses.

1.2 Prior to the commencement of works, a geotechnical report from a qualified and accredited supplier of such services will be required to determine the soil conditions on the slopes of the bank of Waterway 3840 and within 100 metres back from the top of bank. The report should also outline any mitigation measures that will be used to prevent erosion and instability of the Waterway 3840 embankment.

1.3 Prior to the commencement of works, further information regarding the maintenance of the proposed sedimentation ponds and management of the bioretention basin must be submitted to Melbourne Water for approval. The maintenance program should include:
- Access points to the sediment ponds
- Sediment drying areas and disposal methods for material
- Expected frequency of sediment cleaning from the ponds and bioretention basin

1.4 All exposed surfaces including bunds walls, access road slopes and disturbed areas which may impact on Melbourne Water's drains or watercourses are to be remediated with grass or vegetation and have interim sediment controls in place until vegetation surface coverage is complete.

1.5 Prior to the commencement of works that are not covered by this approval, a separate application direct to Melbourne Water must be made for any new or modified storm water connection to Melbourne Water's drains or watercourses.

1.6 Prior to the commencement of works, a separate application must be made to Melbourne Water for approval of any new or modified waterway crossing(s).

1.7 Prior to the commencement of works, a Site Environment Management Plan (SEMP) must be submitted to Melbourne Water for approval. The SEMP must show the location and nature of environmental values identified through site environmental assessments, and include details of measures to protect or mitigate risk to those values. The SEMP must include a site map detailing the location and design of all measures in relation to significant site values including the following:
- Silt fencing;
- Access tracks;
- Spoil stockpiling;
- Trenching locations;
- Machinery/Plant locations;
- Exclusion fencing around native vegetation/habitat associated with Waterway 3840;
- Vehicle wash down bay (to prevent introduction of weeds);
- Areas subject to dust, noise and/or light control;
- Litter control measures.

1.8 Prior to the commencement of works, a Work Method Statement and a Task Risk Assessment must be submitted to Melbourne Water for review, outlining the general construction techniques to be adopted. The statement must address the following:
- Process for machinery to access the creek;
- OH&S measures in place to reduce risk;
- Diversion of flows for low and high flows;
- Evacuation procedure during times of high flows.

Bell, Cochrane & Associates
Extractive Industries
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CONSULTANTS TO THE QUARRYING & SAND EXTRACTION INDUSTRIES

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Work Plan for

Extractive Industry Work Authority No. 1488

1381 – 1395 Bass Highway, Grantville 3984

Prepared for

Dandy Premix Quarries Pty Ltd

MINERAL RESOURCES
(SUSTAINABLE DEVELOPMENT) ACT 1990
Tenement No. WA1488
Statutory endorsed work plan comprising pages 37
and drawings 6 & 9 APPENDICES & 2 ACCOMPANYING DOCUMENTS
Delegate / Date: 3/8/12
Department of Primary Industries

Dandy Premix Quarries Pty Ltd
21 – 23 Bennet Street
DANDENONG VIC 3175

Tel: 03 9703 8260
Fax: 03 9793 2096

Project No. D10-003
May 2012

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List of Figures

1. Preface

This Work Plan has been prepared by Dandy Premix Quarries Pty Ltd for Extractive Industry Work Authority 1488 and includes inputs from a number of consultants including, but not limited to:

- Bell Cochrane & Associates Extractive Industries in the preparation of plans;
- Norris & Schoeffel in the assessment and management of flora and fauna issues;
- Neil M Craigie Pty Ltd in the assessment and management of surface water and drainage;
- John Leonard Consulting Services Pty Ltd in the assessment and management of the groundwater regime;
- Watson Moss Growcott acoustics Pty Ltd in the assessment and management of noise;
- Environmental Science Associates (ESA) in the assessment and management of air quality (dust).

The Work Plan has been prepared for the development of a new sand extraction operation at Grantville, which is located approximately 100 kilometres south-southeast of Melbourne, refer Figure 1.

The site was allocated Work Authority Number 1488 (WA1488) on 30 March 2012. The Work Plan details how the site will be developed for sand extraction on land with 280 metres of frontage to the east side of the Bass Highway, approximately two kilometres north of Grantville township. It describes the proposed operating methods and post extraction site rehabilitation.

A Stakeholder Consultative Meeting was held at the Grantville Transaction Centre, inclusive of a site visit, on 8 March 2012. The meeting was chaired by Ian McLeod, Manager Minerals and Extractive Operations (Melbourne District), Minerals and Petroleum Regulations Branch, Earth Resources Division, Department of Primary Industries (DPI) and was attended by representatives of the following organisations:

- Department of Primary Industries – Ian McLeod & Neil Stewart
- Dandy Premix Quarries Pty Ltd – Garry Cranny & Mark Van Den Heuvel
- Bass Coast Shire Council – John Ciavarella & Martin Gill

- Melbourne Water – Mark Warren, Gavin Brock, Con Gantonas, Louis Kerford & Luke McLean
- Southern Rural Water – Vince Lopardi
- Bell Cochrane & Associates Extractive Industries – Basil Natoli
- Norris & Schoeffel – Paul Kelly for Ken Norris
- Neil M Craigie Pty Ltd – Neil Craigie
- John Leonard Consulting Services Pty Ltd – John Leonard
- Focus CDS Pty Ltd – Jack Kraan
- Traffix Group Pty Ltd – Don Robertson
- Stewart Young Pty Ltd – Stewart Young
- Tract Consultants Pty Ltd - Mark Reilly
- Watson Moss Growcott acoustics Pty Ltd – Neville Goddard

The Department of Sustainability and Environment (DSE) were invited but having already visited site and conducted an assessment against preliminary proposal details provided by Dandy Premix Quarries Pty Ltd determined there were no issues they required clarifying through the Stakeholder Consultative Meeting. DSE, Dandy Premix Quarries and their ecologist have engaged in consultation since the meeting.

VicRoads were also invited and were an apology. Separate consultations and site visits have been undertaken with VicRoads.

The purpose of the consultative meeting was to outline the development proposal and introduce the proponent to stakeholders. Stakeholders were provided with a detailed briefing of the proposal by Dandy Premix Quarries Pty Ltd and their respective expert consultants and were provided with the opportunity to register any issues or concerns that needed to be addressed in the proposal Work Plan, inclusive of a Development Plan and Rehabilitation Plan.

Consequently, those stakeholder issues identified at the meeting have been addressed in this Work Plan application.

1.1. Need for Development

Dandy Premix Quarries Pty Ltd own and operate a hard rock quarry at McMahons Road, Launching Place (WA375) and are the holder of WA277 at Thompsons Road, Cranbourne. The related family business Dandy Premix Concrete Pty Ltd, owns and operates four concrete batching plants in the south-east growth corridor of Melbourne.

The Grantville site has been strategically acquired by Dandy Premix Quarries Pty Ltd to negate their current dependency on external operators for the supply of approximately 300,000 tonnes per annum of construction sand to their concrete batch plants as at 2012. Dandy Premix own and operates a bulk materials heavy vehicle fleet. The proposed sand extraction operation will be vertically integrated into the associated Dandy Premix business operations. This integration will reinforce the existing business model, provide new local (Grantville) employment opportunities and strengthen job security for those currently employed at Dandy Premix Concrete Pty Ltd.

Construction sands are rapidly being depleted in the Melbourne Supply Area (MSA) and the Lang Lang to Grantville region has long been identified through investigations by various Government Departments as a major sand and gravel resource supply area to the MSA into the future.

This Work Plan application is consistent with the findings of those investigations and the Melbourne 2030 Stategy. A Work Authority over this site will secure a significant sand resource that will assist the extractive industry meet the continued growth and infrastructure construction material needs of the south-eastern region of Melbourne.

1.2. Description of Proposal

It is proposed to develop the site for the extraction and dry blend processing of construction and specialty sands. Sand resources above the standing groundwater level within the site will be dry extracted and processed using modern techniques and facilities to comply with contemporary environmental standards and in keeping with community expectations.

1.3. Introduction

This document has been prepared to support the application for Work Authority No.1488 (WA1488) proposed as a medium scale sand extraction and blending operation on behalf of Dandy Premix Quarries Quarries Pty Ltd at the greenfield site 1381 – 1395 Bass Highway, Grantville. Dandy Premix Quarries Pty Ltd are new to the local community but operate WA375 at Launching Place and are the holders of WA277 at Cranbourne . This

Work Plan application includes a Community Engagement Plan to inform the community of the proposed sand quarry activities and based on relevant feedback, to take account of the community's interests and concerns in relation to any perceived off-site impacts. The Community Engagement Plan provides for ongoing engagement including mechanisms for the recording and response to community enquiries and complaints.

1.4. Site & Locality Description

The site is becoming increasingly known locally as the Dandy Premix Sand Quarry. The site is located on 156 Hectares at 1381 – 1395 Bass Highway Grantville, 2km North of Grantville township. The site is situated on the eastern side of the Bass Highway and will be accessed directly from Bass Highway. The general location of the site and the extent of the Work Authority application are shown on Figures 1 and 2 respectively.

The Figure 3, 2012 Site Photo Plan, illustrates the site and adjoining land uses. The photo shows the extent of the proposed Mineral Resources (Sustainable Development) Act 1990 – Extractive Industries Work Authority No.1488. While the surrounding land uses are predominantly agricultural and pastoral to the north, east and south-east, there is a block of native vegetation on Crown Land to the south-western perimeter of the site along with several residential 'lifestyle' blocks, one of which abuts the Work Authority site. Holcim GSG operate a sand quarry directly to the south of the Colbert Creek southern boundary section of the WA1488 site.

There is a well established residential community to the west, north-west of the site on the opposite side of the Bass Highway. Occupying the majority of that land between the Bass Highway and Western Port Bay, the nearest (most easterly backing onto the Bass Highway road reserve) of these residences is approximately 350 metres from the western extremity of the proposed Extraction Pit and the duplicated Bass Highway provides a significant separation between the Work Authority site and the existing residential amenity of these residents.

1.5. Site History

The majority of the site has been farmed continually since 1974 by Bill and Roy Blackmore, who also provide anecdotal evidence that farming has been the sole activity carried out on the property for many decades prior to their ownership.

The site has been extensively maintained and managed to optimise its use for farming and this has included slashing under exemptions in Planning Scheme Provision 52.17-6 for

Utility installations, Regrowth, Dead vegetation and Noxious weeds. The majority of the farm paddocks, especially those to the front of the site covering the proposed development area, have a strong history of noxious weed control, harrowing, seeding and fertilisation.

There is no known history or evidence of any extractive industries or other earth resources history at the site.

1.6. Anticipated Impacts of Proposal

The 156 Hectare site is zoned as Farming (refer Bass Coast Planning Scheme - Local Provision, Map No. 14, FZ). The site is identified as an extractive industry interest area (EIIA) in the Department of Primary Industries (DPI) 2003 publication of the Melbourne Supply Area (MSA) – Extractive Industry Interest Areas Review, A. Olshina & P. Burn, 2003.

The proposed excavation area will not be visible from near locations on the Bass Highway or between the Bass Highway and Westernport Bay to the west of the site due to the natural landform and existing topography to the front (west) of the site. To enhance the natural sceening provided by the landform and existing topography, several 2.5m high bunds will be constructed and sown down to pasture grasses. Extensive planting of trees and shrubs will also be carried out to complement the natural screening. The screening effect of the bunds and plantings will ensure the potential for visual impact of views from distant sight lines such as Tenby Point some 6 kilometres to the south-west and from vessels on Western Port Bay are all but eliminated.

There is no potential for visual impact by the proposed Work Authority development to landholders or residents to the near north, east or south.

The processing area of the development has been strategically located to take full advantage of the undulating site topography in conjunction with the native vegetation immediately bordering this area in the adjoining Dandy Premix property to the north. This native vegetation either side of Deep Creek will provide natural noise absorption and visual screening to the north and north-west as will its continuation through a Crown Land allotment further west of the processing area to the Bass Highway.

Surface drainage water leaving the site will be strictly managed and monitored to ensure there is no impact upon Deep Creek and Western Port Bay.

Access to the Work Authority site is directly off the Bass Highway, thereby negating any potential impact on local roads and residential or commercial areas by heavy vehicle traffic.

In keeping with the above, minimal local amenity impacts are anticipated from the Work Authority proposal.

1.7. Heritage Assessment

1.7.1. Aboriginal Cultural Heritage

The proposed WA1488 land contains no known cultural heritage features or culturally significant areas. The Extraction Pit, the associated Hard Stand Area for operations and the Site Access Track have been specifically designed and located to avoid and/or minimise the possibility of impact on known or potential aboriginal cultural heritage sensitivity sites.

A copy of the AAV Process List and maps of sensitive areas and recorded Aboriginal Places, including the AAV Site Record Card for Site Number 8021-23 on the Bass Highway to the front of 1393 and a small part of 1395 Bass Highway are attached as part of Appendix 9. The Work Authority 1488 (WA1488) boundary avoids this Aboriginal Place recorded on 23 April 1997 as part of the VicRoads duplication of the Bass Highway.

A desktop review and site analysis was also undertaken by qualified archaeologist and AAV recognised Aboriginal heritage advisor Nicholas Clark of Clarkeology. The Clarkeology report advising that there is no requirement for a Cultural Heritage Management Plan (CHMP) is also attached at Appendix 9.

1.7.2. European Cultural Heritage

A search of the Heritage Victoria, Victorian Heritage Database identified three items of significant European heritage in Grantville, two of which, the Former Grantville Hotel (H8021-0039), 1517–1529 Bass Highway, Grantville and Old Queensferry Road (H8021-0006) are registered with inventory numbers.

The Grantville Avenue of Honour, planted in 1923 with 38 Red Flowering Gum trees (*E. ficifolia*) to commemorate the First World War, of which only seven original trees remain due to the 1980 road widening, has a ‘For Public View’ level of significance.

Copies of search results from the Heritage Victoria, Victorian Heritage Database are attached at Appendix 9.

The proposed WA1488 land contains no known features, culturally significant areas or items of European cultural heritage.

1.8. Flora, Fauna & Native Vegetation Offsets

The site has been reviewed by ecologist Ken Norris of Norris & Schoeffel and his Ecological Assessment with Net Gain Report is included as Appendix 4. This assessment shows the restricted removal of 'Native Vegetation' is below the the threshold of 25% that would trigger a 'Net Gain' assessment.

No permit(s) will be required under either of the *Flora and Fauna Guarantee Act 1988* (FFG Act) or the *Environment Protection and Biodiversity Conservation Act 1999* (the EPBC Act).

Given the locality of the proposed Work Authority with farming to the east, a parcel of Crown Land to the south and additional Dandy Premix land to the north, advice is that native fauna will not be adversely impacted by the proposal.

The neighbouring Dandy Premix land to the north contains a major portion of Deep Creek and its surrounding riparian vegetation. The Work Authority proponent is committed to appropriately managing this site to ensure its ongoing quality and enhancement as a valuable ecological habitat.

1.9. Workplace Health and Safety Management Plan

Dandy Premix Quarries Pty. Ltd. will implement a Workplace health and Safety Management Plan based on the company's Occupational Health and Safety Management System (OHMS) Compliance Kit. This OHMS system is generic and will be specifically tailored as a compliance tool for the Grantville work site. The system provides a set of documents, standard operating procedures, registers and assessment media tailored for the worksite. These provide a management framework and a strong platform for continual improvement of Occupational Health and Safety and Environmental operating standards.

Dandy Premix Quarries Pty Ltd intends to use the above OHMS Compliance Kit as the basis for seeking accreditation and registration to AS/NZS 4801:2001 by an external organisational. The Grantville WA1488 site will be included in the registration.

2. Resource Information

The resource is part of the Heath Hill Fault scarp formation stretching in a linear belt from south of Grantville to west of Nyora. The resource consists of the basal, relatively thin Childers Formation that contains coarse red to brown gravels with plastic clay interbeds laid up against the Heath Hill Fault scarp which intersects the property at its upper levels of 100 – 120M AHD. At the lower western levels of the propsed Work Authority site, these are overlain with the main economic and very clean fine to coarse tertiary sands of the Yallock Formation in varying thicknesses. The WA1488 deposit is a typically clean, loose (free running) fine to medium “Grantville” resource with sporadic layers of coarse sand in a non-marine environment.

The resource is overlain with approximately 150mm to 700mm of top soil, with a layer of red plastic clay varying in depth from 4.0 to 8.0 metres . Beneath the clay overburden is clean sand, low in clay silt value, varying in colour from white to dark brown to a depth of 35 metres.

The proposed extraction area of the site is estimated to yield approximately:

- 2,700,000 insitu cubic meters of material (fine to coarse sand)

These sand volumes would be termed an "indicated resource" according to the Australasian Code for Reporting of Identified Mineral Resources and Ore Reserves prepared by The Australasian Institute of Mining and Metallurgy and the Australian Mining Industry Council.

2.1. Soil Estimates

Site investigations indicate that the top soil is consistently distributed throughout the site with an average depth generally in the order of 300mm – 400mm. Sufficient quantities of top soil will be stockpiled for use in planned progressive rehabilitation works. Top soil stockpiled for rehabilitation works will provide a minimum cover of 200mm over all areas requiring rehabilitation. Top soil stockpiles will be less than 3.0 metres high.

Top soil stripping of the proposed Extraction Pit area is estimated to yield approximately 63,000 cubic meters of top soil with a further 22,000 cubic metres estimated to come from stripping of the Hard Stand Area, Site Access Track and the Temporary Overburden Storage stockpile site for an estimated total site yield of 85,000 cubic metres.

2.2. Overburden Estimates

The site yields a red-orange/brown plastic clay overburden. The plastic clay overburden will be suitable for lining water storage dams and used as base filler to form internal (Site Access Track and Haul Roads) roads and the Screening Bunds as well as the proposed Hard Stand Area.

The proposed Extraction Pit is expected to yield approximately 1,500,000 m^3 of overburden

Construction of the Hard Stand Area to accommodate the Screening and Blending Plant, Stockpiles, Weighbridge/Office and other facilities will utilise an estimated 100,000 m^3 of overburden. The sealed Site Access Track base, Screening Bund bases, internal roads and the formation of sediment ponds and water storage dams will use a further 60,000 m^3. The amount of overburden removed in the mid Extraction Pit development stage(s) and required to be temporarily stored is estimated to be approximately 110,000 m^3. Overburden remaining insitu and beyond the above quantities that have been removed, will be used directly in pit backfill rehabilitation works.

2.3. Geotechnical Constraints / Ground Water

The total depth of excavation in the proposed Extraction Pit will be approximately 25 - 30 metres below the natural ground surface. Working faces will be cut at 1V:1H, with a minimum 15 metre Bench. The southern terminal face will be cut at 1V:3H, with a 7.5 metre Bench creating an overall batter of 1V:3.5H. The remaining terminal faces will be cut at 1V:1H with a 7.5 metre Bench, creating an overall 1V:1.5H batter. Faces 15 metres or less in height will remain at 1V:1H overall.

Ground water was not intersected above approximately 1.0 – 2.0 metres AHD during the Air-Core exploratory drilling program. Three groundwater investigation bores have been installed to monitor groundwater at the site.

The proposed Excavation Pit depth is purpose designed to avoid interference to groundwater and this application does not propose any extraction of groundwater.

3. Markets – Internal and External

Sales from the site are estimated to be in the order of 200,000 to 300,000 tonnes per annum during years one and two, increasing to approximately 500,000 tonnes per year thereafter. It is anticipated the external market for concrete, brick and other construction sands and gravel will grow over the life of the site. However, the primary role and key priority of the Dandy Premix Sand Quarry is to meet internal Dandy Premix Concrete Pty Ltd supply needs for concrete sand to its four concrete batch plants in the south-east corridor of Melbourne. This supply need is approximately 300,000 tonnes per annum.

The vertical integration of these concrete sand sales will significantly assist the family owned Dandy Premix group of businesses progress towards a greater level of control and certainty over critical raw materials supply to its premix concrete business. This will give the company a stronger business model to underpin future sustainability and growth. The positive flow-on effects start with the security of existing Dandy Premix employment and extend to the opportunity for the creation of new jobs in the expanding Bass Coast Shire township of Grantville. The success of this extractive industries application also brings with it tangible economic benefits to the State, in particular the Melbourne south-east growth corridor and the local Bass Coast Shire community.

External sales of an estimated 200,000 tonnes per annum will be considered as the capacity to meet the market need for concrete and other sands is progressively developed.

4. Work Authority Area

The area covered by the proposed Work Authority 1488 is detailed in the Figure 4 Work Authority (WA1488) Area Plan and is 156 Hectares in size. The Work Authority area is predominately bordered by Dandy Premix land and a smaller parcel of other privately owned land to the north. A mix of Crown Land (native vegetation reserve) and private land adjoins the Work Authority site to the south, east and the south-west corner. This land is predominately used for grazing and life-style residential purposes, apart from the long established Holcim GSG sand quarry to part of the south boundary of the proposed WA1488 site. The Bass Highway borders the site on its 280 metre frontage to the west. The proposed Extraction Pit is located in the middle/front of the Work Authority site, with extraction planned to generally commence working from the east, north-east terminal face. The extraction will progress in a west, south-westerly direction to the extent of the Extraction Pit as illustrated in the Figure 5 Development Plan.

4.1. Title & Easements Description

The land comprising the proposed Work Authority is owned by Dandy Premix Quarries Pty Ltd, and comprises six titles, namely:

- Crown Allotment 174A(PT), TP398939V, Volume 05390 Folio 819;
- Crown Allotment 176B, TP267029V, Volume 07824 Folio 032;
- Crown Allotments 219A & 218 (Part), PS300991J, Volume 10031, Folio 148;
- PS604744H, Volume 11044, Folio 475;
- PS604744H, Volume 11044, Folio 476; &
- Crown Allotment 174A(PT), TP515206V, Volume 08869 Folio 053 (Nil Royalty).

State Government royalty payments apply to all materials extracted from below 15.24metres on all but one title. A copy of the titles is included as Appendix 1.

4.2. Site Security

There is a 1.2 metre stock proof fence and lockable gates at the entrance to the Work Authority site on the Bass Highway. Site access is only available from the Bass Highway. The remainder of the site is fenced with stock proof fences. All fences continue to be maintained in good order.

Should the existing stock proof fencing need upgrading for security purposes, in particular to the Bass Highway frontage of the Work Authority site, a 1.8 metre chainmesh security fence with matching lockable gates will be installed as appropriate to meet site security and visual amenity criteria.

4.3. Non-Extraction Area – Zone of Influence

There will be a minimum 20m non-extraction area from the extraction edge to the Work Authority boundary on the southern boundary (to the Crown Land Reserve) and 30m to the centre of a surface water drainage gully to the north (Northern Drainage Tributary) with a further 60m to the Work Authority northern boundary. There is a minimum 200m buffer from the proposed Extraction Pit to the nearest residences to the west, north-west and south-west boundaries of the Work Authority.

Three residences on the Work Authority land are owned and controlled by Dandy Premix Quarries Pty Ltd.

4.4. Internal Access

The Site Access Track will extend from the Bass Highway site entrance to the Plant, Stockpiles, Sales Loader and Weighbridge Hard Stand Area. The Site Access Track, including the entrance from the Bass Highway to the Hard Stand Area will be sealed from initial construction. The entire Site Access Track will be constructed and fully maintained for the life of the operation to mitigate noise, dust and to manage stormwater runoff.

Any additional internal access routes will be properly formed and drained with appropriate signs erected to control traffic movement and safety around the site as required. Trucks loaded with product will be wetted or suitably covered to prevent any nuisance arising from spillage or by the emission of dust.

Appropriate procedures will be implemented to ensure debris is not deposited onto local roads from the wheels of trucks leaving the site, These measures will include the installation of a wheel wash in that part of the sealed Site Access Track approximately 80 – 100 metres west from the Hard Stand Area, above the Sediment Pond and Bioretention Basin shown on the Figure 5 Development Plan, to prevent the carriage of sand or soils off-site to the Bass Highway.

5. Plant and Equipment

5.1. Infrastructure

There is low voltage mains power to the three Bass Highway frontage (residential) blocks of the Work Authority site. Each of these blocks is fully serviced and contain a range of amenities. An initial site office will be established at one of the existing residences located within the Work Authority site. Longer term, permanent fully serviced office, staff and operating facilities will be established at the Weighbridge/Office, Stockpiling, Screening and Blending Hard Stand Area as indicated on the Figure 5 Development Plan. High voltage mains power will also be connected to this area and a suitably configured electrical sub-station installed.

An appropriately bunded bulk storage diesel fuel facility will be installed at the site to comply with AS 1940-2004 (Incorporating Amendments 1 & 2). Bulk fuel deliveries will be trucked in as required.

Staffing levels at the site will increase proportionately to the level of operational activity, but will initially involve a base load of 6-8 people during site establishment. An additional 6-10 staff will be engaged once stripping, production and sales commence. Further employment will be created as production and sales volumes increase, additional trucks are based at the site and diesel fitters, mobile and fixed plant service technicians and other operations, administrative and maintenance staff are required.

Adequate parking for operational staff and visitors will be provided.

5.2. Mobile Plant

Conventional dry extraction mobile plant and equipment will be used, including but not limited to an Excavator, Bulldozer, Front-end Wheel Loader, Dump Trucks, Road Grader, Scraper and a Water Tanker(s). Other specialised equipment such as Compactors, will be used as required.

5.3. Material Processing

Site investigation found that the raw sand resources deposited at the site are predominately, medium fine particles with a relatively low clay fine silt value.

The extraction of raw feed sand for processing will be by excavator, using a selective benching method. Extracted raw feed sand from the different benches will be delivered to the Hard Stand Area area by Dump Truck and deposited in separate raw feed stockpiles. These stockpiles will segregate the raw feed inputs according to a number of quality criteria. The imported coarse additive will also be separately stockpiled in close proximity.

The site raw sand feeds and the imported coarse sand additive from their respective stockpiles is fed into separate feed bins by a wheel loader. The individual feed bins output is able to be adjusted to achieve the required blend ratios.

Output from the feed bin system is discharged onto a common conveyor which delivers the combined feed to a twin deck vibrating screen where the removal of oversized lumps and mixing occurs. Once screened the product is discharged from the screen onto another conveyor which in-turn discharges the now blended and screened sand onto a radial stacker. The radial stacker stockpiles the finished sand product ready for sales loading.

The sales loading of finished sand product is by wheel loader with sales delivery trucks being axle group and gross combination weighed on the Work Authority site weighbridge prior to clearance for dispatch from site.

The dry blend and screen processing plant will be modular and can be of fixed or portable design. The plant's electrical consumption has also be assessed and is estimated to be less than half (<50%) the energy required to drive a conventional sand washing process. Discussions with SPAusNet regarding the plant's energy requirement and connection to the local power network grid are underway.

All processing plant equipment will be new, being purpose designed and constructed and will comply with all relative Australian standards.

The processing plant general arrangement layout is shown on the Figure 5 Development Plan.

6. Method of Working

The Figure 5 Development Plan outlines the proposed development, the proposed direction of extraction and operational details.

The Extraction Pit will be worked commencing in the northern section of the east terminal face and progress in a westerly direction. Some clay overburden from this early extraction will be used for perimeter edge protection and to divert rainfall runoff away from the perimeter of the Extraction Pit. The clay overburden representing the balance of this initial extraction stripping program will be used to form the base (filler) of the Site Access Track, the Plant Hard Stand Area, the Screening Bunds, the site runoff Sediment Ponds and the Bioretention Basin.

Extraction will continue in a westerly direction through the northern half of the Extraction Pit but stop well short of the west terminal face with top soil removed being stockpiled in windrows. Clay overburden removed during the opening up of this section of the Extraction Pit will be stored in the Temporary Overburden Storage stockpile located in the south of the Work Authority site. As this overburden stripping progresses, the removed overburden will be used to commence backfill rehabilitation of the previously worked out section of the Extraction Pit.

The clay overburden will be compacted in layers and contoured according to the approved Figure 6 Rehabilitation Plan by bulldozer and road grader. As sections of the backfilling and contouring are completed, preparation for top soil will be done by ripping and scarifying the surface. Following surface preparation the spreading of a minimum 200mm layer of top soil will be carried out with top soil sourced from the commencement of stripping and opening up of the remaining area of the Extraction Pit.

Fertilising and the sowing down of suitable pasture grasses will follow-on directly behind the spreading of the fresh top soil.

Extraction continues at the easterly end of the southern half of the Extraction Pit with extraction initially progressing south to the terminal boundary bordering the Crown Land (reserve) and thereafter progressing in a westerly direction to the south-west terminal face.

The last area of extraction will see the north-west area of the Extraction Pit worked out to the terminal face.

All top soil removed from these latter areas of extraction will be retained for site rehabilitation works.

Clay overburden removed from these areas of extraction will be progressively used to:

- Backfill, compact and contour any remaining un-rehabilitated sections of the initial extraction area;
- Backfill, compact and contour any worked out and un-rehabilitated sections of the intermediate area of extraction; and
- Rehabilitate those worked out sections of the last area of extraction as per the earlier rehabilitation works.

The balance of clay overburden required to complete rehabilitation of the last extraction area will come from the Temporary Overburden Storage stockpile which will be fully utilised to complete the Extraction Pit rehabilitation works. Ripping, scarifying, sowing down and fertilising Temporary Overburden Storage area will also be carried out to return this grazing pasture.

Top soil retained from the later areas of extraction will be spread over the more recently backfilled and prepared Extraction Pit area and sown down as previously described.

Drainage of the rehabilitated Extraction Pit is through the remaining and naturally draining sands in the pit floor. An area of exposed sand in the pit floor at a lower (sump) level than the rehabilitated pasture surfaces will operate as an aquifer recharge point. Rehabilitated Extraction Pit runoff water will be drained gradually through a series of sediment collection ponds and then finally to the exposed sand aquifer recharge point.

6.1. Operating Hours

The extraction, sales, processing operations and truck movements are proposed to commence from 06:00am and operate continuously through to 6:00pm weekdays, Monday to Friday and between 06.00am and 1.00pm on a Saturday.

No site operations or truck movements are proposed on Sundays or Public Holidays.

Works outside of these hours will only be for essential maintenance unless otherwise authorised in advance by the Responsible Authority (Bass Coast Shire Council) and the Department of Primary Industries (DPI).

6.2. Extractive Operations

The commencement of site development will see the establishment of the Site Access Track base, site water runoff interceptor drains and sediment collection traps. The planting of Vegetation Screens and formation of Screening Bunds along with their grassing and vegetation will occur simultaneously or immediately thereafter as a first order of works. For location of the Screening Bunds and Vegetation Screens, refer Figure 5 Development Plan.

Earthworks required to create the sealed Site Access Track base, the Plant Hard Stand Area and the Screening Bunds will be carried out using the mobile plant and equipment listed above at section 5.2 Mobile Plant.

Forming and final shaping of the Screening Bunds will be quickly achieved and balanced with top soil and overburden removal derived from the Site Access Track works. Formation and final shaping of the Screening Bunds will result in the bunds being at a finished height of 2.5 to 3.0 metres, depending upon their location and purpose. The bunds will be suitably contoured for aesthetics and for ease of maintenance.

Dust control during the site establishment and ongoing operating works will involve soil loads being wetted down prior to loading. Exposed excavation surfaces, Quarry Haul Roads and the Plant Hard Stand Area will also be watered to control dust.

Sprinkler systems will be strategically designed and installed as the Screening Bunds are formed and vegetated. The installed sprinkler systems will supply the required amount of water to initially establish, then underpin the long term growth of the planted vegetation while also providing the necessary coverage of dust suppression. Water to supply the sprinkler system and the site is available from several existing large farm dams on the site and the Northern Storage Dam proposed upstream of the Quarry Haul Road, refer Figure 5 Development Plan.

Sowing down with pasture grasses and fertilising of the Screening Bunds will be undertaken immediately behind their formation and any subsequent failure or die-back of vegetation will be replaced.

Fill material required for construction of the Quarry Access Ramp, Quarry Haul Road, Plant Hard Stand Area and the base of the sealed Site Access Track will be the plastic clay overburden removed from the initially opened up north-east area of the Extraction Pit, refer Figure 5 Development Plan. Suitable compaction rates and surface levels will be achieved using a Bulldozer, Compactors and Road Grader. Compaction monitoring will be ongoing

throughout these infrastructure construction works and crushed rock materials will be imported for use as required.

Sealing of the Site Access Track from the Bass Highway entry point to the processing plant Hard Stand Area where the Weighbridge/Office and associated Sales Loader operations occur will be completed as a priority infrastructure project and include appropriate surface water drainage works.

The early sand extraction area within the Extraction Pit has a top soil depth averaging approximately 300mm with a clay overburden depth averaging 5.0 metres immediately below. The Extraction Pit edge will be surveyed and clearly marked with extraction pegs to guide the Excavator operator. Prior to top soil extraction, Extraction Pit perimeter interceptor drains will be established to collect and direct any rainwater runoff from the area to be disturbed to Sediment Collection Traps.

Top soil removal using an Excavator fitted with a mud bucket to enable good separation of the top soil from the surface of the clay overburden beneath and will stay in advance of the overburden stripping. Extracted top soil will be hauled on-site by Dump Truck with some of the top soil won from the early stripping work used to dress out the clay formed Extraction Pit perimeter edge protection to divert surface drainage away from the Extraction Pit. The balance of the top soil removed in the early stripping operation will be stored in designated top soil storage stockpile windrows 2.0 to 3.0 metres high. These will be located a minimum distance of 20 metres from the Extraction Pit edge and any drains in preparation for site rehabilitation. The quantity of top soil retained for rehabilitation works will be balanced to ensure a minimum 200mm cover over all disturbed areas.

The clay overburden will be stripped employing a benching method by using an Excavator fitted with a digging bucket. Bench heights will vary, but be no greater than 3.0 metres and working faces will be 1V:1H.

Clay overburden stripped from the initial opening up of the Extraction Pit area will be hauled by Dump Truck and utilised to form the base of the sealed Site Access Track and the base of the Plant Hard Stand Area. Overburden stripping will stay in advance of sand extraction.

Raw sand will be extracted by an Excavator using a benching method. Bench heights will be no greater than 15 metres and working faces will be 1V:1H with 15 metre benches.

Access to the extraction area within the Extraction Pit will be by the Quarry Access Ramp which will be constructed to an incline of 1V:10H. The Quarry Access Ramp will work its way down to depth in timing with the extraction.

Raw sand extracted will be loaded onto Dump Trucks and hauled to the designated stockpiles on the Plant Hard Stand Area near the Blending and Screening Plant. The raw sand stockpiles are then used to supply the Raw Feed Bins, co-located on the Plant Hard Stand Area. The raw sand is stored in its defined stockpile based on a quality criteria that determines it's subsequent use in the blending and screening process to create finished product.

6.3. Water Control

Given the topography of the extraction area and the free draining nature of the sands, there will be minimal retained surface water. Where rainwater enters the pit it will be directed to a sump in the north east corner of the excavation. Water stored in the sump is to be used as a back-up supply for dust suppression and irrigation around the site.

In the unlikely event that ancillary water that is required for dust suppression around the site it can be sourced externally from storage dams on adjoining Dandy Premix land to the north and under arrangement with the site's previous owners who have dams on neighbouring land to the immediate east. Any ancillary water required from these readily accessible sources would be transported the short (off road) distances required in the WA1488 Water Tanker Truck(s).

The total depth of the excavation is expected to be in the order of 25-30 metres throughout the majority of the Extraction Pit.

Extraction and rehabilitation of the Extraction Pit area will be carried out in a sequential manner with progressive rehabilitation following as closely as practicable behind extraction to ensure the amount of area within the Extraction Pit open/exposed at any given point in time is kept to a reasonably achievable minimum. This process will enable the timely use of stripped overburden and top soil stockpiles through placement and compaction of worked batter sections back to the terminal face to create stabilised, rehabilitated batter slopes that are safe and reduce the impact of extractive operations.

6.4. Effluent Control

The storage and handling of all hydrocarbons and other potential contanimants, including bulk fuel storage and filling operations will be carried out in a Service Containment Area located an appropriate and safe distance from extraction operations.

Oil changes, maintenance, washing and degreasing of mobile equipment, tools etc, will be carried out in the designated Service Containment Area on the site that will be

constructed with a concrete slab designed to ensure the suitable containment of any potential contaminants and to comply with EPA guidelines. This will include the provision of a triple interceptor pit.

Flammable and combustible liquids will be stored and handled in accordance with the Australian Standard *"The storage and handling of flammable and combustible liquids"*, AS 1940-2004, which will include the provision of a purpose designed storage facility(s).

Environmental spill kits, training and an accredited environmental disposal service will be in-place and readily accessible to ensure the safe, environmental control of these potential effluent sources.

7. Safety and Environmental Management

Measures to control the impacts of the operation both within the extraction area and the Work Authority area will be monitored for compliance with licence conditions and agreed standards.

There will be no blasting or use of explosives on the site.

The nearest resident is a minimum of 200 metres west and approximately 210 – 230 metres north-west and south/south-west of the proposed Extraction Pit.

The extraction and processing of materials will be relatively quiet. Operational noise is required to comply with the requirements of State Environment Protection Policy (SEPP) Noise in Regional Victoria (NIRV) October 2011 (replacing Interim Guidelines for Control of Noise from Industry in Country Victoria (N3/89) at the nearest sensitive site.

All engine powered mobile equipment and fixed plant will be modern and fitted with mufflers and spark arresters as appropriate.

Fire fighting equipment, will be maintained ready for use and to be fully effective at all times.

The servicing and maintenance of mobile equipment is to carried out in the designated service containment area of the site. Environmental spill kits will be readily accessible whenever equipment is serviced or refuelled on site.

Dust will be controlled in and around the site by the use of a Water Tanker Truck(s). Internal tracks and roads (the Site Access Track, Quarry Haul Road and the Quarry Access Ramp) along with the Temporary Overburden and Top Soil Stockpiles and the Extraction Pit stripping areas will be watered to control dust as required. Dust emissions will be measured at the site boundary in accordance with AS3580 Methods for Sampling and Analysis of Ambient Air, section 10.1.8.1 as required. Respirable dust will be monitored, as required by Occupation Health and Safety regulations at strategic work locations as required.

Surface runoff will be directed to drains edging all internal unsealed tracks and around the Hard Stand Area, including the raw sand and finished product stockpiles The drainage system directs water runoff into Sediment Ponds, the Northern Storage Dam and the Bioretention Basin prior to the Northern Drainage Tributary.

Top soil and overburden stockpiles will be protected from runoff erosion by interceptor and diverter drains. Top soil and overburden stockpile surfaces will also be contoured, stabilised and grassed to minimise water runoff velocity and wind erosion.

The "EPA Guidelines for the Control of Erosion of Construction Sites" will be applied to all disturbed areas, including construction of the top soil and overburden stockpile storages.

All lubricant recepticles and wastes will be collected and stored in appropriate waste disposal bins until periodically removed from site by an EPA licensed contractor. All domestic waste will be regularly removed from site under contract to an EPA licensed waste disposal company.

Mobile plant and equipment will use designated internal haul tracks to minimise the area of disturbance.

Surveyed extraction marker posts will clearly define the extraction area.

Regular site inspections for noxious weeds will be undertaken. Appropriate noxious weed management strategies and programs will be implemented as required.

In the event of a bushfire at the site or threatening the site, the Site Emergency Evacuation Procedures will be activated. Adequate water storage is available on the site from a number of storage and farm dams. The Water Tanker Truck(s) will be plumbed to fight fires and to assist local CFA units as a water supply carrier if required. Fully maintained fire extinguishers will be fitted to all mobile equipment, offices, amenties, workshops and strategically located in the vicinity of fixed plant on the Hard Stand Area.

7.1. Risk Assessment of Potential Impacts

Suitably qualified and experienced consultants have risk assessed the various public safety, environmental and public infrastructure impacts of the Work Authority 1488 development proposal.

The potential environmental impacts risk assessed include groundwater, surface water and drainage, noise, dust control, biodiversity, visual amenity and public safety, including road safety on the Bass Highway.

The following represents a summary of the key points and recommendations of the expert consultants reports which form part of this Work Authority application at Apendices 2 to 9 inclusive.

7.1.1. Drainage and Water Quality Management

- The hydrologic impact of WA1488 development will be an incremental loss of surface water runoff from the Extraction Pit excavation area which will be partially offset by increased runoff from the Hard Stand Area and the Site Access Track.
- Upslope surface runoff is to be deflected around the pit excavation at all stages by use of small fill berms so that runoff captured in the pit excavation will be kept to a minimum and upslope runoff prevented from entraining sediments from disturbed work areas as far as practicable.
- The upslope runoff is to be directed back into the Northern Drainage Tributary depression.
- Any pumpout water from the pit excavation, if required, will be transferred into the Northern Storage Dam and Bioretention Basin for treatment/reuse or disposal downstream.
- Mean annual Northern Drainage Tributary surface flows to Deep Creek are estimated to reduce by 20%.
- The impact of WA1488 should be reduced pollutant loads (TSS, TP & TN and associated pollutants) compared with existing conditions, at the Northern Drainage Tributary outlet to Deep Creek. This improvement should also be evidenced at the Deep Creek outlet into Western Port Bay.
- A monthly surface water quality monitoring program, in accordance with Table 9, Section 5.1 Surface Water Quality Monitoring of the Neil M Craigie Pty Ltd Drainage and Water Quality Management report of 16 May 2012, will be instituted for a minimum 12 month period with samples and test results for the following five sites:
    - Outlet pit of the Northern Storage Dam;
    - Outlet pit of the Bioretention Basin;
    - Northern Drainage Tributary at the western property boundary;
    - Deep Creek just upstream of the Northern Drainage Tributary confluence; and
    - Deep Creek at the Bass Highway.
- The parameters to be monitored will include:

- Temperature, Conductivity (uS/cm), pH, DO (mg/L), Turbidity (NTU), Suspended Solids (mg/L), TKN (mg/L), Nitrate N (mg/L0, Nitrite N (mg/L), TN (mg/L), TP (mg/L), TPH – total petroleum hydrocarbon (ug/L)s and Heavy Metal Scan (ugL).

- The monitoring program will be reviewed for monitoring frequency and parameters after a minimum of 12 sets of monthly records have been collated to adequately define the quality and any seasonal or other variations in the runoff.
- A Construction Management Plan (CMP) to include (but not be limited to) the following key factors will be prepared and implemented to ensure the environmental values of Deep Creek and Western Port Bay (RAMSAR site) are protected during the Greenfield site establishment works.
- All site works are to be carried out in accordance with contemporary best site management practice. This will include any temporary outfall drainage works that may be required in advance of downstream drainage construction;
- Implement erosion protection and control measures generally in accordance with provisions of:
  - *"Construction Techniques for Sediment Pollution Control" (EPA Publication No.275, 1991),*
  - *"Environmental Guidelines for Major Construction Sites" (EPA Publication No. 480, December 1995), and*
  - *"Doing it right on subdivisions. Temporary environmental protection measures for subdivision construction sites" (EPA Publication No. 960).*
- Areas of disturbance should be kept to a minimum with stage works areas clearly defined to prevent machine access or materials storage elsewhere. Livestock are to be completely excluded from the works area using existing or new fencing;
- Construct and establish the Quarry Access Road embankment, the North Sediment Ponds, Northern Storage Dam and integrated structures and excavate the the Bioretention Basin to act as a sedimentation pondage as part of initial construction. Completion of the bioretention filter, under-drainage system and establishment of aquatic/ephemeral vegetation communities in the Bioretention Basin in the next growing season;
- Divert runoff from undisturbed areas away from active work areas (especially the Extraction Pit upslope edges) by use of fill berms and NOT excavated drains;
- Locate top soil stockpiles at least 20 metres from any drainage line or pit;

- Remove soil and clay from tyres before trucks leave the Work Authority site; and
- All significant vegetation to be retained should be fenced out with appropriate setbacks prior to the commencement of any site works.

7.1.2. Groundwater - Hydrogeological Assessment

- No extraction of groundwater is proposed;
- The water table elevations are calculated to be about 2.0m to 4.0m AHD based on a conservative regional hydraulic gradient of 0.004;
- As no groundwater extraction is proposed there will not be any drawdown interference in local supply bores and no reduction in groundwater discharge (base flows) into Deep Creek;
- The water table, which slopes in a general westerly direction towards Western Port Bay, is below the base of Deep Creek along the northern boundary of the Work Authority site and only intersects the streambed west of the Bass Highway;
- The Work Authority site is within Zone 7 of the Koo Wee Rup Water Supply Protection Area which has a fully allocated annual groundwater extraction limit of 2545.5 ML. However, actual groundwater usage in Zone 7 is less than 40% of the total allocated volume;
- The salinity of groundwater sampled in the Brighton Group sediments beneath WA1488 is less than 500 mg/L TDS and is in Groundwater Beneficial Use Environment Segment A as defined in the SEPP Groundwaters of Victoria;
- The horizontal hydraulic conductivity of the predominately fine sand in the Extraction Pit is in the range of 20 to 30 m/day. The vertical hydraulic conductivity of these sands is estimated to be about 10 to 12 m/day;
- Rainfall recharge under pre-quarrying conditions was variable with lower infiltration rates (less than 10%) in the western portion of the Work Authority site where the Extraction Pit is located, with sand generally overlaid by a thicker layer of silt and clay;
- The recharge regime will change with development of the Extraction Pit through exposure of the sands resulting in higher vertical hydraulic conductivity and associated high infiltration characteristics. Direct recharge through the floor of the Extraction Pit will be reduced by sloping the pit floor towards the sump near the access ramp in the north-east corner of the pit.

- Water collected in the sump will be lost to evaporation from the free water surface and by seepage through the sump floor to the underlying water table;
- Daily rainfall recordings must be taken for the WA1488 site, collated and securely stored for accessibility and referral;
- Groundwater levels in the three purpose-installed observation or investigation (monitoring) bores - Southern Rural Water Works Licence ID: WLE054614, Bore Works ID's: WRK068863, WRK068864 and WRK068865 respectively, are to be measured at least every three months to enable the depth to groundwater to be mapped and to establish the relationship between rainfall and water table elevation;
- Any potentially contaminating activities at the WA1488 site such as the storage and handling of hydrocarbons must be in accordance with best practice and Australian Standards to ensure that local surface and groundwater resources are not contaminated; and
- The potential impact of the Extraction Pit on local groundwater or flow in Deep Creek does not depend on the shape ("footprint") of the pit or its location within WA1488, but on whether or not the pit intersects the water table. Consequently, any adjustment to the shape, extent and/or location of the pit will not cause drawdown interference or affect flow in Deep Creek provided the pit does not extend below the water table.

7.1.3. Ecology – Flora and Fauna

- DSE Interactive Map identifies EVC_16 Lowland Forest, a 'Vulnerable' EVC, as the vegetation type that once covered the Extraction Pit and Hard Stand Area of WA1488;
- DSE mapping records EVC_53 Swamp Scrub, an 'Endangered' EVC, downstream of the Northern Drainage Tributary beyond the north west WA1488 site boundary and extending across the Bass Highway;
- Design of the Extraction Pit avoids impacts on 'Native Vegetation', being located on grazing land without indigenous trees, except for emergent Cumbungi in a small farm dam, which is an artificial landform;
- The alignment of the Site Access Track across the Northern Drainage Tributary, a deeply incised channel, utilises a gap between trees and therefore avoids the Tree Retention Zone of trees in the tributary/channel – no trees will be removed;

- The removal of 'Native Vegetation' is restricted to some scattered grasses and shrubs that, collectively, are beneath the threshold of 25% triggering a 'Net Gain' assessment and consideration of 'Offsets' under the terms of *The Framework*;
- Perimeter planting of 'screening' vegetation will be in keeping with the environment of the site and use indigenous species of local provenance;
- Reclamation and replanting of the Northern Drainage Tributary of Deep Creek will be carried out to add a native vegetation community to and buffer the 'Endangered' patch of 'Swamp Scrub' immediately downstream of the Work Authority;
- Noxious Noxious weeds (Appendix 1 - Catchment and Land Protection Act 1994) and the listed 'invasive species' Red Fox and Blackberry (Commonwealth EPBC Act 1999) will be controlled on the Work Authority site;
- No taxon or flora and fauna Listed under the provisions of the Flora and Fauna Guarantee Act 1988 (FFG Act) have been recorded on-site and none is likely except for flying over (e.g. Swift Parrot) or visiting water features during wet seasons (e.g. Eastern Great Egret); and
- The Work Authority site has no apparent liability arising from requirements of the Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act), although DSE records show three species of EPBC-listed animals within about 5km of the Work Authority site.

7.1.4. Noise

- The October 2011 EPA noise in regional Victoria guidelines – NOISE FROM INDUSTRY IN REGIONAL VICTORIA, Recommended Maximum Noise Levels from Commerce, Industry and Trade Premises in Regional Victoria (NIRV) – apply to the WA1488 site;
- The NIRV Recommended Maximum Noise Levels (RMNLs) for the site are:
  - 'Day' 7.00am – 6.00pm Monday to Friday & 7.00am – 1.00pm Saturday:

    50 dB(A)
  - 'Night' 6.00am – 7.00am Monday to Friday:

    45 dB(A)
- A noise barrier is to be constructed to an overall height of 4.0 metres relative to the finished RL of the Hard Stand Area. The barrier can be a combination of earth

bunding and solid panels to the required 4.0 metre total height. The noise barrier is to be installed along the south-western, western and north-western arc of the Hard Stand Area as outlined on the Figure 5 Development Plan;

- All mobile equipment will be fitted with 'new generation' broadband reverse alarms which vary their noise output according to the ambient noise level. The reversing beepers are to selected for the lowest noise level consistent with safe operations;
- The sales product stockpile(s) and their access route within the Hard Stand Area is to be configured so as to minimise the need for sales delivery trucks to reverse;
- Any above ground stripping of top soil or overburden, particularly in the western sections of the Extraction Pit, along with the formation of bunds, access routes, water storage dams, sediment ponds and the bioretention basin will only be carried out after 7.00am. This is to ensure noise levels are within the NIRV Recommended Maximum Noise Levels (RMNLs) day limits and to avoid impact on local amenity during the EPA defined night period;
  - Extractive operations in the lower AHD levels of the north-west (front) section of the Extraction Pit, proposed to be the final area of pit extraction, will also be carried out after 7.00am to comply with the NIRV day limits;
- The proposed directional extraction plan will deliver several operational noise emission benefits in so far as:
  - It facilitates the efficient winning of resource from the north, north-east quadrant of the Extraction Pit where there is the least depth of overburden to be removed;
  - The north, north-east area of the Extraction Pit is closest in proximity to the processing plant Hard Stand Area providing additional early production efficiencies;
  - It enables higher equipment noise levels generated during the initial above ground stripping activities required to open up the Extraction Pit to be at maximum separation from residences to the west, south-west and to a slightly lesser extent, the north-west of the Work Authority site; and
  - It enables extraction to proceed in a westerly, then south-westerly direction through the Extraction Pit with mobile plant operating at depths well below natural ground level thereby ensuring optimal mitigation of noise to off-site receptors to the direct west, the north-west and south-west.

- This approach will provide significant noise attenuation benefit as extraction activities extend to the west and in particular, the lower AHD north-west terminal face of the Extraction Pit. The north-west segment of the Extraction Pit will be the final area of extraction ensuring it is worked from a minimum of 5 metres below the natural ground surface level; and

- DPQ will remove the engine exhaust brake system fitted to those of it's fleet of quarry product heavy vehicles (essentially fixed tray and 4 axle dog trailers) to be used to transport product from the DPQ Grantville Work Authority (WA1488) site. This initiative will significantly reduce the potential for noise impact from these heavy vehicles entering the site from the Bass Highway, especially during the 6.00am to 7.00am EPA defined night period.
- DPQ will only consider retrofitting engine exhaust brakes to these heavy vehicles if a suitable product is identified as being available, or become available in the future and their evaluation fully satisfies the NIRV noise level requirements of the WA1488 site and any related OHS considerations.

7.1.5. Dust

- Dust control measures and safeguards set out in the DPQ Dust Control Management Plan are comprehensive, achievable and more stringent than those described in the EPA's "Environmental Guidelines for Major construction Sites". Best Practice Management Guidelines Series, Publication 480 (December 1995);
- The DPQ Dust Control Management Plan is to be implemented at all times site operations are being carried out;
- The nearest sensitive land uses are located beyond the EPA's recommended 200 metre buffer distance from operations;
- There must always be an adequate supply of water in storage on-site to implement the dust control measures outlined in the DPQ Dust Control Management Plan. The estimated 35 ML peak annual water demand for dust control only represents approximately 16% of the mean annual runoff from the Northern Drainage Tributary which feeds the Northern Storage Dam, the Existing Farm Dam and the Bioretention Basin which are each on-site water supply sources for dust control;
- Local winds are predominately from the west and north-west sectors which places the DPQ operations downwind of the nearest sensitive uses.

- Winds which have the greatest potential to generate dust emissions during the summer and autumn months are strong winds from the north to north-east;
- The DPQ Dust Control Management Plan provides for operations to be suspended during extreme weather conditions which could result in significant off-site dust emissions upwind from nearby sensitive uses; and
- Dustfall monitoring will provide an indication of the contribution of the DPQ operation to dust deposition rates at the WA1488 site boundary.

7.1.6. Landscape and Visual Impact

- The proposed WA1488 quarry development will have negligible or no landscape and visual impact on the surrounding areas;
- Zone of Visual Influence mapping combined with a site visit investigation identified only one location with potential visibility of the proposed quarry;
- The one view with potentially negligible visibility of the quarry Temporary Overburden Storage stockpile is from The Shuntoff, east to south-east of the proposed Work Authority site;
- The Shuntoff view requires further modelling (which will be undertaken) to confirm the potential visibility; and
- Visibility of the proposed WA1488 quarry development from other locations within the Zone of Visual Influence locations is screened by vegetation within the road reserve and vegetation within the broader landscape and landform.

7.1.7. Traffic Management

- Access to the proposed Work Authority site is directly off the VicRoads controlled Bass Highway;
- The Bass Highway is a duplicated highway providing two traffic lanes in either direction with approximately 3.5 metres of sealed shoulder pavement for several hundred metres prior to the proposed left hand turn into the site for vehicles travelling south away from Melbourne. A deceleration lane is proposed to be constructed to enable safe heavy vehicle site access;
- Vehicles travelling north towards Melbourne will have use of an existing right turn lane and median strip slot to perform a safe right turn into the site;

- Traffic signals which will be activated by vehicles exiting the site are proposed to be installed to ensure the safe egress of heavy vehicles turning right onto the Bass Highway to travel north towards Melbourne. This will be the exit direction of travel for the greater majority of the loaded heavy vehicles exiting the site;
- Provision has been made in the Preliminary Plan Functional Layout Plan for a free left turn for vehicles exiting the site south towards Grantville township without the necessity to wait for the Bass Highway traffic signals to change if there is no south-bound traffic in the vicinity;
- The Bass Highway sightlines in both the northerly and southerly directions from the proposed Work Authority site entry point from the highway are excellent in terms of distance and the lack of visual obstruction;
- Internal site access will be via the sealed Site Access Track to the Hard Stand Area where sales loading will be carried out and the Work Authority Weighbridge/Office is co-located with the product stockpile(s);
- The planned layout of the Hard Stand Area including the sales loading and Weighbridge/Office operations will be such that the requirement to reverse heavy delivery vehicles will be avoided;
- A 25kph speed limit will apply on the Site Access Track.

7.2 Aboriginal Cultural Heritage Controls

All Aboriginal sites, places and objects in Victoria are protected under the Aboriginal Heritage Act 2006. It is an offence to willfully deface damage or otherwise interfere with an Aboriginal object or place without obtaining prior written consent from the relevant local Aboriginal community.

Activity on the land must comply with the provisions of the Aboriginal Heritage Act 2006 in particular:

> Paraphrasing … "A person must not knowingly or negligently deface or damage or otherwise interfere with an archaeological relic or carry out an act likely to endanger a relic except in accordance with a consent …" and
>
> "… a person who discovers an archaeological relic must as soon as practicable report the discovery to the Executive Director or an inspector unless he or she has reasonable cause to believe that the relic is recorded in the Heritage Register;"

and

> "if an archaeological relic is discovered in the course of excavation on any land, the person in charge of the construction or excavation must as soon as practicable report the discovery to the Executive Director."

We acknowledge that development works must cease immediately upon the discovery of any Aboriginal cultural material, and Aboriginal Affairs Victoria must be notified immediately of any such discovery at GPO Box 2392V, Melbourne, 3000.

If suspected human remains are discovered in the course of development, work in the area will cease and the Police or State Coroner's Office will be informed of the discovery without delay. The State Coroner's Office is contactable at any time on ph. (03) 9684 4444 and this number will be readily accessible at the site Office.

If there are reasonable grounds to suspect that the remains are Aboriginal, the discovery will also be reported to Aboriginal Affairs Victoria (AAV) on ph. 1300 888 544 or (03) 9208 3287. AAV will ensure the local Aboriginal community(s) is informed about the circumstances of the discovery. Currently, there is no Registered Aboriginal Party (RAP) for the area, but there are two Aboriginal Communities local to the area who will be informed.

We will not touch or otherwise interfere with the remains, other than to safeguard them from further disturbance, and there will be no contact with the media about any discovery.

8. Rehabilitation

8.1. Objectives and End Use

The objectives of the Rehabilitation Plan are to -

- create a safe and stable landform that complies with the agreed rehabilitation commitments;
- control and manage any adverse environmental or amenity impacts of the site; and
- develop a landform suitable for continuing agricultural use.

The proposed end use for the site will be a return to pasture for agricultural activities.

8.2. Disturbed Areas & Progressive Rehabilitation

During site development ongoing consideration and effort will be given to minimising the area of disturbance, particularly in the Extraction Pit. The disturbed area allows for Extraction Pit stripping, extraction/working faces, Quarry Access Haul Track(s), Stockpiles and the (plant, equipment and load out) Hard Stand Area.

Progressive rehabilitation on the site will occur as the extraction faces advance from the initial north-east quadrant of the Extraction Pit to the west and thereafter to the south/south-west and finally to the front north-west segment. In line with the anticipated extraction plan, rehabilitation will commence during the latter part of the intermediate stage of extraction.

Thereafter, progressive rehabilitation will be continual at a practicable distance behind the working face throughout the remaining life of the Extraction Pit.

Overburden removed in the initial and intermediate stages of extraction and not required for use in site infrastructure establishment works, will be stockpiled in the designated Temporary Overburden Stockpile site located in a large, suitably contoured southern paddock on the Work Authority site.

The Temporary Overburden Stockpile site is located in close proximity to the Extraction Pit, is visually screened by the Crown Land Nature Reserve and drains naturally to the Northern Drainage Tributary as part of its subcatchment area. A Sediment Pond will be constructed in the Northern Drainage Tributary below the Temporary Overburden Stockpile to reduce the potential for sediment flow down the tributary to the Northern Storage Dam.

All overburden in the Temporary Overburden Stockpile will be used in completion of the Extraction Pit rehabilitation. The area will then be regraded, tidied and returned to grazing pasture.

While it is not envisaged that externally sourced fill materials will be used in the site rehabilitation, in the event such a need arises, it will be considered if the fill material is EPA approved, available to assist the Rehabilitation Plan and/or provides a community benefit.

8.3. Revegetation

Top soil that is stripped from the last area of extraction will be used directly to provide a minimum 200mm deep cover over the contoured and scarified clay overburden backfill surfaces of the earlier worked out areas of the Extraction Pit.

Fertilising and sowing down of top soiled surfaces with appropriate pasture grasses will follow on directly behind.

Drainage from the rehabilitated areas of the Extraction Pit will be by gently contouring and interceptor drains through a series of sediment collection/bioretention ponds, leading to the recharge aquifer in the pit floor. Other areas to be rehabilitated and sown to pasture using the same methods are the processing plant Hard Stand Area, internal Quarry Access and other Haul Tracks and the Temporary Overburden and Top Soil Storage sites, refer Figure 6 Rehabilitation Plan

The Rehabilitation Plan proposes the land is essentially revegetated back to a similar pastoral enterprise as that prior to extractive industries development. Shelter belts will be established, other patches of native tree planting carried out and the Northern Drainage Tributary will be enhanced by the planting of aquatic/ephemeral and native vegetation communities to enhance the ecological value and aesthetics of the property. Appropriate pasture types as determined through research and experience, will be sown and fertilised.

A variety of revegetation procedures may be required to establish the viable, healthy tree cover envisaged, but typically will involves tube stock planting, brush matting or direct seeding. Species and typical densities used in the rehabilitation are included in Appendix 5 Revegetation Species.

8.4. Final Rehabilitation

Final rehabilitation will see all faces finished with a 7.5 metre wide bench and drainage every 15 metres, formed to a 1V:3H batter. The floor areas will be lightly covered with clay

overburden, lightly ripped, spread with soil, fertilised and sown down with pasture grasses in keeping with those contained on the undisturbed areas of the property.

Internal Site Access Tracks not required for land management purposes and the processing plant Hard Stand Area will also be lightly ripped, top soiled and sown down to pasture.

All plant and equipment will be removed from the site.

All product stockpiles will be removed.

All clay overburden and top soil stockpiles not required for rehabilitation purposes will be graded and revegetated as pasture.

8.5 Noxious Weed Monitoring

Regular noxious weed inspections will be completed and the results discussed with DSE. Appropriate noxious weed management strategies and programs will be implemented following the discussions with DSE and liaison with the Phillip Island Landcare Group. Methods may include but not be limited to hand pulling, mechanical removal and spraying.

9. Community Engagement Plan

The Community Engagement Plan that forms part of this Work Plan will be implemented to comply with requirements introduced by the Department of Primary Industries (DPI) under the *Mineral Resources (Sustainable Development) Act* 1990 (The Act) and the *Mineral Resources Development Regulations* 2002 .

The Community Engagement Plan is included as an Accompanying Document to the Work Plan to enable it to be readily updated as circumstances require.

The aim of the Community Engagement Plan, which has been written to accord with the Department of Primary Industries "Community Engagement – Guidelines for Mining and Minerals Exploration in Victoria", May 2008, is for DPQ to fulfill it's duty to consult with local communities and to share relevant information about the quarry's activities that may have the potential to impact a range of environmental and other amenities of importance to the local community.

Every reasonable opportunity will be provided for the community to express their views, share their values and be actively engaged in shaping and monitoring activities at the proposed Work Authority 1488 (WA1488) site.

The Community Engagement Plan is an evolving or "living" document that will be updated to reflect the outcome of ongoing consultation and engagement on various levels, including but not limited to, the proposed Grantville public meeting, engagement with various environmental and local community special interest groups, local business, the Bass Coast Shire Council and individual members of the local community

.

APPENDIX 1 Copy of Land Titles

1393 – 1395 Bass Highway, Grantville 3984

WA (Bill) & RR (Roy) Blackmore

Summary of Property Title and Plan Details

	Lot No.	Title Plan (TP) or Plan of Subdivision (PS)	Volume	Folio	Crown Allotment	Parish	Size (Approx) Acres or Hectares	Description
1	1	TP 398939V	05390	819	174A	Corinella	3A 3R 25P	Roy & Gwen's (North-West) house block and front paddock to Bass Hwy
2	N/a	TP 267029V	07824	032	176B	Corinella	5A 3R 38P	Bill & Val's (South-West) house block and front paddock to Bass Hwy
3	4	PS 604744H	11044	475		Corinella	Approx 33A	Front (West) paddocks behind house blocks
4	5	PS 604744H	11044	476		Corinella	Approx 33A	Front (West) paddocks behind house blocks
5	2	PS 300991J	10031	148	219A & 218 (Part)	Corinella	125.1 Ha (Approx 310A)	Rear (East) portion of property, contains gully and native vegetation to rear both North & South

SUITE 1, 675 BORONIA ROAD
WANTIRNA 3152
PH (03) 9887 2888
FAX (03) 9887 3897
EMAIL surveyors@landair.com.au
WEB www.landair.com.au

SURVEYORS REFERENCE:
2110611 / 2011 06 17 TITLE COMPILATION

CO-ORDINATES ARE TO MGA (MAP GRID OF AUSTRALIA)
VIDE Gdait from SP21045

DATE OF PLAN: 17/06/2011
DRAWN BY: PT

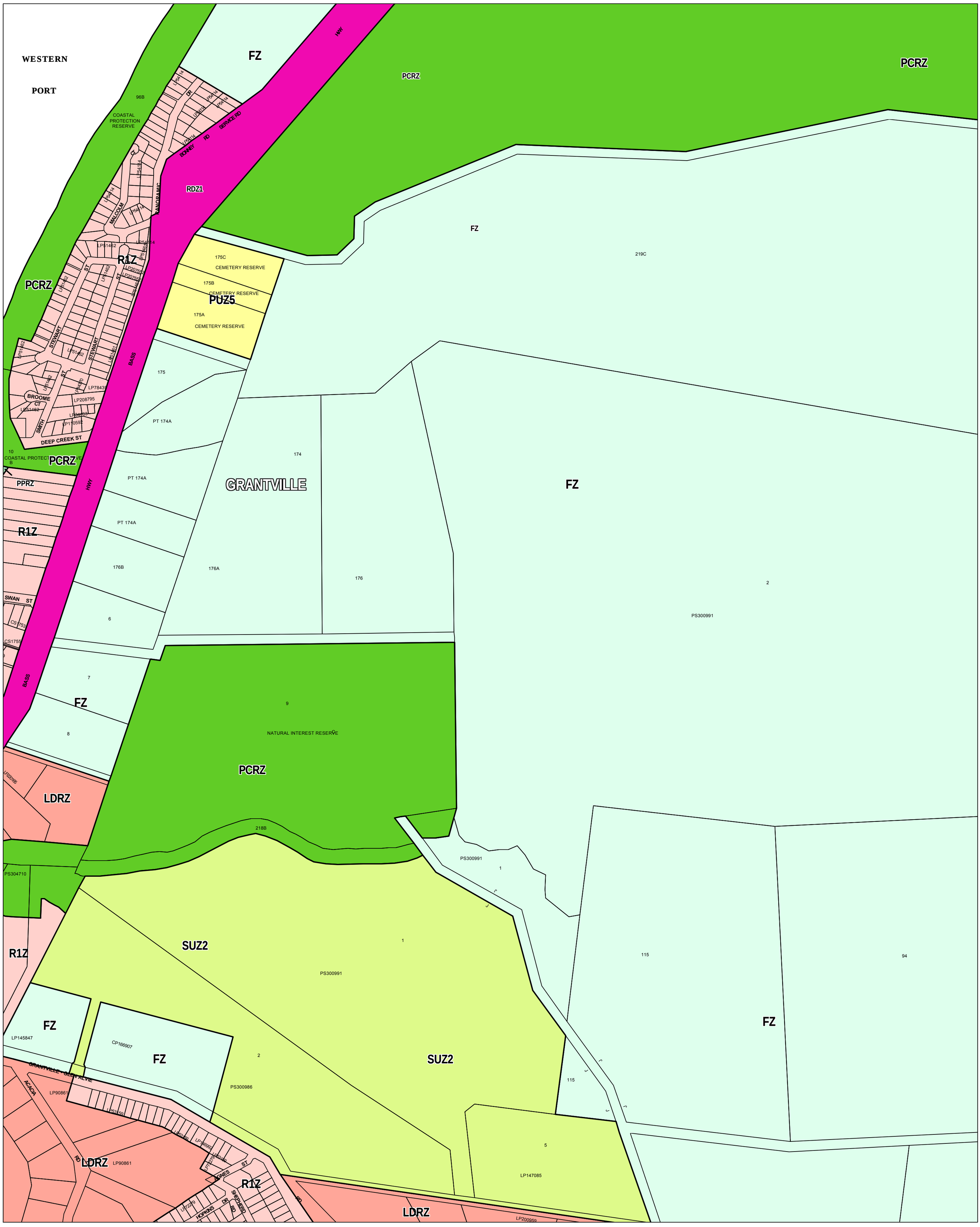
SCALE
0 45 90 135 180 225
LENGTHS ARE IN METRES

ORIGINAL
SCALE 1:3000
SHEET SIZE A1

SHEET
1 OF 1

DANDY PREMIX
TITLE COMPILATION
GRANTVILLE

BASS COAST PLANNING SCHEME - LOCAL PROVISION



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This map should be read in conjunction with additional Planning Overlay Maps (if applicable) as indicated on the INDEX TO MAPS.

Public Land

- PCRZ — Public Conservation And Resource Zone
- PPRZ — Public Park And Recreation Zone
- PUZ5 — Public Use Zone - Cemetery/crematorium
- RDZ1 — Road Zone - Category 1

Residential

- LDRZ — Low Density Residential Zone
- R1Z — Residential 1 Zone

Rural

- FZ — Farming Zone

Special Purpose

- SUZ2 — Special Use Zone - Schedule 2

100 0 100 200 300 400 500 m

AUSTRALIAN MAP GRID ZONE 55

N

Victoria The Place To Be

INDEX TO ADJOINING METRIC SERIES MAP

Printed: 9/10/2008

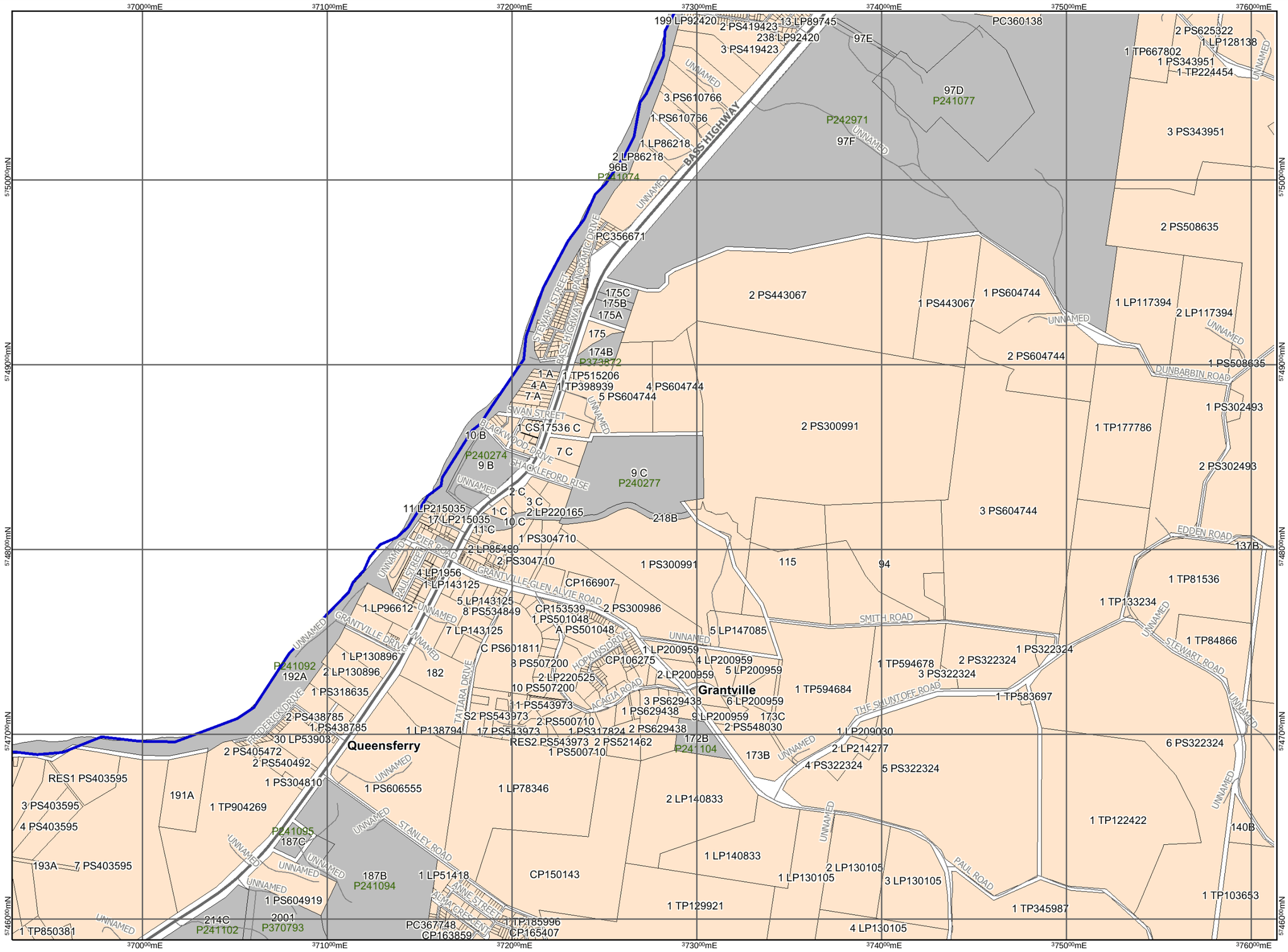
AMENDMENT C72

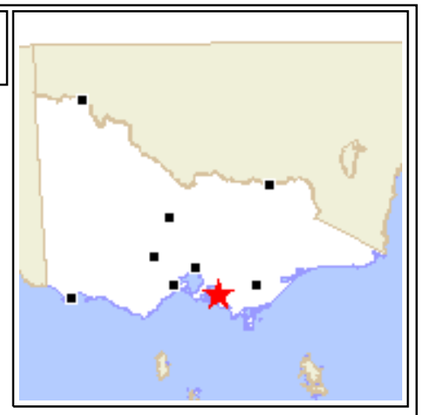
ZONES

MAP No 14

Department of Primary Industries

Map created Wed Jun 15 16:56:41 EST 2011





Legend

Roads (vmtrans)

- Freeway
- Highway
- Main Road
- Other
- Property - Parcel Description
- Crown Land
- Property - Address

GN

MN

Map Server: P00403

Map Service: erd_geovic_v2_7

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Produced on Wed Jun 15 16:57:00 EST 2011

Map Scale 1:20,947

Projection: MGA_55

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Department of Sustainability and Environment
State Government Victoria
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VOLUME 08869 FOLIO 053

Security no : 124037179829V
Produced 22/03/2011 01:04 pm

LAND DESCRIPTION

Lot 1 on Title Plan 515206V (formerly known as part of Crown Allotment 174A Parish of Corinella).
PARENT TITLE Volume 05042 Folio 206
Created by instrument D955090 09/02/1971

REGISTERED PROPRIETOR

Estate Fee Simple
Sole Proprietor
MAHA BASTWROUS of 4 CROWS LANE GLEN WAVERLEY VIC 3150
AF034092M 30/04/2007

ENCUMBRANCES, CAVEATS AND NOTICES

Any encumbrances created by Section 98 Transfer of Land Act 1958 or Section 24 Subdivision Act 1988 and any other encumbrances shown or entered on the plan set out under DIAGRAM LOCATION below.

DIAGRAM LOCATION

SEE TP515206V FOR FURTHER DETAILS AND BOUNDARIES

ACTIVITY IN THE LAST 125 DAYS

NIL

----------END OF REGISTER SEARCH STATEMENT----------

Additional information: (not part of the Register Search Statement)

Street Address: 1381 BASS HIGHWAY GRANTVILLE VIC 3984

DOCUMENT END

Imaged Document Cover Sheet

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TITLE PLAN		EDITION 1	TP 515206V

Location of Land

Parish: CORINELLA
Township:
Section:
Crown Allotment: 174A(PT)
Crown Portion:

Last Plan Reference:
Derived From: VOL 8869 FOL 053
Depth Limitation: NIL

Notations

ANY REFERENCE TO MAP IN THE TEXT MEANS THE DIAGRAM SHOWN ON THIS TITLE PLAN

Description of Land / Easement Information

THIS PLAN HAS BEEN PREPARED FOR THE LAND REGISTRY, LAND VICTORIA, FOR TITLE DIAGRAM PURPOSES AS PART OF THE LAND TITLES AUTOMATION PROJECT
COMPILED: 27/06/2000
VERIFIED: GB

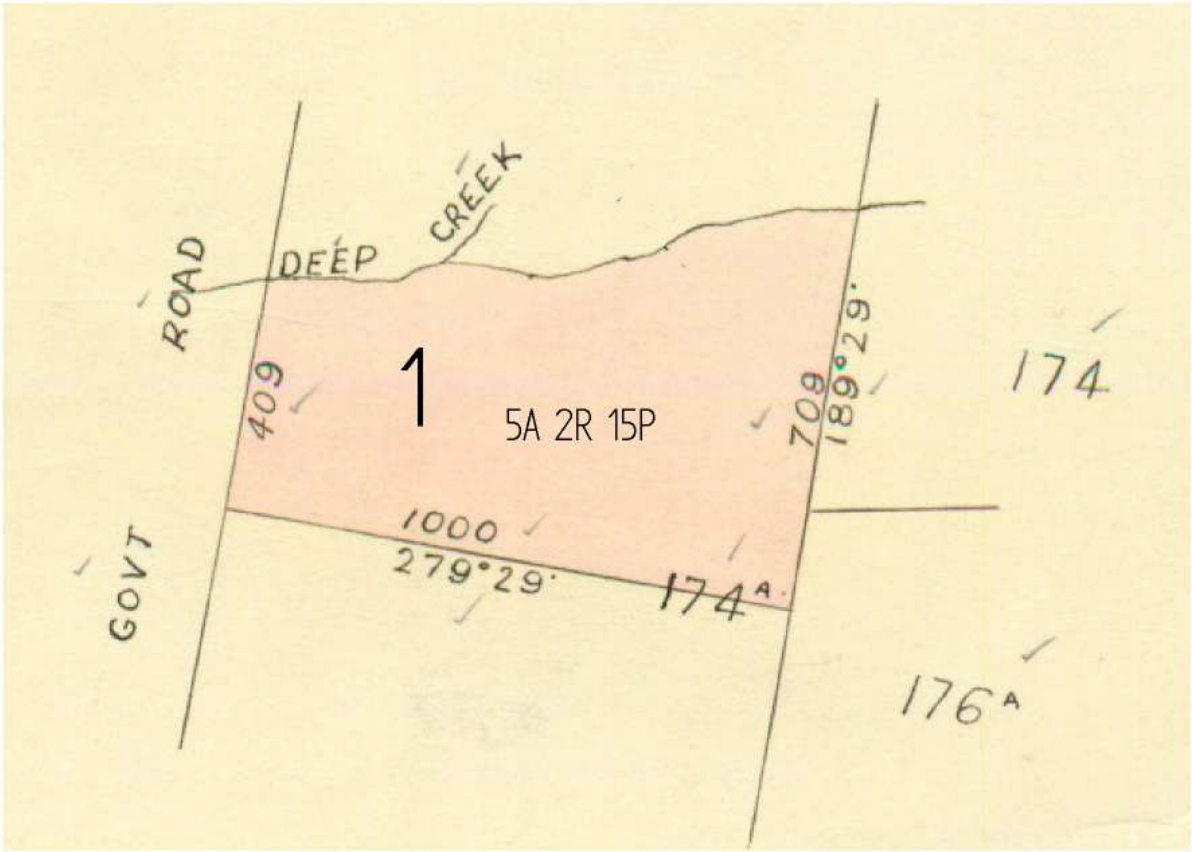

TABLE OF PARCEL IDENTIFIERS
WARNING: Where multiple parcels are referred to or shown on this Title Plan this does not imply separately disposable parcels under Section 8A of the Sale of Land Act 1962
PARCEL 1 = CA 174A (PT)

LENGTHS ARE IN LINKS	Metres = 0.3048 x Feet Metres = 0.201168 x Links		Sheet 1 of 1 sheets

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REGISTER SEARCH STATEMENT (Title Search) Transfer of Land Act 1958

VOLUME 05390 FOLIO 819 Security no : 124037984831T
Produced 03/06/2011 04:31 pm

LAND DESCRIPTION

Lot 1 on Title Plan 398939V (formerly known as part of Crown Allotment 174A Parish of Corinella).
PARENT TITLE Volume 05042 Folio 206
Created by instrument 1361860 17/04/1928

REGISTERED PROPRIETOR

Estate Fee Simple
TENANTS IN COMMON
As to 1 of a total of 2 equal undivided shares
Sole Proprietor
WILLIAM ARTHUR BLACKMORE of 21 BLOOMFIELD ROAD NOBLE PARK
As to 1 of a total of 2 equal undivided shares
Sole Proprietor
ROY ROGERS BLACKMORE of 21 BLOOMFIELD ROAD NOBLE PARK
F168067 17/01/1974

ENCUMBRANCES, CAVEATS AND NOTICES

Any encumbrances created by Section 98 Transfer of Land Act 1958 or Section 24 Subdivision Act 1988 and any other encumbrances shown or entered on the plan set out under DIAGRAM LOCATION below.

DIAGRAM LOCATION

SEE TP398939V FOR FURTHER DETAILS AND BOUNDARIES

ACTIVITY IN THE LAST 125 DAYS

NIL

----------END OF REGISTER SEARCH STATEMENT----------

Additional information: (not part of the Register Search Statement)

Street Address: 1393 BASS HIGHWAY GRANTVILLE VIC 3984

DOCUMENT END

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TITLE PLAN		EDITION 1	TP 398939V

Location of Land

Parish: CORINELLA
Township:
Section:
Crown Allotment: 174A (PT)
Crown Portion:

Last Plan Reference:
Derived From: VOL 5390 FOL 819
Depth Limitation: NIL

Notations

ANY REFERENCE TO MAP IN THE TEXT MEANS THE DIAGRAM SHOWN ON THIS TITLE PLAN

Description of Land / Easement Information

THIS PLAN HAS BEEN PREPARED FOR THE LAND REGISTRY, LAND VICTORIA, FOR TITLE DIAGRAM PURPOSES AS PART OF THE LAND TITLES AUTOMATION PROJECT
COMPILED: 11/04/2000
VERIFIED: GB

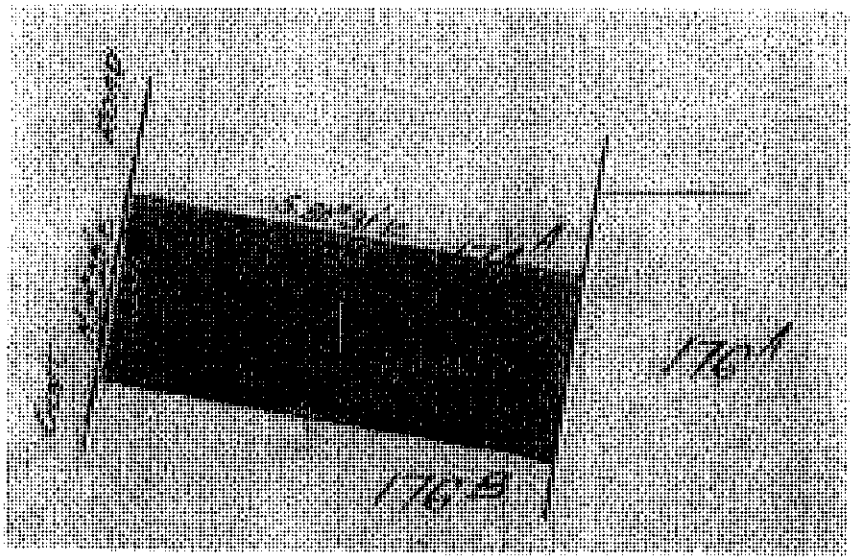

TABLE OF PARCEL IDENTIFIERS
WARNING: Where multiple parcels are referred to or shown on this Title Plan this does not imply separately disposable parcels under Section 8A of the Sale of Land Act 1962
PARCEL 1 = CA 174A (PT)

LENGTHS ARE IN LINKS	Metres = 0.3048 x Feet Metres = 0.201168 x Links		Sheet 1 of 1 sheets

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REGISTER SEARCH STATEMENT (Title Search) Transfer of Land Act 1958

VOLUME 07824 FOLIO 032

Security no : 124037984848A
Produced 03/06/2011 04:33 pm

LAND DESCRIPTION

Crown Allotment 176B Parish of Corinella.
PARENT TITLE Volume 00635 Folio 957
Created by instrument 2479151 28/03/1952

REGISTERED PROPRIETOR

Estate Fee Simple
TENANTS IN COMMON
As to 1 of a total of 2 equal undivided shares
Sole Proprietor
WILLIAM ARTHUR BLACKMORE of 21 BLOOMFIELD ROAD NOBLE PARK
As to 1 of a total of 2 equal undivided shares
Sole Proprietor
ROY ROGERS BLACKMORE of 21 BLOOMFIELD ROAD NOBLE PARK
F168067 17/01/1974

ENCUMBRANCES, CAVEATS AND NOTICES

For details of any other encumbrances see the plan or imaged folio set out under DIAGRAM LOCATION below.

DIAGRAM LOCATION

SEE TP267029V FOR FURTHER DETAILS AND BOUNDARIES

ACTIVITY IN THE LAST 125 DAYS

NIL

----------END OF REGISTER SEARCH STATEMENT----------

Additional information: (not part of the Register Search Statement)

Street Address: 3195 BASS HIGHWAY GRANTVILLE VIC 3984

DOCUMENT END

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TITLE PLAN		EDITION 1	TP 267029V

Location of Land

Parish: CORINELLA
Township:
Section:
Crown Allotment: 176B
Crown Portion:

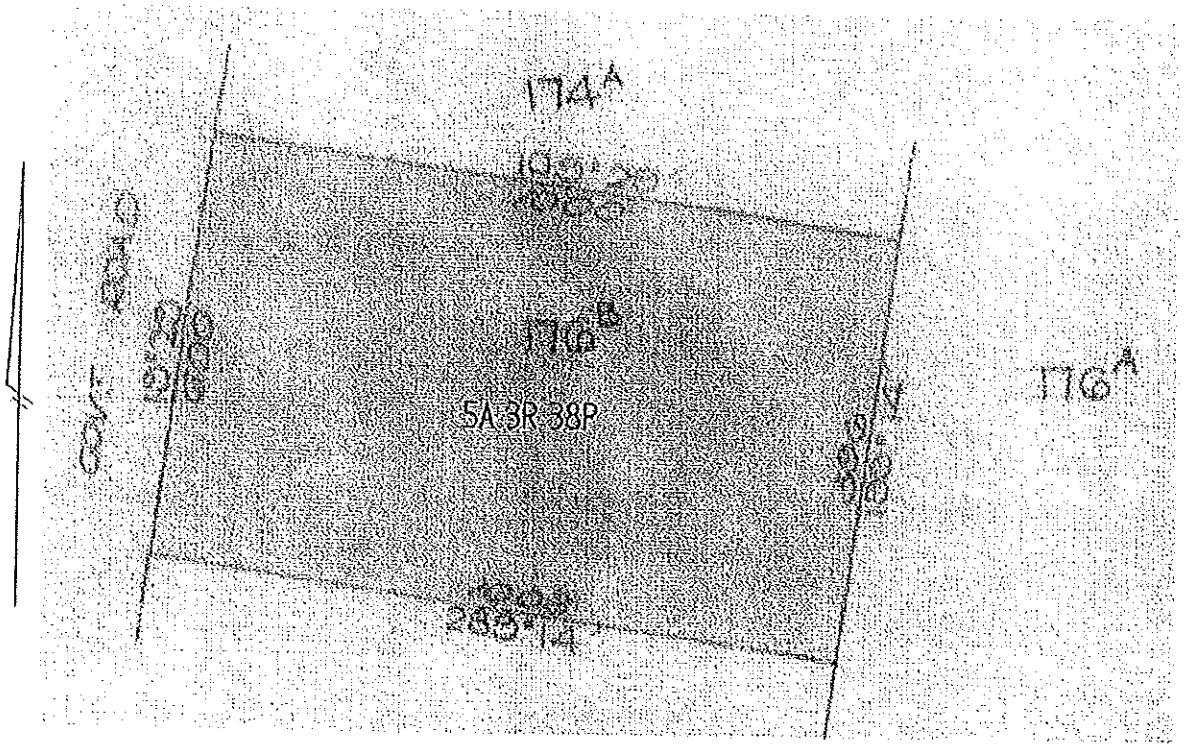
Last Plan Reference:
Derived From: VOL 7824 FOL 032
Depth Limitation: NIL

Notations

ANY REFERENCE TO MAP IN THE TEXT MEANS THE DIAGRAM SHOWN ON THIS TITLE PLAN

Description of Land / Easement Information

THIS PLAN HAS BEEN PREPARED FOR THE LAND REGISTRY, LAND VICTORIA, FOR TITLE DIAGRAM PURPOSES AS PART OF THE LAND TITLES AUTOMATION PROJECT
COMPILED: 10/01/2000
VERIFIED: BH



LENGTHS ARE IN LINKS	Metres = 0.3048 x Feet Metres = 0.201168 x Links		Sheet 1 of 1 sheets

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REGISTER SEARCH STATEMENT (Title Search) Transfer of Land Act 1958

VOLUME 11044 FOLIO 475 Security no : 124037984881P
Produced 03/06/2011 04:34 pm

LAND DESCRIPTION

Lot 4 on Plan of Subdivision 604744H.
PARENT TITLES :
Volume 01563 Folio 433 Volume 02283 Folio 499 Volume 03483 Folio 463
Volume 08863 Folio 989 to Volume 08863 Folio 990
Created by instrument PS604744H 17/12/2007

REGISTERED PROPRIETOR

Estate Fee Simple
TENANTS IN COMMON
As to 1 of a total of 2 equal undivided shares
Sole Proprietor
WILLIAM ARTHUR BLACKMORE of 1393-1395 BASS HIGHWAY GRANTVILLE VIC 3984
As to 1 of a total of 2 equal undivided shares
Sole Proprietor
ROY ROGERS BLACKMORE of 1393-1395 BASS HIGHWAY GRANTVILLE VIC 3984
PS604744H 17/12/2007

ENCUMBRANCES, CAVEATS AND NOTICES

Any encumbrances created by Section 98 Transfer of Land Act 1958 or Section 24 Subdivision Act 1988 and any other encumbrances shown or entered on the plan set out under DIAGRAM LOCATION below.

AGREEMENT Section 173 Planning and Environment Act 1987
AF196772F 11/07/2007

DIAGRAM LOCATION

SEE PS604744H FOR FURTHER DETAILS AND BOUNDARIES

ACTIVITY IN THE LAST 125 DAYS

NIL

DOCUMENT END

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REGISTER SEARCH STATEMENT (Title Search) Transfer of Land Act 1958

VOLUME 11044 FOLIO 476 Security no : 124037984899U
Produced 03/06/2011 04:35 pm

LAND DESCRIPTION

Lot 5 on Plan of Subdivision 604744H.
PARENT TITLES :
Volume 01563 Folio 433 Volume 02283 Folio 499 Volume 03483 Folio 463
Volume 08863 Folio 989 to Volume 08863 Folio 990
Created by instrument PS604744H 17/12/2007

REGISTERED PROPRIETOR

Estate Fee Simple
TENANTS IN COMMON
As to 1 of a total of 2 equal undivided shares
Sole Proprietor
WILLIAM ARTHUR BLACKMORE of 1393-1395 BASS HIGHWAY GRANTVILLE VIC 3984
As to 1 of a total of 2 equal undivided shares
Sole Proprietor
ROY ROGERS BLACKMORE of 1393-1395 BASS HIGHWAY GRANTVILLE VIC 3984
PS604744H 17/12/2007

ENCUMBRANCES, CAVEATS AND NOTICES

Any encumbrances created by Section 98 Transfer of Land Act 1958 or Section 24 Subdivision Act 1988 and any other encumbrances shown or entered on the plan set out under DIAGRAM LOCATION below.

AGREEMENT Section 173 Planning and Environment Act 1987
AF196772F 11/07/2007

DIAGRAM LOCATION

SEE PS604744H FOR FURTHER DETAILS AND BOUNDARIES

ACTIVITY IN THE LAST 125 DAYS

NIL

DOCUMENT END

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PLAN OF SUBDIVISION

STAGE NO.	LR use only	Plan Number
—	EDITION 1	PS604744H

Location of Land

Parish: CORINELLA

Township: ——

Section: ——

Crown Allotment: 116, 176, 174, 176A

Crown Portion: ——

Title Reference: VOL.8863 FOL.989
VOL.8863 FOL.990
VOL.2283 FOL.499
VOL.1563 FOL.433
VOL.3483 FOL.463

Last Plan Reference: LP87345 (LOTS 1 & 2)

Postal Address: (at time of subdivision) 10 SMITH ROAD GRANTVILLE VIC 3984

MGA Co-ordinates (of approx. centre of land in plan) E 374 705 N 5748 400 ZONE: 55

Council Certification and Endorsement

Council Name: BASS COAST SHIRE COUNCIL Ref: 7205000600

1. This plan is certified under section 6 of the Subdivision Act 1988.
~~2. This plan is certified under section 11(7) of the Subdivision Act 1988.~~
~~Date of original certification under section 6 / /~~
~~3. This is a statement of compliance issued under section 21 of the Subdivision Act 1988.~~

OPEN SPACE

(i) A requirement for public open space under section 18 of the Subdivision Act 1988 ~~has~~/has not been made.
~~(ii) The requirement has been satisfied.~~
~~(iii) The requirement is to be satisfied in Stage ——.~~

Council Delegate
~~Council Seal~~

Date 24 / 10 / 2007

~~Re-certified under section 11(7) of the Subdivision Act 1988.~~

~~Council Delegate~~
~~Council Seal~~

~~Date / /~~

Vesting of Roads and / or Reserves

Identifier	Council/Body/Person
NIL	NIL

Notations

Staging: This is not a staged subdivision
Planning Permit No. 050531

Depth Limitation: DOES NOT APPLY.

CREATION OF RESTRICTION

UPON REGISTRATION OF THIS PLAN THE FOLLOWING RESTRICTION IS CREATED

LAND BENEFITED: LOTS 4 + 5 ON THIS PLAN
LAND BURDENED: LOTS 4 AND 5

RESTRICTION

DWELLINGS AND OUTBUILDINGS CAN NOT BE CONSTRUCTED ON LOTS 4 AND 5 UNTIL THE GOVERNMENT ROAD AND THE CONNECTION TO THE BASS HIGHWAY IS CONSTRUCTED AND COMPLETED TO THE SATISFACTION OF THE RESPONSIBLE AUTHORITY AND VICROADS

LOTS 1, 2, 4 & 5 AND DIMENSIONS SHOWN UNDERLINED ARE THE RESULT OF THIS SURVEY.

THE AREA OF LOT 3 HAS BEEN OBTAINED BY DEDUCTION FROM TITLE

The land being subdivided is enclosed within thick continuous lines.

Survey: This plan is based on survey.

This survey has been connected to permanent marks no(s). 74, 87, 36, 92, in Proclaimed Survey Area No. 97

Easement Information

Legend: E - Encumbering Easement or Condition in Crown Grant in the Nature of an Easement
A - Appurtenant Easement R - Encumbering Easement (Road)

Subject Land	Purpose	Width (Metres)	Origin	Land Benefited/In Favour Of
E-1	POWERLINE	SEE DIAG.	THIS PLAN-SECTION 88 ELECTRICITY INDUSTRY ACT 2000	SPI ELECTRICITY PTY LTD
E-2	CARRIAGEWAY	10m	THIS PLAN	LOT 4 ON THIS PLAN AND
E-3 E-2	CARRIAGEWAY	10m	THIS PLAN	LOT 2 ON PS 300991 J

LR use only

Statement of Compliance/ Exemption Statement

Received ☑

Date 29 / 11 / 07

LR use only

PLAN REGISTERED

Time 9.59 AM

Date 17 / 12 / 2007

Assistant Registrar of Titles

Sheet 1 of 3 Sheets

BEVERIDGE WILLIAMS & CO. PTY LTD.
ACN 006 197 235 ABN 44 622 029 694
SURVEYORS, ENGINEERS, PLANNERS
ENVIRONMENTAL CONSULTANTS
PO BOX 2205 CAULFIELD JUNCTION 3161 95284444
PO BOX 1465 BALLARAT MAIL CENTRE 3354 53313877
PO BOX 161 LEONGATHA 3953 56622630
PO BOX 128 WONTHAGGI 3995 56721505
PO BOX 1916 TRARALGON 3844 51760374

LICENSED SURVEYOR (PRINT) PETER ALAN TOCLE

SIGNATURE ..... DATE 06/02/2007

REF W5996 VERSION 3

DATE 24/10/2007
COUNCIL DELEGATE SIGNATURE

Original sheet size A3

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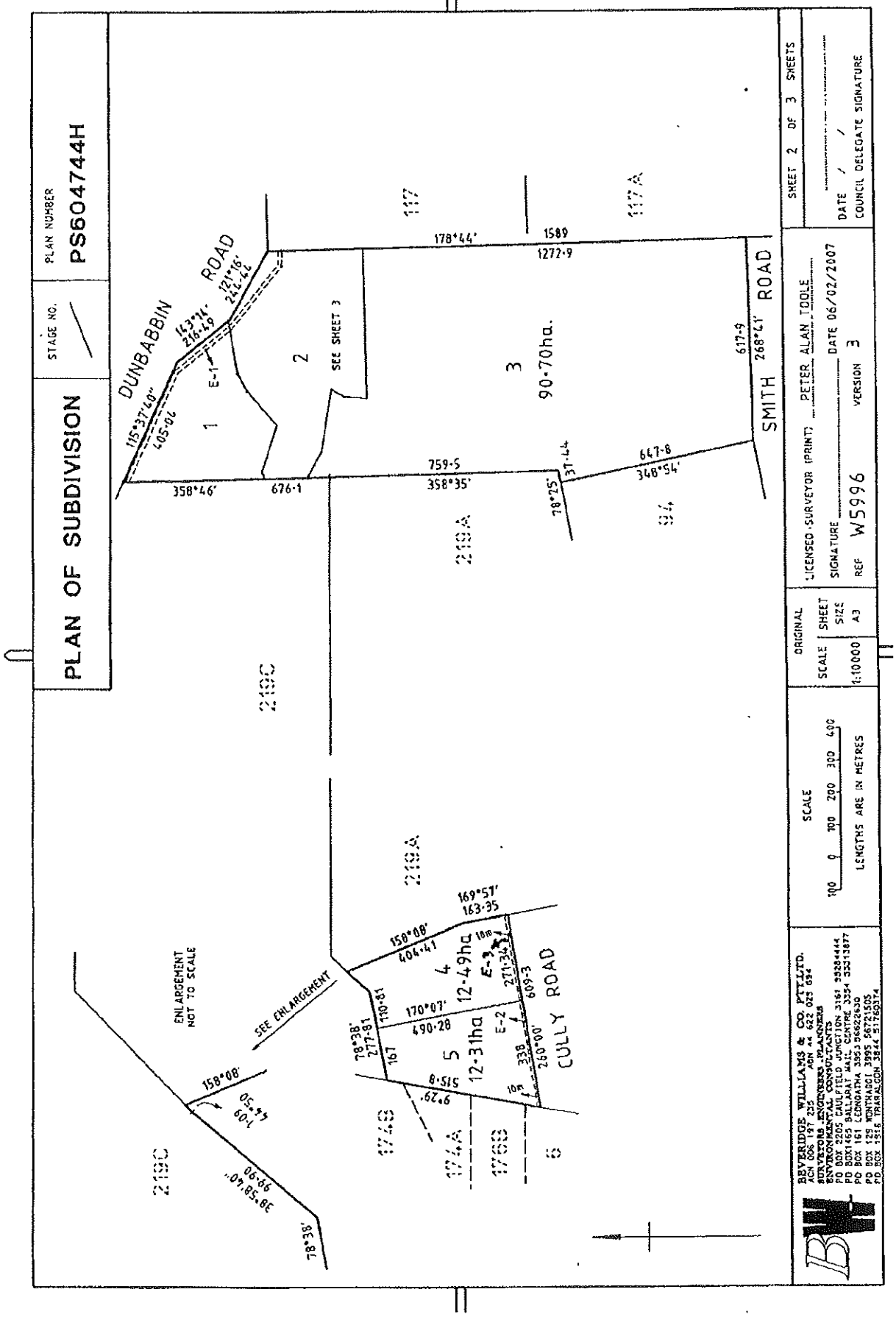

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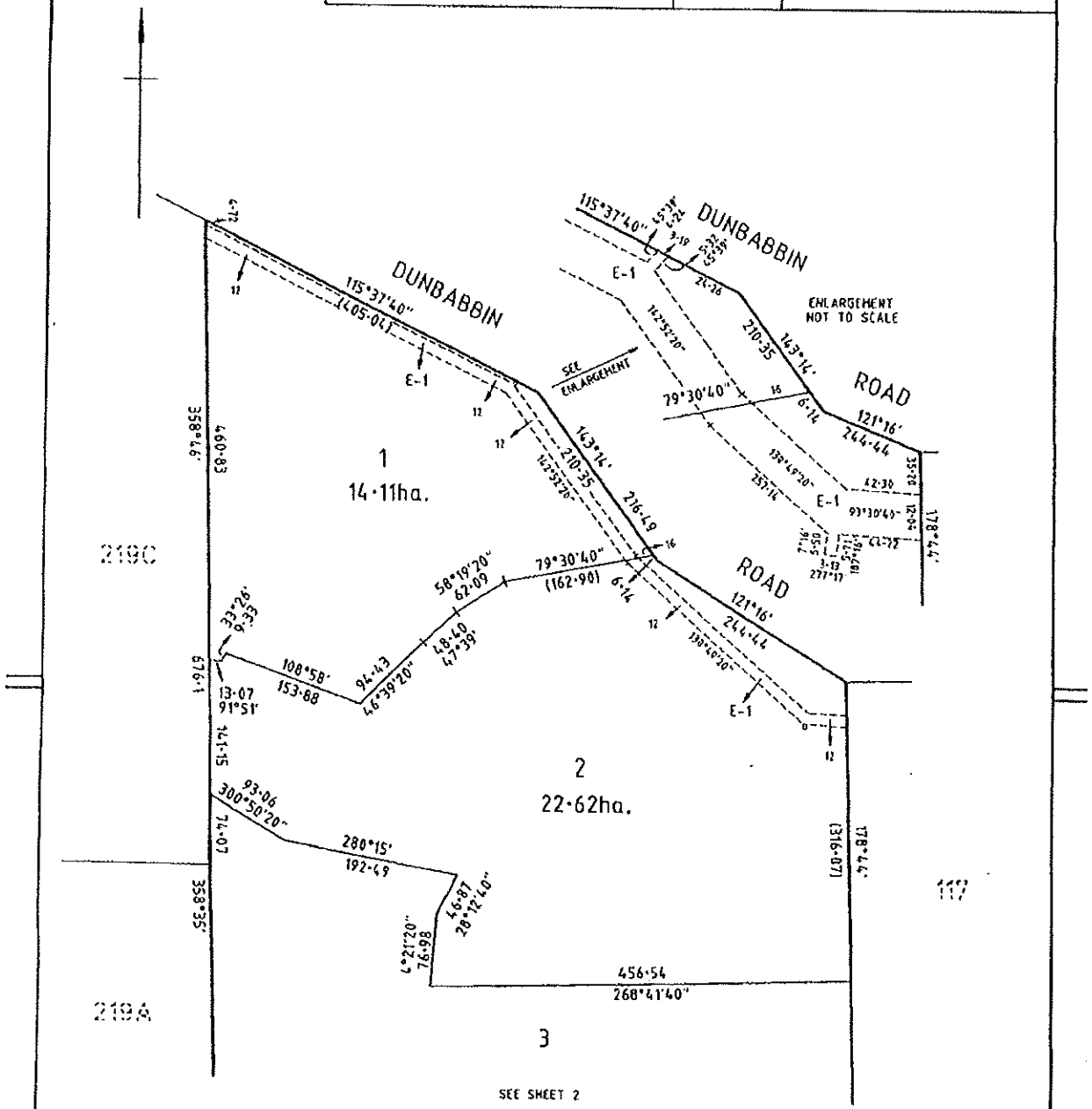
PLAN OF SUBDIVISION	Stage No.	Plan Number
	/	PS604744H



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PO BOX1465 BALLARAT MAIL CENTRE 3354 53313671
PO BOX 161 LEONGATHA 3953 56622530
PO BOX 129 WONTHAGGI 3995 56721585
PO BOX 1916 TRARALGON 3844 51760374

ORIGINAL		SCALE	LICENSED SURVEYOR (PRINT) PETER ALAN TOOLE	Sheet 3 of 3 Sheets
SCALE	SHEET SIZE	40 0 40 80 120 160	SIGNATURE ..... DATE 06/02/2007	DATE / /
1:4000	A3	LENGTHS ARE IN METRES	REF. W5996 VERSION 3	COUNCIL DELEGATE SIGNATURE
				Original sheet size A3

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REGISTER SEARCH STATEMENT (Title Search) Transfer of Land Act 1958

VOLUME 10031 FOLIO 148 Security no : 124037984916C
Produced 03/06/2011 04:36 pm

LAND DESCRIPTION

Lot 2 on Plan of Subdivision 300991J.
PARENT TITLE Volume 09013 Folio 643

REGISTERED PROPRIETOR

Estate Fee Simple
TENANTS IN COMMON
As to 1 of a total of 2 equal undivided shares
Sole Proprietor
WILLIAM ARTHUR BLACKMORE of 21 BLOOMFIELD ROAD NOBLE PARK 3174
As to 1 of a total of 2 equal undivided shares
Sole Proprietor
ROY ROGERS BLACKMORE of 21 BLOOMFIELD ROAD NOBLE PARK 3174

ENCUMBRANCES, CAVEATS AND NOTICES

Any encumbrances created by Section 98 Transfer of Land Act 1958 or Section 24 Subdivision Act 1988 and any other encumbrances shown or entered on the plan set out under DIAGRAM LOCATION below.

DIAGRAM LOCATION

SEE PS300991J FOR FURTHER DETAILS AND BOUNDARIES

ACTIVITY IN THE LAST 125 DAYS

NIL

----------END OF REGISTER SEARCH STATEMENT----------

Additional information: (not part of the Register Search Statement)

Street Address: CULLY ROAD THE GURDIES VIC 3984

DOCUMENT END

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PLAN OF SUBDIVISION

STAGE NO. /

LTO use only
EDITION 2

Plan Number
PS 300991 J

Location of Land

Parish: CORINELLA

Township: ———
Section: ———
Crown Allotment: 219A AND 218 (PART)
Crown Portion: ———

LTO Base Record: LITHO
Title Reference: VOL. 9013 FOL. 643

Last Plan Reference: PS300986B
Postal Address: ALMURTA ROAD GRANTVILLE 3984
(at time of subdivision)

AMG Co-ordinates (of approx. centre of land in plan) E 373150 N 5748400 Zone: 55

Vesting of Roads and/or Reserves

Identifier	Council/Body/Person
NIL	NIL

Council Certificate and Endorsement

Council Name: SHIRE OF BASS Ref: 90/04/10

1. This plan is certified under section 6 of the Subdivision Act 1988.
2. ~~This plan is certified under section 11(7) of the Subdivision Act 1988. Date of original certification under section 6 / /~~
3. This is a statement of compliance issued under section 21 of the Subdivision Act 1988.

OPEN SPACE

(i) A requirement for public open space under section 18 of the Subdivision Act 1988 has/has not been made.

~~(ii) The requirement has been satisfied.~~

~~(iii) The requirement is to be satisfied in Stage.....~~

Council delegate
~~Council seal~~

Date 5 / 07 / 90

~~Re-certified under section 11(7) of the Subdivision Act 1988~~

~~Council Delegate~~
~~Council Seal~~

~~Date / /~~

Notations

Staging This is/is not a staged subdivision
Planning Permit No. 89/119

Depth Limitation

DOES NOT APPLY

Appurtenant Carriageway easement in favour of Lot 2 on this plan has been created by PS604744H

LOT 1 IS THE RESULT OF THIS SURVEY

AREA OF LOT 2 HAS BEEN OBTAINED BY DEDUCTION FROM TITLE

Survey This plan is/~~is not~~ based on survey
This survey has been connected to permanent marks no(s)
in Proclaimed Survey Area No.

Easement Information

Legend: A - Appurtenant Easement E - Encumbering Easement R - Encumbering Easement (Road)

Easement Reference	Purpose	Width (Metres)	Origin	Land Benefited/In Favour Of

LTO use only

Statement of Compliance/ Exemption Statement

Received ☑

Date 16 / 11 / 90

LTO use only

PLAN REGISTERED

TIME

DATE 9 / 8 / 91

Assistant Registrar of Titles

Sheet 1 of 2 Sheets

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CIVIL ENGINEERS & SURVEYORS
COMO ROAD LILYDALE 3140
PH (03) 735 1233 FAX (03) 735 1691

LICENSED SURVEYOR (PRINT) GRAEME CLIFFORD ADAMSON
SIGNATURE..... DATE / /
REF 4950 B VERSION 2

DATE 5 / 7 / 90
COUNCIL DELEGATE SIGNATURE

Original sheet size A3

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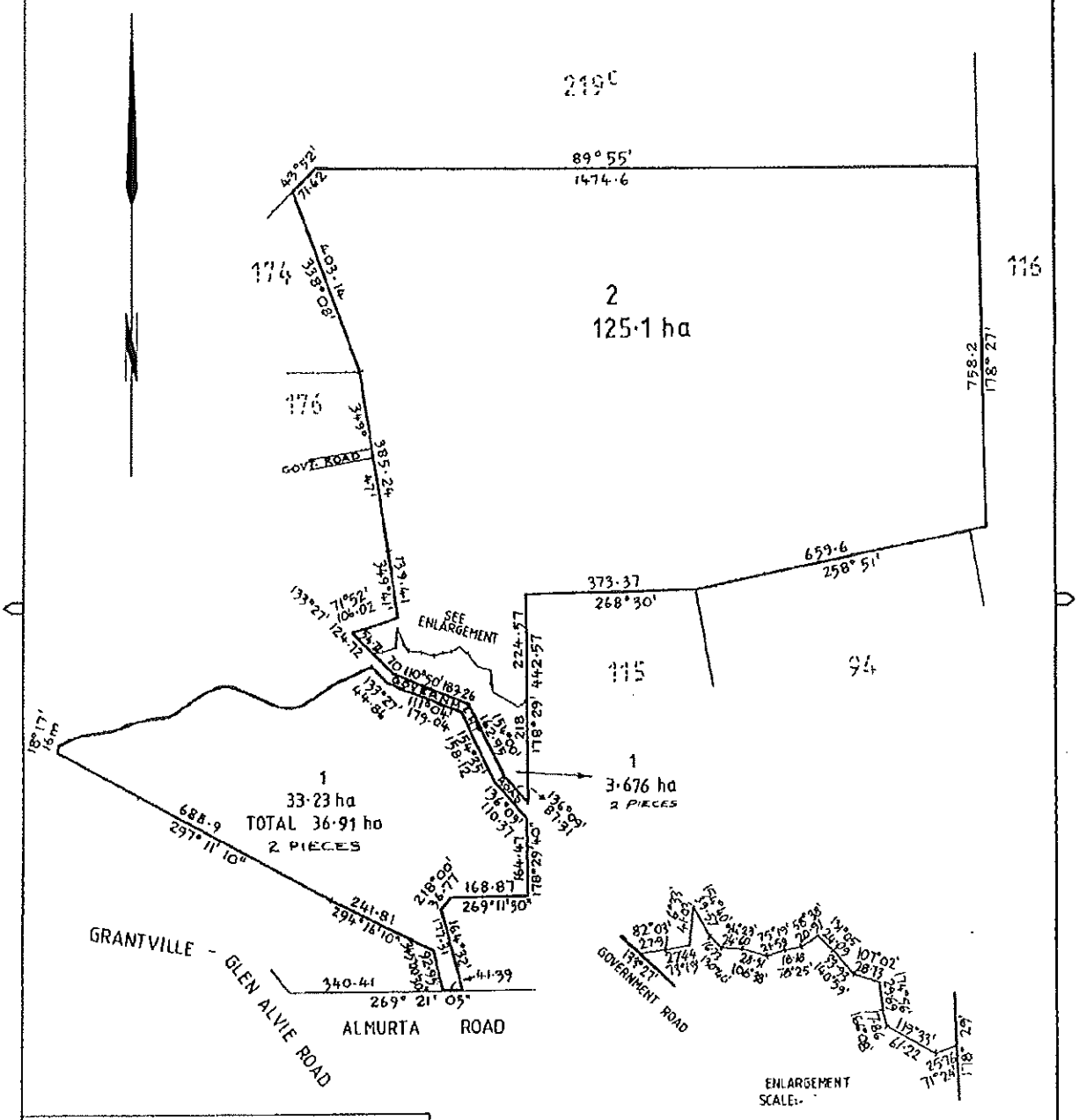
PLAN OF SUBDIVISION	Stage No.	Plan Number PS 300991 J



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COMO ROAD LILYDALE 3140
PH. (03) 735 1233 FAX (03) 735 1691

Sheet 2 of 2 sheets

ORIGINAL SCALE	SHEET SIZE	SCALE	
1:8000	A3	80 0 160 240 LENGTHS ARE IN METRES	

LICENSED SURVEYOR (PRINT) GRAEME CLIFFORD ADAMSON
SIGNATURE..... DATE / /
REF 4950 B VERSION 2

DATE 5 / 7 / 90
COUNCIL DELEGATE SIGNATURE
Original sheet size A3

T.O.2

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MODIFICATION TABLE

RECORD OF ALL ADDITIONS OR CHANGES TO THE PLAN

PLAN NUMBER
PS300991J

WARNING: THE IMAGE OF THIS DOCUMENT OF THE REGISTER HAS BEEN DIGITALLY AMENDED. NO FURTHER AMENDMENTS ARE TO BE MADE TO THE ORIGINAL DOCUMENT OF THE REGISTER.

AFFECTED LAND/PARCEL	LAND/PARCEL IDENTIFIER CREATED	MODIFICATION	DEALING NUMBER	DATE	EDITION NUMBER	ASSISTANT REGISTRAR OF TITLES
LOT 2		APPURTENANT EASEMENTS ADDED	PS604744H	17/12/07	2	KMB

Imaged Document Cover Sheet

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Document Type	**instrument**
Document Identification	**AF196772F**
Number of Pages (excluding this cover sheet)	**10**
Document Assembled	**23/07/2010 16:00**

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AF196772F
11/07/2007 $102 173

Planning and Environment Regulations 2005 S.R. No. 33/20

Form 18

OFFICE OF TITLES B.E.B. VICTORIA

Section 181

APPLICATION BY A RESPONSIBLE AUTHORITY FOR THE MAKING OF A RECORDING OF AN AGREEMENT

Planning and Environment Act 1987

Lodged at the Land Titles office by:

Name: Gilbert + Rahilly

Phone: 03 5672 1133

Address: 140 Graham Street
WONTHAGGI VIC 3995

Ref: Customer Code: 1600WB.42 0858F

The Authority having made an agreement referred to in section 181(1) of the **Planning and Environment Act 1987** requires a recording to be made in the Register for the land.

Land:	Situate in the lands at Dunbabbin Road and Government Road, Grantville being described as Crown Allotment 174, Volume 01563 Folio 433, Crown Allotment 176A, Volume 02283 Folio 499, Crown Allotment 176, Volume 03483 Folio 463, Lot 1 PS87345, Volume 08863 Folio 989 and Lot 2 PS87345 Volume 08863 Folio 990
Authority:	Bass Coast Shire Council 76 McBride Avenue, Wonthaggi
Section and Act under which Agreement made:	Section 173 Planning & Environment Act 1987

A copy of the Agreement is attached to this Application.

Signature for the Authority:

Name of Officer: Allan Bawden

Designation: Chief Executive Officer

Date: 2 . 07 . 07

Delivered by LANDATA®. Land Victoria timestamp 23/07/2010 16:00 Page 2 of 10

AF196772F
11/07/2007 $102 173

PLANNING AND ENVIRONMENT ACT 1987

SECTION 173 AGREEMENT

Between

BASS COAST SHIRE COUNCIL

and

William Arthur Blackmore and Roy Rogers Blackmore

in relation to

**Lands at Dunbabbin Road
and Government Road, Grantville**

Delivered by LANDATA®. Land Victoria timestamp 23/07/2010 16:00 Page 3 of 10

THIS AGREEMENT is made the 2nd day of July 2007

BETWEEN

1. **BASS COAST SHIRE COUNCIL** of 76 McBride Avenue, Wonthaggi Victoria (hereinafter called "the Responsible Authority") and

AF196772F
11/07/2007 $102 173

2. **WILLIAM ARTHUR BLACKMORE AND ROY ROGERS BLACKMORE** of 1393-1395 Bass Highway, Grantville (hereinafter called "the Owners")

WHEREAS:

A. The Owners are the owners and registered by the Registrar of Titles as the proprietors of an estate in fee simple in the lands at Dunbabbin Road and Government Road, Grantville, being described in the table below and hereinafter called "the subject land";

Parcel	Volume	Folio
Crown Allotment 174, Parish of Corinella	01563	433
Crown Allotment 176A, Parish of Corinella	02283	499
Crown Allotment 176, Parish of Corinella	03483	463
Lot 1 PS87345	08863	989
Lot 2 PS87345	08863	990

B. The Responsible Authority is responsible for the administration and enforcement of the Bass Coast Planning Scheme (hereinafter called "the Planning Scheme") pursuant to the provisions of the Planning and Environment Act 1987 (hereinafter called "the Act").

C. On 19 September, 2006, the Responsible Authority issued Planning Permit Number 050531 allowing the realignment of boundaries to create 5 lots and the use of new lots 1 & 2 for the purpose of a single dwelling on the land comprising Crown Allotments 174, 176, 176A, Parish of Corinella, and Lots 1 and 2 of PS87345 (hereinafter called "the Planning Permit").

D. Condition number 3 of the Planning Permit requires the Owners to enter into this Agreement to provide for the matters set out in that Condition.

E. The Responsible Authority and the Owners have agreed that, without restricting or limiting their respective powers to enter into this Agreement, and insofar as it can be so treated, this Agreement is an agreement entered into pursuant to Section 173 of the Act.

F. The Responsible Authority and the Owners have entered into this Agreement in order to achieve or advance the objectives of planning in Victoria or the objectives of the Planning Scheme.

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IT IS AGREED AS FOLLOWS:

Definitions

1. In this Agreement unless inconsistent with the context or subject matter:

1.1 "Act" means the Planning and Environment Act 1987;

1.2 "Agreement" means this Agreement and any agreement executed by the parties varying or expressed to be supplemental to this Agreement;

1.3 "Subject land" means the land described in Recital A;

1.4 "Owner" means the owner for the time being of the land and the person or persons entitled from time to time to be registered by the Registrar of Titles as the proprietor of an estate in fee simple in the land or any part thereof, and includes a Mortgagee in possession;

1.5 "Planning Permit" mean the planning permit referred to in Recital C, including any plans endorsed under the planning permit;

1.6 "Planning Scheme" means the Bass Coast Planning Scheme and any successor instrument or other planning scheme which applies to the subject land;

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1.7 "Responsible Authority" means Bass Coast Shire Council or its successor as the authority responsible for administering and enforcing the Planning Scheme and includes its agents, officers, employees, servants, workers and contractors; and

1.8 "Tribunal" means the Victorian Civil and Administrative Tribunal or any successor tribunal, court, institution or body.

Interpretation

2. In this Agreement unless inconsistent with the context or subject matter:

2.1 The singular includes the plural and the plural includes the singular;

2.2 A reference to a gender includes a reference to each other gender;

2.3 A reference to a person includes a reference to a firm, corporation, association or other entity and their successors in law;

2.4 If a party consists of more than one person this Agreement binds them jointly and each of them severally;

2.5 A reference to a statute includes any statute amending, consolidating or replacing that statute and includes any subordinate instruments made under that statute;

2.6 The Recitals to this Agreement are and will be deemed to form part of this Agreement including any terms defined within the Recitals.

Specific Obligations of the Owner

3. The Owners covenant with the Responsible Authority that:

3.1 The land comprising lots 1, 2, 3, 4 & 5 on PS604744H will not be further subdivided so as to increase the number of lots.

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3.2 The Farm Management Plan for the above lots approved by the responsible authority on 18th April 2007 will be implemented on an ongoing basis.

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Further Obligations of the Owner

4. The Owners further covenant that:

4.1 The Owners will not sell, transfer, dispose of, assign, mortgage or otherwise part with possession of the subject land or any part of it without first disclosing to its successors the existence and nature of this Agreement.

4.2 The Owners will do all that is necessary to enable the Responsible Authority to make an application to the Registrar of Titles to make a recording of this Agreement on the Certificate of Title to the subject land in accordance with Section 181 of the Act, including the signing of any further agreement, acknowledgment or other document.

4.3 The Owners shall immediately on demand pay the reasonable legal costs and fees incurred and incidental to the preparation and execution of this Agreement and the registration hereof pursuant to Section 181 of the Act, together with all costs of enforcing this Agreement if deemed necessary by the Responsible Authority. The Owners hereby agrees that any such costs are and remain a charge on the subject land until paid, and consents to the Responsible Authority registering a caveat on the Certificate of Title to the subject land in respect of any such costs and acknowledges that any such costs shall be capable of being recovered by the Responsible Authority in any court of competent jurisdiction as a civil debt recoverable.

4.4 That until such time as this Agreement is registered on the title to the subject land, the Owners shall ensure that successors in title will give effect to this Agreement, and do all acts and sign all documents which will require those successors to give effect to this Agreement, including executing a deed agreeing to be bound by the terms of this Agreement.

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4.5 The Owners agrees to indemnify and keep indemnified the Responsible Authority from and against all costs, expenses, losses or damages that it may sustain, incur, suffer or be or become liable for or in respect of any suit, action, proceeding, judgment or claim brought by any person arising from or referable to this Agreement and/or any non-compliance with this Agreement.

4.6 The Owners agrees to allow the Responsible Authority to enter the subject land at any reasonable time to assess compliance with this Agreement.

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Owner's Warranties and Acknowledgements

5. The Owners warrant that:

5.1 They are the registered proprietor (or entitled to be so) of the subject land;

5.2 There are no mortgages, liens, charges or other encumbrances affecting the subject land which are not disclosed by the usual searches;

5.3 If the subject land is affected by a mortgage, the Mortgagee of the subject land consents to the Owners entering into this Agreement and the Agreement being registered on the title to the subject land.

6. The Owners acknowledge that any obligations imposed on the Owners under this Agreement take effect as separate and several covenants which are annexed to the subject land and run at law and in equity with the land and every part thereof and bind the Owners, their successors, assigns and transferees, and the registered proprietor for the time being of the whole or any part of the subject land.

Further assurance

7. The parties to this Agreement must do or cause to be done all things that are reasonably necessary to give effect to this Agreement.

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Default

8. If the Owners default or fail to perform any of their obligations under this Agreement the Responsible Authority may, without prejudice to any other remedies, rectify and remedy such default and the cost of doing so shall be borne by the Owners. The Owners hereby consent to the Responsible Authority registering a caveat on the Certificate of Title to the subject land in respect of any such costs, and acknowledges that any such costs shall be capable of being recovered by the Responsible Authority in any court of competent jurisdiction as a civil debt recoverable.

No waiver

9. Any time or other indulgence granted by the Responsible Authority to the Owners or any variation of the terms and conditions of this Agreement or any judgment or order obtained by the Responsible Authority against the Owners will not in any way amount to a waiver of any of the rights or remedies of the Responsible Authority in relation to the terms of this Agreement.

No Fettering of Powers of Responsible Authority

10. The Owners expressly acknowledge and agree that nothing in this Agreement nor the performance by the Owners of any of its obligations under this Agreement does or will restrain, limit or otherwise fetter the exercise by the Responsible Authority of the powers, duties and discretions that the Responsible Authority has or may have (as planning authority, responsible authority or otherwise) under the Act or under the Planning Scheme to consider, approve, amend or to make any decision or impose any requirements or conditions in connection with the granting of any planning approval or certification relating to any use or development, or in relation to the commencement or initiation of any enforcement action or proceeding whatsoever.

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Entire Agreement

11. This Agreement constitutes the entire agreement between the parties in connection with its subject matter and supercedes all previous Agreements or understandings between the parties in connection with its subject matter.

Severability

12. If a court, arbitrator, tribunal or other competent authority determines that a word, phrase, sentence, paragraph or clause of this Agreement is unenforceable, illegal or void then it shall be severed and the other provisions of this Agreement shall remain operative and be of full force and effect.

Disputes

13. If there is a dispute between the parties concerning the interpretation or implementation of this Agreement, that dispute must be referred to the Tribunal for resolution to the extent permitted by the Act.

14. If there is a dispute concerning any matter which is not referable to the Tribunal under the Act, that dispute must be referred for arbitration by an Arbitrator agreed upon in writing by the parties, or, in the absence of such agreement the Chair of the Victorian Chapter of the Institute of Arbitrators Australia or his or her nominee, for arbitration.

15. The parties shall each be entitled to legal representation for the purposes of any proceedings or arbitration referred to clause 13 or 14 of this Agreement unless the Tribunal or arbitrator otherwise directs, and each party must bear its own costs.

Commencement of Agreement

16. Unless otherwise provided in this Agreement, this Agreement shall commence on the date of this Agreement.

EXECUTED by the parties on the date set out at the commencement of this Agreement:

THE COMMON SEAL OF BASS COAST SHIRE COUNCIL was affixed in the presence of:)

.....
Chief Executive Officer

BASS COAST SHIRE COUNCIL
THE COMMON SEAL OF

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SIGNED, SEALED AND DELIVERED by the said **William Arthur Blackmore** in the presence of:)

W A Blackmore

.....
Witness

SIGNED, SEALED AND DELIVERED by the said **Roy Rogers Blackmore** in the presence of:)

R R Blackmore

.....
Witness

APPENDIX 2 Drainage and Water Quality Management

Neil M Craigie Pty Ltd
ACN 074 582 282 ABN 29 074 582 282

Waterway Management Consultants

WORK AUTHORITY APPLICATION FOR EXTRACTIVE INDUSTRY WORK AUTHORITY NO. 1488

1381 – 1395 BASS HIGHWAY, GRANTVILLE, 3984 (GRANTVILLE)

SAND EXTRACTION PROJECT PROPOSAL

DRAINAGE AND WATER QUALITY MANAGEMENT

For: Dandy Premix Quarries Pty Ltd

Version 5

22 May 2012

Director ***Neil McKinnon Craigie*** *BE(Civil), MEngSci, MIEAust, CPEng*
Email: nmcraigie@bigpond.com
15 Mulawa Street Croydon, Vic. 3136, Australia
Telephone & Fax: (03) 9725 1053; Mobile: 0427 510 053

TABLE OF CONTENTS

1. INTRODUCTION

This report has been prepared as part of the technical background for the Work Authority Application by Dandy Premix Quarries Pty Ltd for the proposed sand extraction development at Grantville. The report forms part of the application for the Department of Primary Industries (DPI) Work Authority 1488, and will form part of the subsequent Bass Coast Shire Council Planning permit application.

The site is located at 1381-1395 Bass Highway in Grantville, and is generally bordered to the west by the Highway, to the north by Deep Creek, to the south by Colbert Creek and to the east by rural lands.

Figure 1 is an extract from Esmap showing the site locality, the overall 450 ha catchment of Deep Creek, boundaries of land held by Dandy Premix Quarries P/L, and the portion of the site affected by the current application. The site is wholly located within the subcatchment boundaries of a small tributary of the Deep Creek (123 ha catchment).

Figure 2 is a title compilation showing all lands held by Dandy Premix Quarries Pty Ltd. It is worth noting that a major sand extraction operation is already located to the south in the Colbert Creek catchment.

> *(Note: It should also be noted that since this plan was prepared an additional property in the northwest corner of the site on Bass Highway has been acquired by Dandy Premix Quarries Pty Ltd and now forms part of the application.)*

Aerial photography of the site locality on Figure 2 shows the application site to be cleared grazing land under existing conditions, with a few scattered remnant overstorey trees fringing the tributary of Deep Creek. Residential area of about 7 ha drains to Deep Creek downstream of the Bass Highway.

The Deep Creek riparian corridor retains good environmental values and with all discharges conveyed by the creek ending up in the Ramsar-listed Western Port Bay only several hundred metres west, the protection of creek flow regimes and water quality are paramount considerations for any development proposal.

As no streamgauging data exists in the locality, it is not possible to directly determine the actual surface runoff regime that presently exists in Deep Creek or the tributary gully affected by the proposal, so recourse to synthetic methods of estimation is necessary. The investigation has focussed on comparison of seasonal and annual runoff regimes with and without the sand extraction proposal, and assessment of the quality of discharge to receiving waters in Western Port Bay. Recommendations are made for future water monitoring programs and design and construction of the new haul road, buffer mounding and stormwater treatment systems.

The proposal is briefly outlined in Section 2. Existing waterway conditions are discussed in Section 3. Section 4 considers hydrologic and water quality issues and impacts. Section 5 considers surface water quality monitoring and construction stage management. Section 6 presents a short summary.

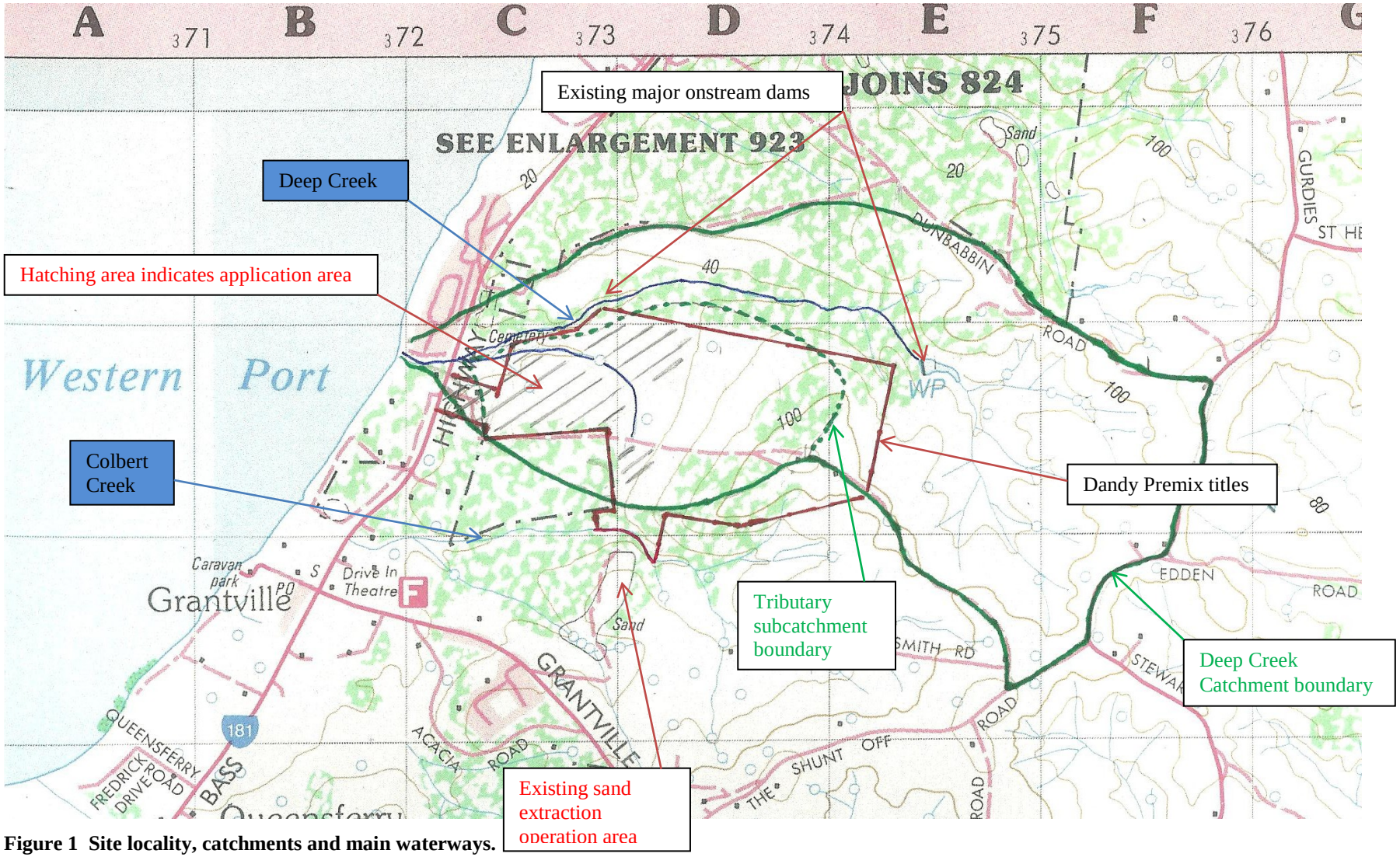

Figure 1 Site locality, catchments and main waterways.

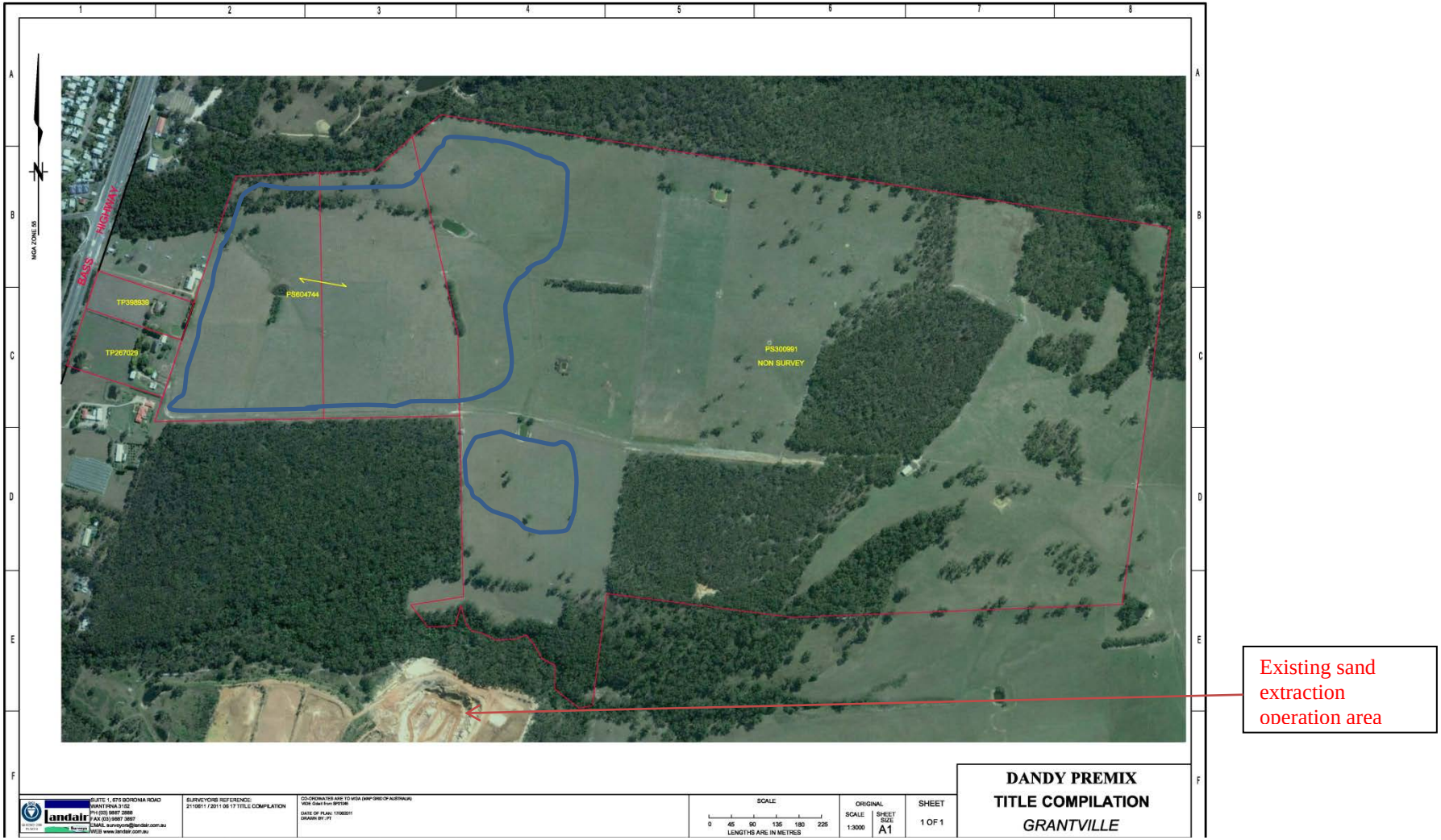

Figure 2 Title compilation for Dandy Premix Quarries at Grantville, existing sand operations, and outlines (blue) of the areas affected by the current application

2. EXISTING WATERWAY CONDITIONS

Field inspections of the Deep Creek and the tributary gully have been undertaken in addition to coverage of the site itself. Figures 3 and 4 and the associated photos illustrate existing conditions. Topography of the subject area is shown on Figure 5 which is a 1 m contour (LiDAR) plot kindly supplied by Melbourne Water.

2.1 Deep Creek Outlet to Western Port Bay

As can be seen from Figure 3 and Photos 1 and 2 the existing outfall is artificial in origin. West of the original indigenous riparian vegetation corridor a straight excavated outfall has been cut to the beach. The cut then has a "deferred" outlet to the tidal zone proper-the actual outlet travels along behind the primary sand dune until able to discharge out to the Bay about 100 m to the north. The channel is disconnected from the Bay at low tide. Residential land abuts the creek on both sides downstream of the Highway.

Judging from the remnant vegetation/wetland patterns on Figure 3 the original natural creek outfall is likely to have followed a southern deferred alignment, terminating behind the foreshore sand dune.

Some Enteromorpha was observed in the terminal pool at the back of the beach, with phragmites lining the banks and wattles and melaleuca behind these at higher elevations. There was no outflow observed at the time the photo was taken (at low tide). The pH was measured at 7.6, the turbidity was 12 FTU and the conductivity was 31,200 uS/cm (essentially seawater). There is no estuary and there is a sudden demarcation between freshwater and seawater in this creek.

The tidal mud flats at the mouth were soft and rich in burrowing crustacean, worm and bivalve species, however there was no evidence of any seagrass for at least to the low tide level some 200 metres further out. Attempts have been made to plant mangroves in these tidal flats as can be seen on Photo 1.

2.2 Deep Creek Upstream to the Bass Highway

Upstream of the cut outlet channel the natural creek is well-defined and retained within a densely vegetated riparian corridor as indicated on Figure 3 and Photo 3. The primary species are acacia, melaleuca, and leptospermum spp. There is evidence of weed management efforts in this reach (blackberries have been sprayed) compared to upstream of the highway but a range of weed species still persist. Some litter is evident in the channel adjacent to Deep Creek Road.

While there was no flow at the time of inspection, the creek supported small pools (generally 2 metres by one metre by 0.6 m deep) at about 20 metre intervals. A pool just upstream of a local drain outlet from the residential area had a pH of 7.2, a turbidity of 14 FTU and a conductivity of 880 uS/cm proving freshwater conditions even in dry weather.

There is Typha growing in places in the pools. Given the sandy nature of the bed and dry weather over the last 2 or 3 weeks before inspection these pools are likely to reflect local (fresh) groundwater levels.

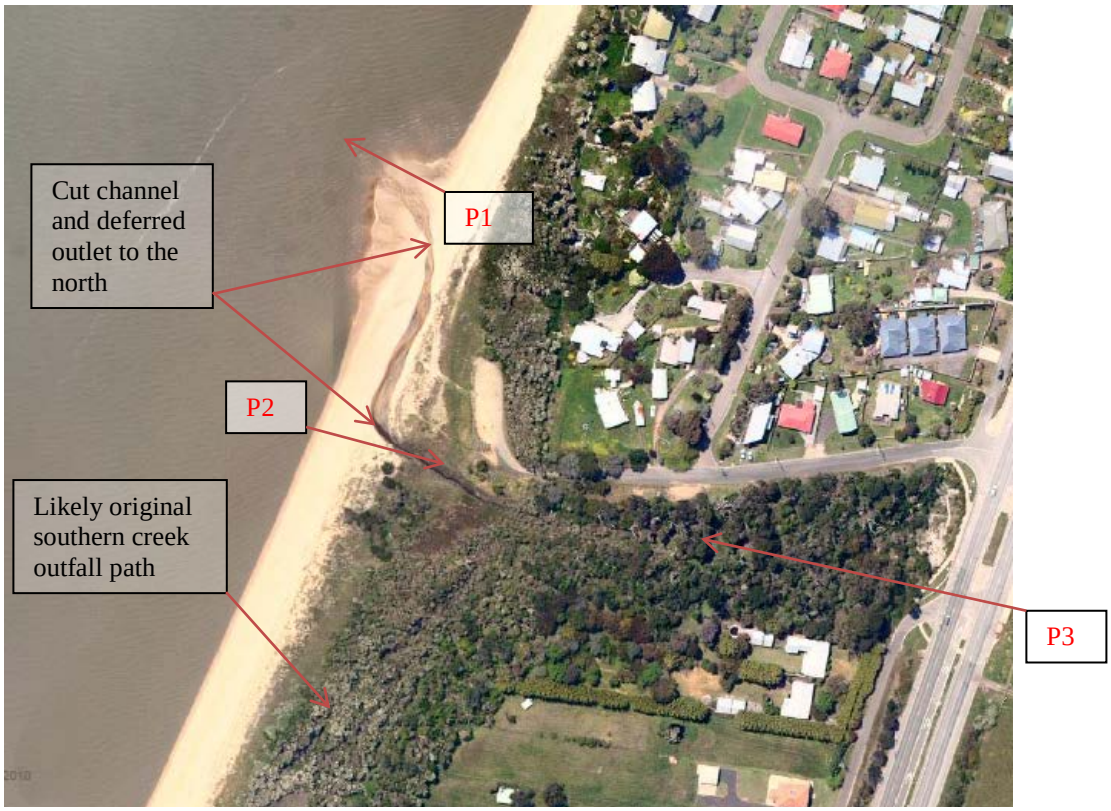

Figure 3 Nearmap.com extract showing Deep Creek between the Bass Highway and Western Port and photo (P) sites

Photo 1 Deep Creek outfall at low tide showing mangrove plantings

Photo 2 Looking upstream from the deferred outfall at the beach. This section of the creek back to the densely vegetated riparian zone in the background is artificial in origin with the natural outfall likely to have been well south. The creek pool is seawater.

Photo 3 Deep Creek 100 m downstream of the Highway showing the sandy bed and small remnant freshwater pool.

2.3 Deep Creek Upstream of the Bass Highway

The creek here is narrower than downstream of the Highway. It has steep (~1:1) banks but is considered essentially stable at this time. The banks were well vegetated however about 50% of plant cover was composed of weeds such as blackberry, ivy and Japanese honeysuckle. Native vegetation was predominantly acacia, melaleuca, and leptospermum species. Photos 4 and 5 refer.

The bed of the creek is sandy with a thin cover of mud. While there was no flow the creek supported small pools similar in size and distribution to those observed downstream.

Aquatic life in the pools appeared to be limited to just two species of water beetle at the time of inspection. Measurements taken in a pool 60 m u/s of the highway (photo 5) revealed a pH of 7.6, a turbidity of 19 FTU, and a conductivity of 1130 uS/cm. Whilst still very clearly freshwater, the conductivity is slightly higher than in the pools downstream of the Highway, indicating the likelihood of lower groundwater inflows and/or evaporative concentration impacts. (Note: this is supported by the groundwater findings by JCLS which are summarized in Section 3.4).

The tributary enters less than 100 m upstream of the Highway.

Upstream of the tributary confluence the creek continues with similar form characteristics for a further 400-500 m. The creek alignment follows that of the tributary gully over this reach with a narrow prominent promontory some 100-150 m wide separating the two.

Water pools observed in this reach have generally clayey beds with the ponded water probably perched above the clay. The water is muddy brown to blackish coloured with a lot of organic matter and a sheen probably due to diatoms. No water testing has been completed yet upstream of the tributary confluence.

The water levels observed in both bores near this part of Deep Creek are well below the base of the creek (water table is a few metres above zero m AHD-JCLS). It is considered that the water in this reach of the creek is likely to be predominantly surface runoff in origin with possibly some shallow interflow.

The bed grade then begins to steepen with the rising topography to the major on-stream dam located about 300 m further upstream. The pondage created by this dam extends some 200 m upstream of the embankment. The creek bed is generally dry downstream of the dam as shown on Photo 6. This is likely to indicate that the sandy creek bed “loses” or exfiltrates low flows through its base to the deeper groundwater and/or that the on-stream dam reduces runoff frequency sufficiently to allow evaporation to dry out any small pools. Vegetation and weed extent is similar to the section downstream.

As shown on Figure 1, another large on-stream dam is located just east of the Dandy Premix Quarries P/L boundary at the confluence of the headwater tributaries.

2.4 The Tributary Gully

Upstream of the property north-west boundary the tributary gully is initially stable but then becomes more incised. Bed and bank erosion is evident in places to near the existing on-stream farm dam as shown on Photo 7. Closer to the dam the gully line is shallow and stable (Photo 8).

Scattered remnant indigenous trees dominate the vegetation with most understory and groundcover cleared in favour of introduced pasture grasses.

The creek bed and banks are predominantly sandy clay or clayey sand and pools are evident only for short periods after significant rainfall events resulting in surface runoff.

The existing on-stream farm dam has stable frontages but stock damage is evident (Photo 9). When inspected the water was generally of low turbidity. No water quality measurements have been taken to date in the tributary gully.

Upstream of this farm dam the gully is a flat depression with no obvious bed and bank form. As shown on Photo 10 it is well grassed all the way upstream to the existing southern farm dam on the farm access track near the catchment divide to the Colbert Creek.

When inspected the depression was saturated and holding water in the numerous stock pug marks. The drainage depression surface soils are clearly clay dominated with little seepage likely to be occurring through to the underlying sands and the deeper groundwater.

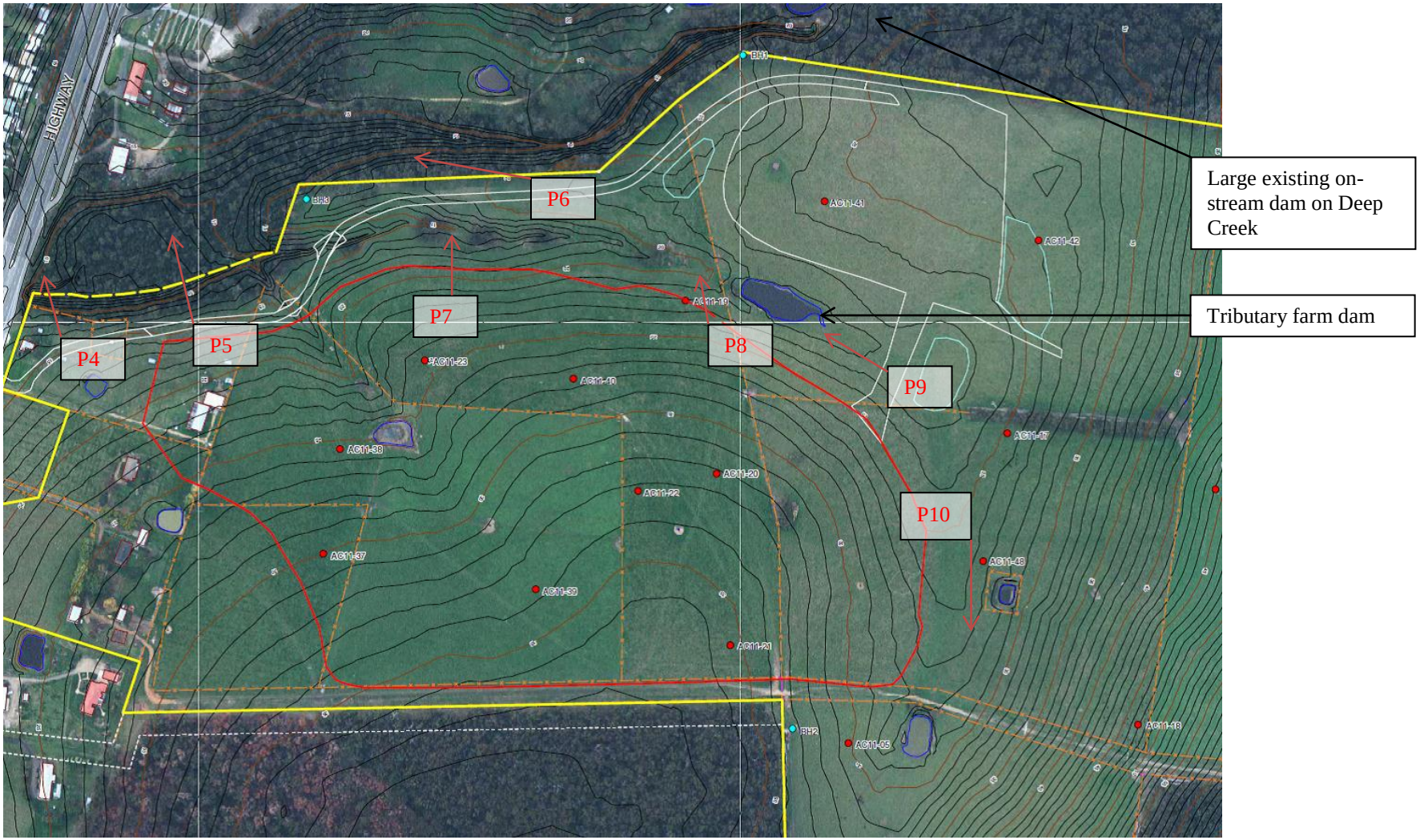

Figure 4 Aerial photo taken May 2012 showing the application outlines, Deep Creek and the tributary gully and photo locations (P) upstream of the Bass Highway

Photo 4 Looking upstream at the Highway. Weeds are far more extensive upstream of the highway than downstream (blackberry, ivy and Japanese honeysuckle). Native vegetation is predominantly acacia, melaleuca, and leptospermum species.

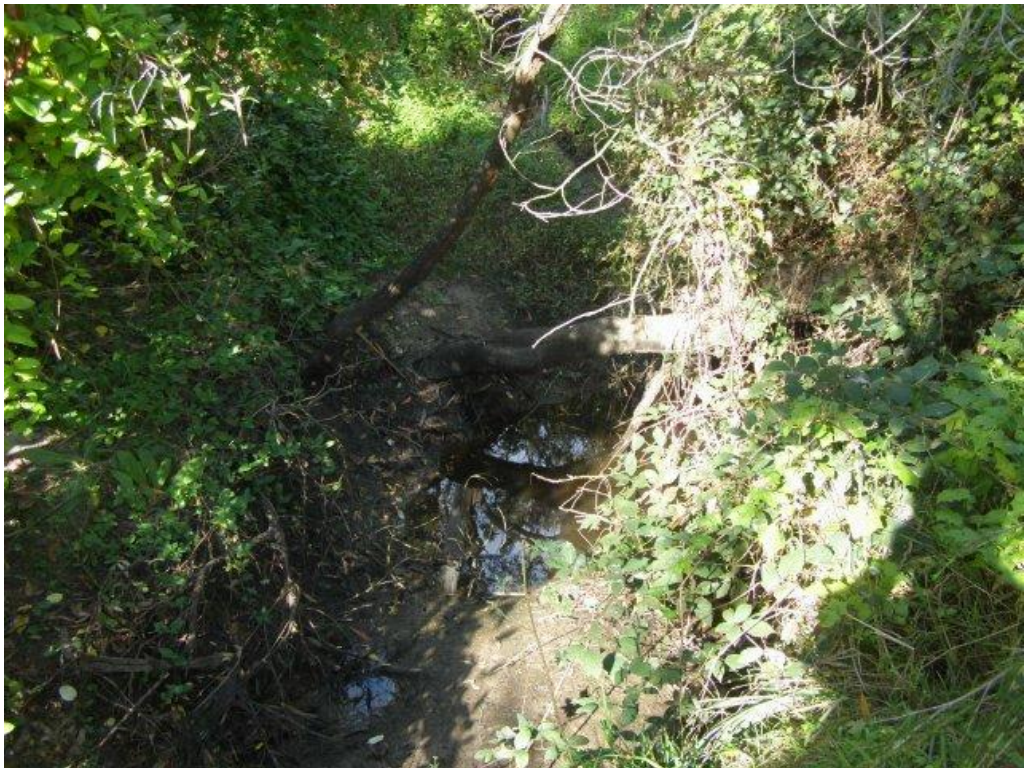

Photo 5 Taken 60 m upstream of the Highway. The creek bed retains its sandy form with small remnant freshwater pools

Figure 6 Looking upstream along Deep Creek above the tributary confluence showing the dry sandy bed

Figure 7 Looking downstream along the tributary (below the existing farm dam) showing effects of bed and bank erosion

Figure 8 Tributary just below the existing farm dam

Figure 9 Existing farm dam looking west

Figure 10 Looking south along the tributary upstream of the existing farm dam showing stock pugging and surface saturation

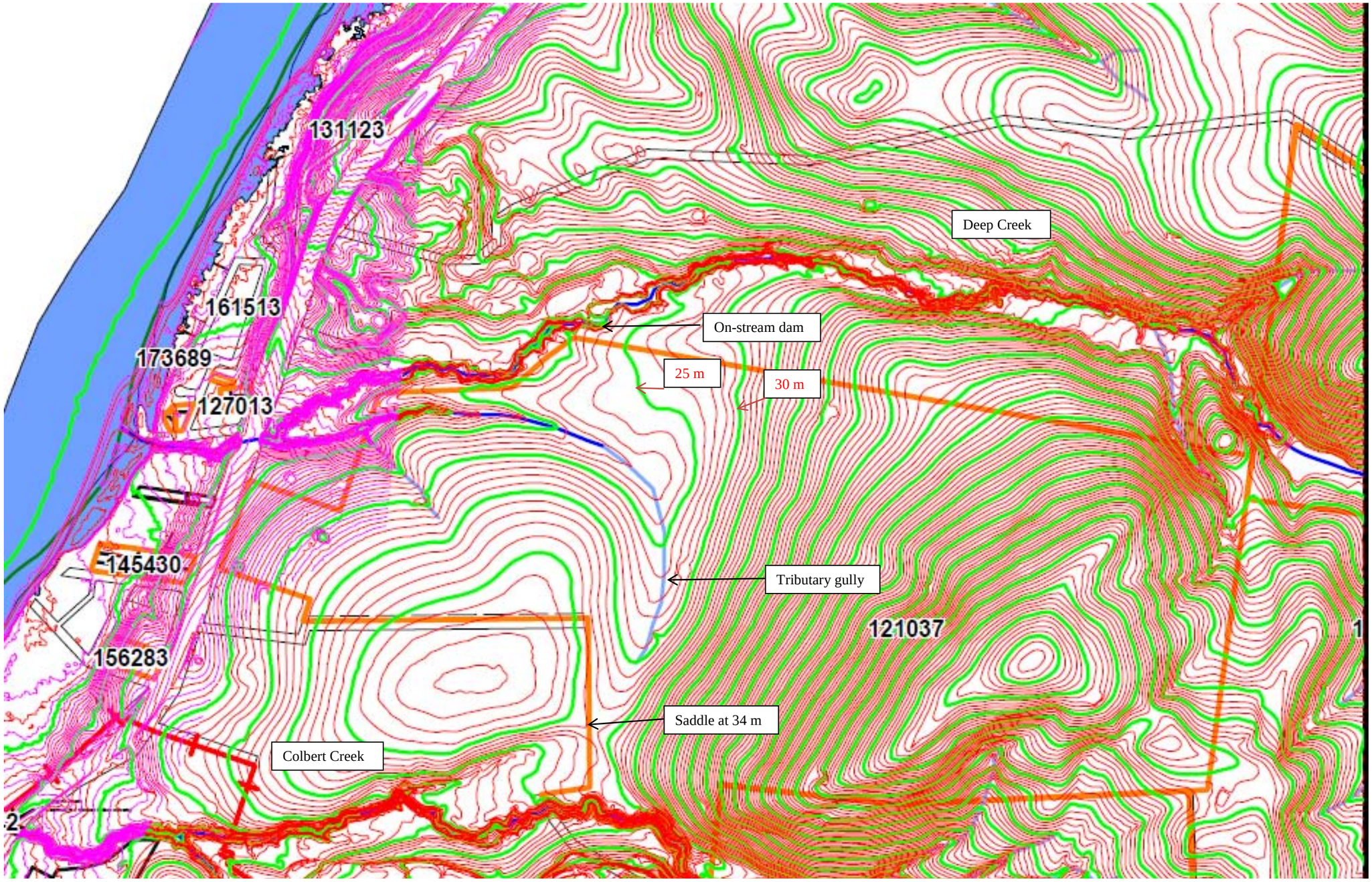

Figure 5 Existing topography (1 m contour LiDAR plot supplied by MWC)

3. THE SAND EXTRACTION PROPOSAL

3.1 Proposed Operation

The current draft Development Plan by Bell Cochrane & Associates is shown on Figure 6 dated 15 May 2012.

The sand extraction development proposal incorporates:

- Extraction to a base level ~ 5m AHD with maximum pit extent of about 20 ha;
- Sealed Site Access Track from the Highway to the processing area;
- Vegetated screening bund along the highway exposure frontage;
- Sand screening and stockpile area (~5 ha);
- Office, shed and weighbridge (~1 ha);
- Overburden storage (~2ha);
- Gravel haul roads between the pit and the processing area and the overburden storage;
- Surface water management facilities.

The proposal is based on onsite dry blending of insitu and imported sands with all extraction being above the identified water table levels. Groundwater assessments and bore logs are discussed in the report by John Leonard Consulting Services P/L (JCLS).

3.2 Proposed Staging and Intent of Works

The existing tributary drainage line in its entirety will be protected by withdrawal of stock grazing (using existing farm fencing networks) which will allow natural regeneration of sedges and shrubs to occur. This will enhance its already high capacity to slow drainage and filter runoff sourced from the surrounding hillslopes.

A large quantity of the early overburden stripped from the pit area will be used as Site Access Track base, Screening and Blending Fixed Plant base (anticipated to be approx. 27m AHD finished level), Weighbridge/Office Area base, and the visual bunding along the westerly frontage. Overburden will also be replaced to create the final terminal pit face slopes after extraction.

The balance of overburden material not required for these purposes or any other alternative use in or external to the site will be progressively transferred to the overburden storage located near the saddle to the south of the property. The design of both the overburden storage and any associated drainage/water management works will ensure there is no runoff from the site to Colbert Creek to the south, regardless of the magnitude of any rainfall event.

Coarser sediments entrained in any runoff from the overburden storage will be initially captured in the proposed new south sediment pond to be built immediately north of the existing farm access track (replacing the existing dam on the south side). Thereafter the runoff discharging from this pond will pass overland along the existing tributary drainage

depression for further fine suspended and colloidal sediment removal. Natural regeneration of vegetation along the depression is expected to be prolific following the withdrawal of stock grazing and will enhance the capacity of this depression to filter out sediments.

The main quarry access haul road will cross the tributary just upstream of the existing farm dam and form the embankment for the proposed North Storage Dam which is to be built for water supply purposes as well as water quality treatment. The haul road embankment will be raised about 2 m above natural surface (to 25 m) to create required water storage capacity to meet site demands, and to enhance water quality treatment performance of the site drainage system. Normal top water level (NTWL) in the Dam will be set at ~22.5 m with water surface area of ~3,000 m^2 (subject to detail design).

The existing main farm dam has a NTWL of about 21.5 m AHD and about 0.5 m of freeboard at most (see Photo 9). It will be retained and the frontages allowed to regenerate after withdrawal of stock grazing. Some revegetation will be carried out using indigenous species of local provenance to support natural regeneration.

All outflows from the North Storage Dam will be directed at controlled rates to the existing farm dam via culverts under the haul road. Low flows from the existing dam will then be directed to a bioretention basin to be constructed on the north side of the gully as shown on Figure 6 and (at larger scale) on Figure 7. This basin will be designed to remove fine to very fine suspended solids. It will have filter surface level of about 20 m and filter surface area of at least 200 m^2. Outflows will be piped to the gully (300 mm diameter).

High flows from the North Storage Dam will not enter the bioretention basin. They will pass through the existing farm dam and continue north-west in the tributary gully towards its eventual Deep Creek confluence as per existing conditions.

The main processing area and haul roads can be expected to generate the highest concentrations and loads of suspended sediments in runoff. Stabilised drainage lines and/or pipes discharging from the main processing area and haul roads will be directed eastwards to a large sediment pond to ensure coarse sediment is removed before water overflows into the North Storage Dam. This sediment pond will be formed largely on natural surface by construction of access and haul road track embankments, have a NTWL of about 25 m and water surface area of about 4,000 m^2 (subject to detail design).

Another smaller sediment pond will serve the western side of the main processing area. NTWL will be about 22.5 m with water surface area of 1,000 m^2 at most, again subject to detail design. This pond will receive outflows from the truck wash facility as well. Low flows will discharge to the bioretention basin with higher flows directed via vegetated swale into the existing farm dam.

The tributary is initially stable downstream of the farm dam. However further downstream minor bed and bank instability requires stabilization works in places. Such works will comply with relevant MWC standards and guidelines, involve some placement of graded rockfill, but primarily will focus on revegetation. The extraction pit will maintain a minimum setback of 30 m to the gully centerline. The complete withdrawal of stock grazing from the application area removes the need for farm fencing works.

All drainage lines serving the sealed Site Access Track will be formed as vegetated swales incorporating graded rock stabilization as necessary to respond to grade controls.

It is proposed that at least one additional sediment pond will be formed in the gully at the Site Access Track crossing, and possibly another at an existing farm access crossing. These ponds will double as gully bed stabilization structures and receive inflows from the vegetated swales.

With the removal of stock grazing and implementation of the minor additional rock stabilization works, weed control and revegetation with indigenous species will then be carried out to complement the existing intact overstorey trees. The intent is to make a landscape and environmental feature of this section of the tributary – from the North Storage Dam to its exit from the property to join Deep Creek. The Site Access Track will cross it and continue to the Weighbridge/Office and Fixed Plant Area in parallel and close proximity to it.

A truck wheel wash facility will be incorporated into the Site Access Track pavement at the office end. All trucks leaving the site will have to pass through for wheel wash down before using the sealed Site Access Track out of the site.

Likely Staging

For the purposes of simulation the progress of earthworks and surface water management works on the site is taken to be as follows:

Year 1	Overburden stripped from extraction pit to construct the main Site Access Track, the administration/processing pad and the main pit haul Site Access Track. Estimated that this will equate to roughly 25% opening of the ultimate pit area at the northeast end. Sand extraction/processing commences to create sump in north east corner of pit. *(note: Site Access Track sealed, wheel wash established, drainage swales, North Storage Pond and all sediment ponds and bioretention basin established and tributary stabilised and revegetated.)*
Year 2	Overburden stripped from a further 25% of the pit working generally westwards from the Stage 1 area to the final pit face. Excess volumes transferred to storage at south end or sold offsite. Deep extraction and processing of sands continues. Terminal faces progressively rehabilitated.
Year 3-4	Overburden stripped from the balance of the pit working south along the full face. Excess volumes transferred to storage at south end or sold offsite. Deep extraction and processing of sands continues. Terminal faces progressively rehabilitated.
Years 4-15	Deep extraction and processing of sands continues above groundwater table. Terminal faces progressively rehabilitated.

3.3 Water Use and Demand Estimates

With a dry blending operation, water use within the site is limited to that required for dust suppression of haul roads, extraction faces, and hardstand areas for processing, plus establishment irrigation for revegetation areas. All water will be sourced from local tributary catchment runoff, using the existing farm dam and the proposed new North Storage Dam and the main north east sediment pond as supply storages.

The estimates for dust suppression water provide for a maximum area of approximately 4.2 ha comprising:

1. Hard Stand Area (Weighbridge/Office/Amenities, Stockpile Areas, Screening and Blending Plant Operations) – 26,000m^2;
2. Extraction Pit Area (Stage 1 Excavation opened) – 14,000m^2;
3. Haul Road (Extraction Pit to Hard Stand Area) – 100m L x 20m W = 2000m^2;

Based on experience with other similar dry blend sites, the operators estimate a demand rate of 5,400L/Ha/application. The number of applications is 1,100 per annum (275 Days x 4 times per day on average). Hence Total Demand = 4.2 Ha (42,000m^2) x 5,400L/Ha x 1,100 (Annual Frequency) = 24.95 ML, say 25 ML.

Fixed sprinklers are assumed for watering bunds and screen plantings, with demand needs estimated as follows:

- Estimate sprinkler use 9 months/annum at average 25 days/month;
- 225 Days x 4 Hours/Day = 900 Hours/annum;
- 10 x Rotary Sprinklers at 14L/min each = 840L/hr/sprinkler;

Hence total irrigation demand =7.56ML – Say 8 ML/annum

Thus total water demand is estimated to be 33 ML/annum, say 35 ML/annum at full scale operations. Looking at the rate at which water demand could be expected to rise from startup the figures assume the following:

Year 1 –	Estimate only 25 ML;
Year 2 –	Estimate only 32 ML;
Year 3 Outwards –	Estimate 35 ML per Annum.

3.4 Groundwater Assessments

Groundwater assessments have been completed by John Leonard Consulting Services ("Hydrogeological Assessment, Proposed Sand Quarry, 1381-1395 Bass Highway, Grantville", JLCS, May 2012).

The main findings of the JLCS report are summarised below:

- WA1488 is located on outcropping Brighton Group (former Baxter Sandstone) sediments. The Brighton Group in the area of the proposed Sand Extraction Pit consists of from four to 10 m of silts and clays overlaying fine (predominantly) to coarse sand.

- WA1488 is within Zone 7 of the Koo Wee Rup Water Supply Protection Area. The amount of groundwater that can be extracted annually from Zone 7 is 2,545.5 ML; this volume has been fully allocated. Actual groundwater usage in Zone 7 is less than 40 per cent of the total allocated volume.

- The water table in the Brighton Group slopes in a general westerly direction towards Western Port Bay. The water table elevations beneath the proposed Sand Extraction Pit would be between about two and four m AHD (based on a conservative regional hydraulic gradient of 0.004).

- The water table is below the base of Deep Creek along the northern boundary of WA1488. The water table only intersects the streambed of Deep Creek west of the Bass Highway.

- Rainfall recharge under existing per-quarrying conditions is variable with high infiltration rates (20 to 25 per cent) on the more elevated eastern portion of WA1488 where Brighton Group sands outcrop or subgroup beneath a thin layer of silt and clay, and lower (less than 10 per cent) in the flatter-lying western portion of the site where the sand is overlaid by a thicker layer of silt and clay.

- Groundwater discharges into the bay over a relatively wide discharge/transition zone, into local creeks including Deep Creek where the base of the creek is below the water table (west of the Bass Highway), or via evaporation along near shore areas along the bay where the water table is close to the ground surface. The length of Deep Creek that receives groundwater discharge (i.e., gaining stream tract) is very short, mostly at elevations below about 2 m AHD.

- The horizontal hydraulic conductivity of the predominantly fine sand in the area of the proposed Sand Extraction Pit is in the general range 20 to 30 m/day. The vertical hydraulic conductivity of these sands is expected to be about 10 to 12 m/day.

- The salinity of the groundwater in the Brighton Group beneath WA1488 was less than 500 mg/L TDS. The groundwater is in Groundwater Beneficial Use Environment Segment A as defined in the SEPP Groundwaters of Victoria. The groundwater beneficial uses to be protected are maintenance of ecosystems, potable mineral water supply, agriculture, parks and gardens, stock watering, industry, primary contact and buildings and structures.

- The recharge regime will change with development of the Sand Extraction Pit specifically with removal of the silt/clay overburden and exposure of the sands with high vertical hydraulic conductivity and associated high infiltration characteristics. However, it is expected that the opportunity for direct recharge through the floor of

the pit would be reduced by sloping of the pit floor towards the sump near the access ramp in the north-eastern corner of the pit.

- Collected water in the sump will be lost by evaporation from the free water surface and by seepage through the sump flowing to the underlying water table.

- The floor of the proposed WA1488 Sand Extraction Pit will not extend below the water table (design pit floor elevation ~ 5 m AHD).

- As the Sand Extraction Pit will not extend below the water table the pit will not cause any drawdown interference in local supply bores and will not cause any reduction in groundwater discharge (base flow) into Deep Creek.

- The potential impact of the Sand Extraction Pit on local groundwater or flow in Deep Creek does not depend on the shape ("footprint") of the pit or its location within WA1488 but on whether or not the pit intersects the water table. Consequently, any adjustment to the shape, extent and/or location of the pit will not cause drawdown interference or affect flow in Deep Creek provided that the pit does not extend below the water table.

On the basis of these findings by JCLS, groundwater inflows to the pit excavation can be neglected for water balance estimates, and seepage losses to deeper groundwater from the sump can be assumed to average 12 m/day through the basal sands at all times.

JCLS further recommended that:

- Daily rainfall should continue to be recorded at the WA1488 site.

- Groundwater levels in the three purpose-installed monitoring bores should be measured at least every three months to enable the depth to groundwater to be mapped and to establish the relationship between rainfall and water table elevation.

- Any potential contamination activities at the site such as storage and use of fuel should be in accordance with best practice to ensure that local surface and groundwater resources are not contaminated.

These recommendations are supported.

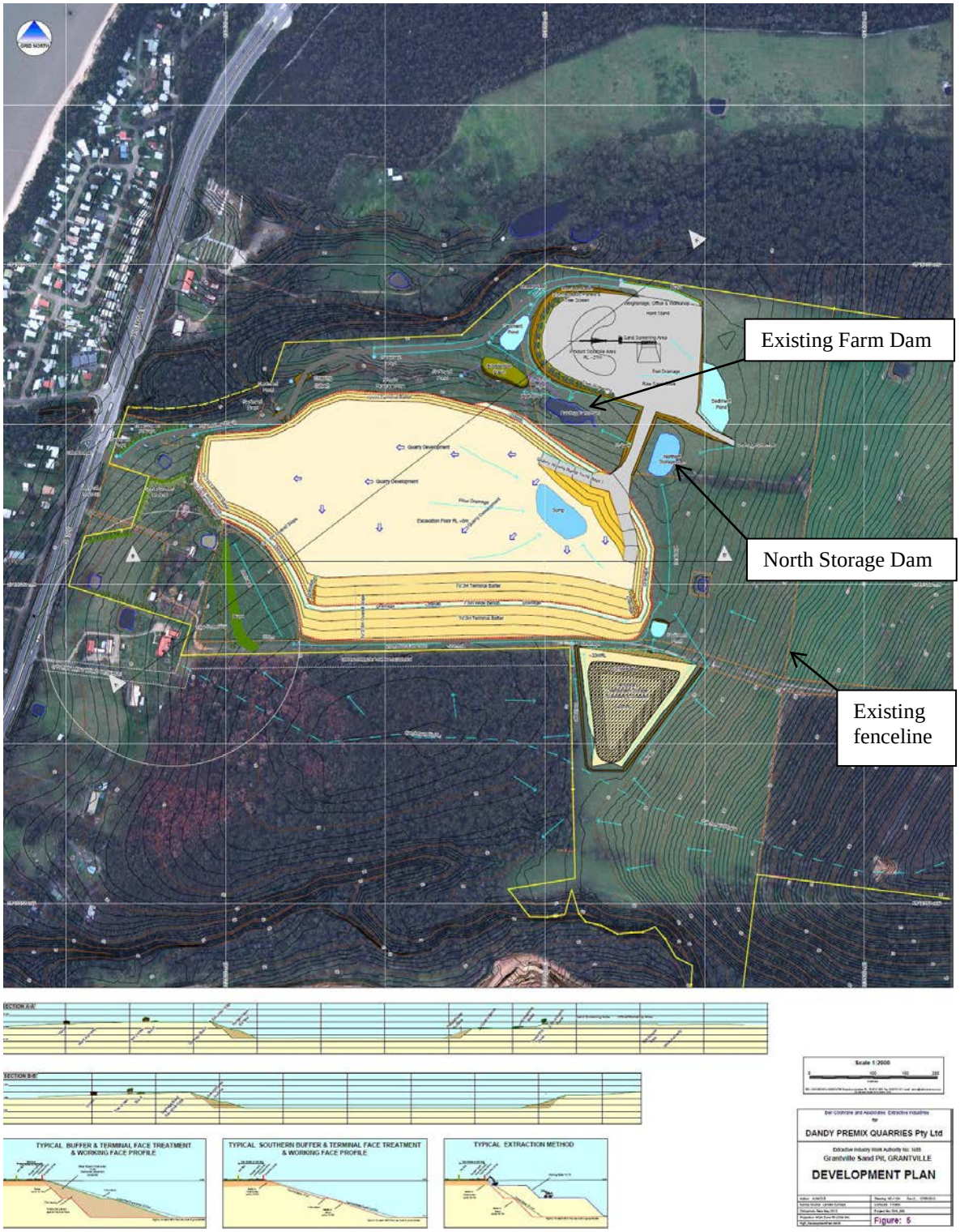

Figure 6 Development Plan, Dandy Premix Quarries, Grantville

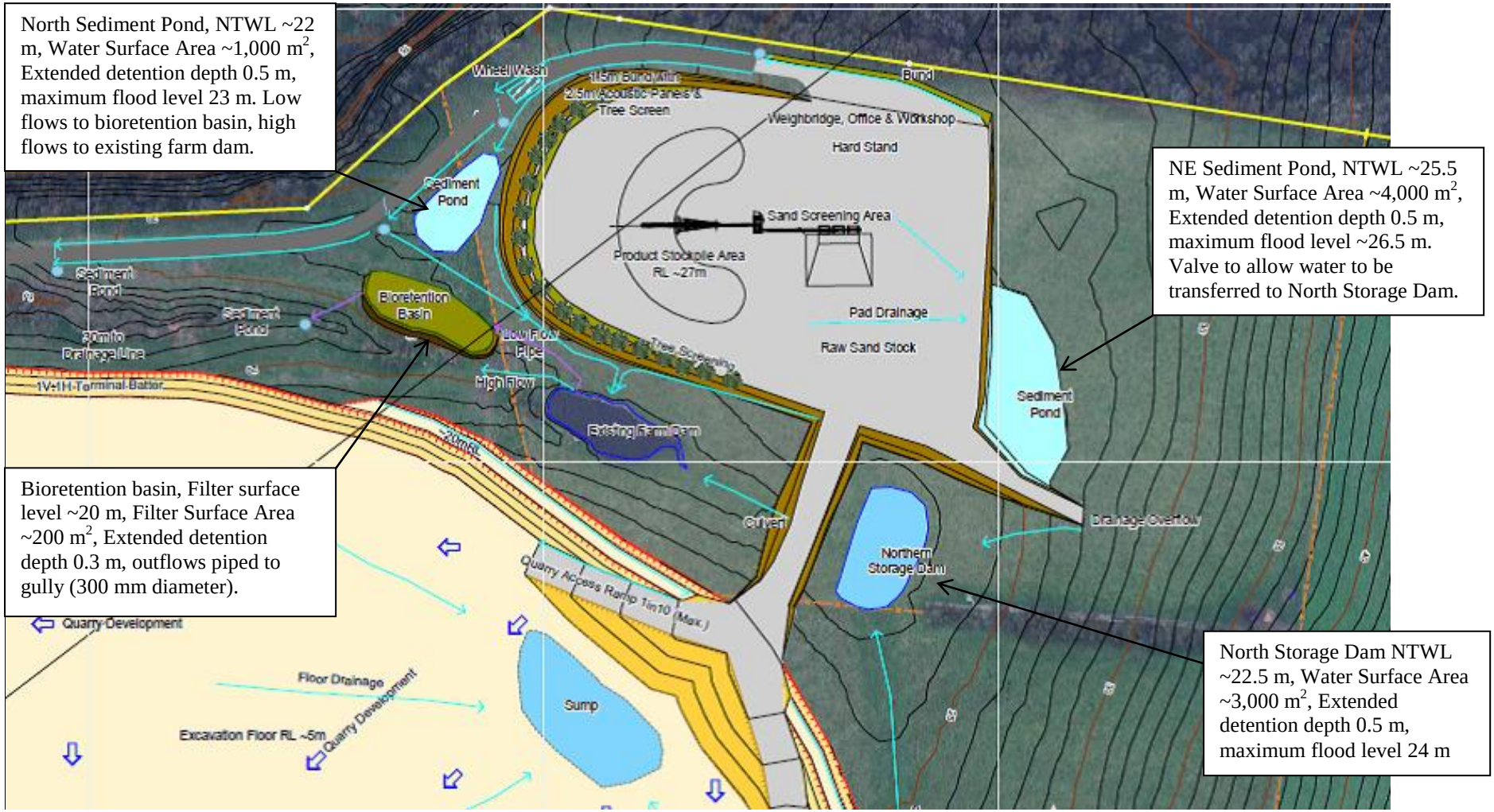

Figure 7 Primary water quality management works around processing and access track areas (levels and areas subject to detail design)

4. HYDROLOGY AND WATER QUALITY

4.1 Mean Annual Rainfall (MAR)

The proposed extraction area is located on north facing slopes between elevations of about 23 -36 m AHD. Bureau of Meteorology data for the region is listed in Table 1.

TABLE 1 Mean Annual Rainfall Data		
Station		**Mean Annual Rainfall (MAR mm)**
Koo Wee Rup	086314 (1985-date)	773
Rhyll	086373	682
Wonthaggi	086127	937
Cranbourne Botanic Gardens	086375	817
Grantville (R Blackmore 1985-date)		882

The Koo Wee Rup station records are the closest that are in part available on a continuous 6 minute basis which is best suited for application in the MUSIC water quality and runoff model.

Daily rainfall records have been kept on site at Grantville since 1 January 1985 by Mr R Blackmore. These records have been compiled on an annual basis and checked against those for Koo Wee Rup for the same period in Table 2. The data in Table 2 shows that site mean annual rainfall averages 1.14 * Koo Wee Rup data.

TABLE 2 Annual Rainfalls (mm)					
Year	**Grantville (R Blackmore)**	**Koo Wee Rup (086314)**	**Year**	**Grantville (R Blackmore)**	**Koo Wee Rup (086314)**
1985	858	790	2000	802	806
6	975	761	1	889	743
7	925	835	2	686	599
8	985	910	3	728	628
9	1044	912	4	929	809
1990	831	795	5	833	739
1	1084	915	6	559	517
2	966	895	7	795	708
3	1133	989	8	747	627
4	790	679	9	720	636
5	1012	969	2010	993	930
6	1014	872	11	1260	908
7	653	477			
8	813	762			
9	787	656			
			Average	882	773
			Std Dev	159	137

4.2 Mean Annual Runoff

As no streamgauging data exists in the locality, it is not possible to directly determine the actual surface runoff regime that presently exists in Deep Creek, or the tributary gully affected by the proposal, so recourse to comparison with regional characteristics and records and also synthetic methods of estimation is necessary. The MUSIC model runoff simulation algorithm has been used to generate the site estimates.

4.2.1 Bass River Records

The records for the Bass River at Glen Forbes South (station 227231) are the closest available to the site. These have been extracted from the Victorian Data Warehouse website. The available data covers the period 1974-2011 inclusive and is listed in Table 3.

TABLE 3 Mean Annual Runoff Bass River at Glen Forbes South (227231, 233 km2 catchment)

Year	Mean daily flow (ML/d)	Annual flow (ML/ha/yr)
1974	193.723	3.04
1975	198.622	3.12
1976	82.383	1.29
1977	198.532	3.12
1978	185.967	2.92
1979	99.392	1.56
1980	182.179	2.86
1981	153.288	2.41
1982	53.374	0.84
1983	227.719	3.58
1984	147.796	2.32
1985	113.47	1.78
1986	196.967	3.09
1987	155.958	2.45
1988	116.332	1.83
1989	185.837	2.92
1990	127.898	2.01
1991	218.712	3.43
1992	154.647	2.43
1993	229.285	3.60
1994	124.024	1.95
1995	209.03	3.28
1996	238.148	3.74
1997	52.242	0.82
1998	56.036	0.88
1999	68.819	1.08
2000	86.474	1.36
2001	119.545	1.88

TABLE 3	Mean Annual Runoff Bass River at Glen Forbes South (227231, 233 km2 catchment)	
Year	**Mean daily flow (ML/d)**	**Annual flow (ML/ha/yr)**
2002	82.111	1.29
2003	89.343	1.40
2004	191.451	3.01
2005	101.508	1.59
2005	15.629	0.25
2007	64.953	1.02
2008	77.447	1.22
2009	70.754	1.11
2010	158.208	2.48
2011	226.563	3.56
Averages	138.2728	2.17

On an annualised basis, the Bass River records indicate that Deep Creek runoff as a percentage of Grantville rainfall could therefore be estimated to be 2.17/8.82= 25% or about 220 mm/annum for existing conditions.

4.2.2 MUSIC Simulations

The Koo Wee Rup 6 minute rainfall data sequence is the closest available that is easily used in MUSIC.

The 6 minute and daily data sequence for the longest complete record period at Koo Wee Rup (1971-1990 inclusive) was run in the MUSIC V3 model using Melbourne catchment runoff defaults and 0% impervious with the urban source node.

> *(Note: Use of the urban source node in the MUSIC model accords with MWC recommendations for catchments which are rural in nature but not subject to intensive agricultural practices, as is the situation on the subject lands.)*

Using the 6 minute data the mean annual runoff was calculated by the model to be 2.12 ML/ha/year for 1971-1990 as listed in Table 4. Using the daily data sequence the result was 2.16 ML/ha/year. The daily sequence therefore produces equivalent runoff results in terms of accuracy and is adequate for simulation purposes.

For the same 1971-1990 period the records for the Bass River catchment at Glen Forbes show an average of 2.42 ML/ha/yr. The MUSIC results therefore under-estimate the Bass River records by about 11%.

Given the inherent errors in streamflow measurement and in synthetic runoff modelling predictions, and considering that the sandy catchment of Deep Creek is likely to produce comparatively lower surface runoff volumes anyway, the Koo Wee Rup data sequence MUSIC results are considered to be adequate for study purposes.

TABLE 4 Comparison of annual flow estimates (ML/ha/yr)		
Year	**Bass River at Glen Forbes South (Station 227231)**	**MUSIC Estimates (KWR 1971-1990 daily)**
1974	3.04	2.72
1975	3.12	2.27
1976	1.29	1.60
1977	3.12	2.28
1978	2.92	2.61
1979	1.56	1.49
1980	2.86	1.32
1981	2.41	2.80
1982	0.84	0.65
1983	3.58	2.90
1984	2.32	1.73
1985	1.78	1.70
1986	3.09	2.30
1987	2.45	2.50
1988	1.83	2.98
1989	2.92	3.14
1990	2.01	2.24
Averages	2.42	2.16

4.3 Hydrologic impact of the sand quarry

Once works commence, existing clayey overburden soils and grass cover will be removed from the excavation area and used as construction fill. The processing area will be stripped of topsoil and unsuitable foundation soils only, prior to placement and compaction of fill.

In essence the hydrologic impact of the sand extraction development will be associated with incremental loss of the surface runoff from the pit excavation area, increased surface runoff from the hardstand Site Access Track/admin/processing fill areas, and reuse of a minor portion for site management purposes.

Upslope surface runoff will be deflected around the pit excavation at all stages by use of small fill berms so that runoff captured in the pit excavation will be kept to a minimum and upslope runoff prevented from entraining sediments from disturbed work areas as far as practicable. The upslope runoff will be directed back into the tributary drainage depression and thence into the North Storage Dam and the existing farm dam for treatment/reuse/release as appropriate.

Surface runoff captured in the pit excavation will mostly be transferred to deeper groundwater based on tested permeability of the underlying sands following removal of overburden (JCLS). It is not likely that pump out will be required at any time, with the possible exception of Year 1 when excavation is shallow and working conditions need to be

maintained. Any pumpout water will be transferred into the North Storage Dam and bioretention basin for treatment/reuse/release downstream as the case may be.

The MUSIC model is used to illustrate the impacts as in Table 5, considering pre-existing conditions (forested catchment), existing conditions (cleared grazing land) and proposed application site conditions.

- For existing conditions the Urban node was used with 0% impervious.
- For pre-existing forest conditions the Forest node with 0% impervious was used.
- For post development disturbed surfaces the Agricultural node was used with 0% impervious for the pit excavation, and 90% impervious for the hardstand areas.

Other assumptions and quantities used for the modelling:

- Pit area ~20 ha @ 0% impervious,
- Admin/Processing/haul road hardstand area ~6 ha @ 90% impervious,
- Site Access Track ~ 1 ha,
- Overburden storage area ~ 2 ha @ 50% impervious,
- Balance tributary catchment 98 ha,
- Urban area downstream of Bass Highway ~7 ha @ 50% impervious,
- Balance Deep Creek catchment 320 ha @ 0% impervious,
- Pit sump 500 m^2 zero permanent water area, 12 m/day infiltration rate to groundwater,
- North Storage Dam~ 3,000 m^2 water surface area and 2,500 m^3 volume at NTWL, extended detention depth 0.5 m,
- North Sediment Pond ~ 1,000 m^2 at NTWL, extended detention depth 0.5 m,
- North east Sediment Pond ~ 4,000 m^2 at NTWL, extended detention depth 0.5 m,
- South Sediment pond~600 m^2 (matches existing dam to the south),
- Water Use demands as per Section 3.3.

TABLE 5 Mean annual flows (ML/yr)
MUSIC Simulations (KWR 1971-1990 daily)

Location	Pre-existing (forest) conditions	Existing Conditions	Future Conditions With Application Development	% change (Existing-Future)
Deep Creek upstream of tributary confluence	528	691	691	0
Tributary upstream of Deep Creek confluence	203	265	213	-20%
Deep Creek at Bass Highway	731	956	903	-6%
Deep Creek at WP Bay	743	986	933	-5%

The results in Table 5 show that mean annual surface water runoff from Deep Creek catchment to Western Port Bay has been significantly increased with clearing of the catchment and establishment of agriculture and residential land uses.

Compared with existing conditions and with the proposed application development in place:

- Mean annual tributary surface flows to Deep Creek will be reduced by 20% but still exceed annual demands by a factor of over 6;
- Mean annual Deep Creek surface flow discharges to Western Port Bay will reduce by just 6%;
- The mean annual surface water discharge to Deep Creek via the tributary will be about the same as would have been expected to occur under original forested conditions, with site supply demands satisfied using the existing and proposed storages.

It is likely to follow that reduced flows in the tributary will further assist with stabilisation and revegetation activities proposed with this application.

4.4 Water Quality Modeling

The MUSIC model has been used to assess pollutant generation and treatment for the application area, and for the overall Deep Creek catchment to the Bay.

The primary model assumptions remain as used for the hydrology assessment. However water quality parameters for the post-disturbance surfaces have been modified to reflect the higher concentrations of pollutants that will be generated from these surfaces and the associated truck and machinery movements.

The North Storage Dam will provide the primary water supply for all operations as set out in Section 3.3. Outflows to 300 l/s are assumed to be directed through the bioretention basin which is set at 200 m^2 filter surface area, hydraulic conductivity of 180 mm/hr and filter thickness of 0.6 m. larger outflows from the North Storage Dam bypass the bioretention.

The default pollutant generation characteristics provided in the model for Forest nodes were retained. Areas affected by the pit and the processing/storage areas were simulated using Agricultural nodes but adjusted from default settings to reflect the higher expected load generation rates. In selecting the adjusted parameter values reference was made to the recommendations by Fletcher et al in the CRCCH Report 04/8, December 2004 ("Stormwater Flow and Quality, and the Effectiveness of Non-Proprietary Stormwater Treatment Measures-A Review and Gap Analysis"). Table 6 lists the adopted parameter values.

TABLE 6 Mean parameter values used in MUSIC for Grantville

Area	Source Node	TSS (mg/L)		TP (mg/L)		TN (mg/L)	
		Base Flow	StormFlow	Base Flow	StormFlow	Base Flow	StormFlow
Quarry pit	Agriculture	25.1	501	0.132	2	1.19	3.16
Processing and stockpiles	Agriculture	25.1	501	0.132	2	1.19	3.16
Overburden store/rehab areas	Agriculture	25.1	501	0.132	1.5	1.19	3.16
Forest	Forest	7.94	79.4	0.0316	0.0794	0.724	0.841

The MUSIC model was run for 3 scenarios:

- Totally forested catchment base case (hypothetical situation);
- Current site and catchment conditions in 2012;
- Proposed ultimate WA 1488 development.

The model results for the three scenarios are listed in Tables 7 and 8.

In short these show that the WA 1488 application will significantly reduce pollutant loads (TSS, TP and TN and associated pollutants) compared with existing conditions, both at the tributary gully outlet to Deep Creek and for Deep Creek into the Bay. No surface runoff outflows will occur from the excavation based on the assessed sand permeability.

TABLE 7 MUSIC Model results for Work Authority Application WA 1488, Grantville

Scenario	Asset/Location	Parameter	Input Source Load	Residual Load	% Removal of Input Source Load
Hypothetical forest catchment	Tributary outlet	Flow (ML/yr)		203	-
		TSS (Kg/yr)		13,200	-
		TP (Kg/yr)		14.9	-
		TN (Kg/yr)		182	-
	Deep Creek at Western Port Bay	Flow (ML/yr)		743	
		TSS (Kg/yr)		49,400	
		TP (Kg/yr)		54.8	
		TN (Kg/yr)		681	
Existing 2012 Conditions	Tributary outlet	Flow (ML/yr)		265	-
		TSS (Kg/yr)		32,400	-
		TP (Kg/yr)		82	-
		TN (Kg/yr)		675	-
	Deep Creek at Western Port Bay	Flow (ML/yr)		986	
		TSS (Kg/yr)		111,000	
		TP (Kg/yr)		284	
		TN (Kg/yr)		2,480	
Ultimate WA 1488 development	South Sediment Pond	Flow (ML/yr)	8	7.5	8
		TSS (Kg/yr)	4,890	254	95
		TP (Kg/yr)	15	1	90
		TN (Kg/yr)	29	13	54
	North Sediment Ponds (2 No.)	Flow (ML/yr)	36	35	8
		TSS (Kg/yr)	22,700	700	97
		TP (Kg/yr)	89	5	95
		TN (Kg/yr)	129	55	57
	North Storage Dam	Flow (ML/yr)	245	206	16
		TSS (Kg/yr)	23,700	12,200	49
		TP (Kg/yr)	66	39	42
		TN (Kg/yr)	573	437	24
	Bioretention basin	Flow (ML/yr)	206	206	0
		TSS (Kg/yr)	12,200	5,820	52
		TP (Kg/yr)	39	24	37
		TN (Kg/yr)	437	337	23
	Tributary outlet (Total source and residual loads)	Flow (ML/yr)	286	213	26
		TSS (Kg/yr)	66,800	5,960	91
		TP (Kg/yr)	227	25	89
		TN (Kg/yr)	791	346	56

TABLE 7 MUSIC Model results for Work Authority Application WA 1488, Grantville					
Scenario	**Asset/Location**	**Parameter**	**Input Source Load**	**Residual Load**	**% Removal of Input Source Load**
	Deep Creek at Western Port Bay	Flow (ML/yr)	1,010	934	7
		TSS (Kg/yr)	147,000	85,900	41
		TP (Kg/yr)	435	234	46
		TN (Kg/yr)	2,700	2,260	17

TABLE 8 MUSIC Model results for Work Authority Application WA 1488, Grantville Comparison of Loads Discharged from the Tributary to Deep Creek and from Deep Creek to Western Port Bay					
Location	**Parameter**	**Forested conditions**	**Existing 2012 conditions**	**Ultimate WA 1488 development**	**% change from existing conditions due to WA 1488**
Tributary outlet to Deep Creek	Flow (ML/yr)	203	265	213	-20%
	TSS (Kg/yr)	13,200	32,400	5,960	-82%
	TP (Kg/yr)	14.9	82	25	-70%
	TN (Kg/yr)	182	675	346	-49%
Deep Creek outlet to WP Bay	Flow (ML/yr)	743	986	934	-5%
	TSS (Kg/yr)	49,400	111,000	85,900	-23%
	TP (Kg/yr)	54.8	284	234	-18%
	TN (Kg/yr)	681	2,480	2,260	-9%

The worst case scenario from a water quality management viewpoint will be early in Year 1 when initial soil disturbance occurs during overburden removal and transfer to construct the processing areas. For this reason the initial works will focus stabilising and sealing the site access track, stabilising and draining temporary access tracks to the North sediment ponds and forming the Storage Dam, and completion of the bioretention basin.

4.5 Site Access Track and Haul Road Crossings of the Tributary

Peak discharges required to convey flows through these crossings have been estimated using the Rational Method as set out in Australian Rainfall and Runoff. Culverts will be able to convey the 100 year Average Recurrence Interval (ARI) flow so that these access tracks remain operational at all times.

Using the original 123 ha catchment area the 100 year ARI peak flow is estimated to be 3.4 m3/s. Twin 1200 mm diameter pipes will suffice to convey this flow at velocities less than 1.5 m/s.

Detail design will resolve final culvert size and finer details regarding extended detention controls, weir level controls, culvert inverts, and offtake for the bioretention basin from the existing farm dam.

5. MONITORING AND CONSTRUCTION MANAGEMENT

5.1 Surface Water Quality Monitoring

An ambient surface water and ground water quality monitoring program will be instituted shortly and continue to run for the lifetime of the sand extraction operations.

Surface water quality parameters to be monitored are to be those listed in Table 9. Groundwater monitoring requirements are presented in the report by JLCS.

Frequency of monitoring needs to reflect seasonal changes and occurrence of wet weather conditions which are the dominant concern from a water quality viewpoint. It is recommended that the longer term ambient monitoring program be set at 3 monthly intervals (Feb, May, Aug, Nov).

Additional monitoring runs are required in the short to medium term to better define wet weather runoff responses and quality behaviour. It is recommended that surface water monitoring be conducted on a monthly basis until such time that collated results have adequately defined runoff quality and groundwater behaviour. This will continue for the first 12 months or at least until 6 months following completion and commissioning of the processing areas and haul roads.

As well as reviewing monitoring frequency, the parameters to be measured should be reviewed after 12 months to ascertain which, if any, could be deleted from future monitoring runs due to adequate data being gathered to discern quality variations.

The monitoring sites should be set so as to best quantify the impact (if any) of the sand extraction operations as opposed to other wider Deep Creek catchment processes. The recommended sites are as follows:

- The outlet pit of the North Storage Dam (only if flow is occurring from the dam);
- The outlet pit of the bioretention basin (only if flow is occurring from the basin);
- The tributary at the western property boundary;
- Deep Creek just upstream of the tributary confluence;
- Deep Creek at the Bass Highway.

Each test run report must incorporate the following information:

- Weather conditions at the time of testing;
- Total rainfall for prior 5 days;
- Gauge water level reading in the North Storage Dam;
- Estimated flow rates observed (or comment on zero flow).

TABLE 9 Surface Water Water Quality Test Results-WA 1488, Grantville

Site	Date	Temp	Conduct-ivity (uS/cm)	pH	DO (mg/L)	Turbidity (NTU)	Suspended Solids (mg/L)	TKN (mg/L)	Nitrate N (mg/L)	Nitrite N (mg/L)	TN (mg/L)	TP (mg/L)	TPH total petroleum hydrocarbon (ug/L)s	Heavy Metal Scan (ugL)
The outlet pit of the North Storage Dam														
The outlet pit of the bioretention basin														
The tributary at the western property boundary														
Deep Creek just upstream of the tributary confluence														
Deep Creek at the Bass Highway														
	Mth 2													
	Mth 3													
	Mth 4													
	Mth 5													
	Mth 6													
	Mth 7													
	Mth 8													
	Mth 9													
	Mth 10													
	Mth 11													
	Mth 12													

5.2 Construction Stage Management

The construction (establishment) phase of the sand extraction development and associated surface water quality management works must be properly managed to ensure environmental values are protected along the way. To do this, a Construction Management Plans (CMP) will need to be prepared to address construction-related impacts.

The CMP must include (but not be limited to) measures designed to prevent surface and stormwater runoff from the development from conveying water-borne pollutants into the Deep Creek and the Western Port Bay Ramsar site during the construction process. Key items to be factored into the CMP are as follows:

- All site works are to be carried out in accord with contemporary best site management practice. This will include any temporary outfall drainage works that may be required in advance of downstream drainage construction.

- Implement erosion prevention and control measures generally in accordance with the provisions of:
  - *"Construction Techniques for Sediment Pollution Control" (EPA Publication No. 275, 1991),*
  - *"Environmental Guidelines for Major Construction Sites" (EPA Publication No. 480, December 1995), and*
  - *"Doing it right on subdivisions. Temporary environmental protection measures for subdivision construction sites" (EPA Publication No. 960).*

- Areas of disturbance should be kept to a minimum with stage works areas clearly fenced to prevent machine access or materials storage elsewhere. Stock are to be completely excluded from the application area using existing fencing.

- Construct and establish the haul road embankment and the North sediment ponds and North Storage Dam and integrated structures and excavate the bioretention basin to act as an sedimentation pondage as part of initial construction. Completion of the bioretention filter, under-drainage system and establishment of appropriate aquatic/ephemeral vegetation communities in the basin can follow in the next growing season.

- Divert runoff from undisturbed areas away from active works areas (especially the extraction pit upslope edges), by use of fill berms and not excavated drains.

- Locate soil stockpiles at least 20 metres from any drainage line or pit.

- Remove soil and clay from tyres before trucks leave site.

- Remove foreign soil and plant matter from trucks before entering site.

- All significant vegetation to be retained should be fenced out prior to commencement of any site works within appropriate setbacks.

6. SUMMARY

Hydrologic Impact of the Proposal

With a dry blending operation, water use within the site is limited to that required for dust suppression of haul roads, extraction faces, and hardstand areas for processing, plus establishment irrigation for revegetation areas. All water will be sourced from local tributary catchment runoff, using the existing farm dam and the proposed new North Storage Dam and the main north east sediment pond as supply storages.

In essence the hydrologic impact of the sand extraction development will be associated with incremental loss of the surface runoff from the pit excavation area, increased surface runoff from the hardstand Site Access Track/admin/processing fill areas, and reuse of a minor portion for site management purposes.

Upslope surface runoff will be deflected around the pit excavation at all stages by use of small fill berms so that runoff captured in the pit excavation will be kept to a minimum and upslope runoff prevented from entraining sediments from disturbed work areas as far as practicable. The upslope runoff will be directed back into the tributary drainage depression and thence into the North Storage Dam and the existing farm dam for treatment/reuse/release as appropriate.

Surface runoff captured in the pit excavation will mostly be transferred to deeper groundwater based on tested permeability of the underlying sands following removal of overburden (JCLS). It is not likely that pump out will be required at any time, with the possible exception of Year 1 when excavation is shallow and working conditions need to be maintained. Any pumpout water will be transferred into the North Storage Dam and bioretention basin for treatment/reuse/release downstream as the case may be.

The results in Table 5 show that mean annual surface water runoff from Deep Creek catchment to Western Port Bay has been significantly increased with clearing of the catchment and establishment of agriculture and residential land uses.

No outflows will occur from the excavation based on the assessed sand permeability. Surface runoff lost to groundwater through the pit base will reappear as groundwater discharge to lower Deep Creek and the near shore zones along Western Port Bay.

Compared with existing conditions and with the proposed application development in place, the results in Table 6 show that:

- Mean annual tributary surface flows to Deep Creek will be reduced by 20%;
- Mean annual Deep Creek surface flow discharges to Western Port Bay will reduce by just 6%;
- The mean annual surface water discharge to Deep Creek via the tributary will be about the same as would have been expected to occur under original forested

conditions, with site supply demands satisfied using the existing and proposed storages.

It is likely to follow that reduced flows in the tributary will further assist with stabilisation and revegetation activities proposed with this application.

Surface water Quality Impacts
The MUSIC water quality modelling results in Tables 7 and 8 show that the WA 1488 application will significantly reduce pollutant loads (TSS, TP and TN and associated pollutants) compared with existing conditions, both at the tributary gully outlet to Deep Creek and for Deep Creek into the Bay.

Surface Water Quality Monitoring
An ambient surface water and ground water quality monitoring program will be instituted shortly and continue to run for the lifetime of the sand extraction operations.

Surface water quality parameters to be monitored (and locations) are to be those listed in Table 9. Groundwater monitoring requirements are presented in the report by JLCS.

Frequency of monitoring needs to reflect seasonal changes and occurrence of wet weather conditions which are the dominant concern from a water quality viewpoint. It is recommended that the longer term ambient monitoring program be set at 3 monthly intervals (Feb, May, Aug, Nov).

Additional monitoring runs are required in the short to medium term to better define wet weather runoff responses and quality behaviour. It is recommended that surface water monitoring be conducted on a monthly basis until such time that collated results have adequately defined runoff quality and groundwater behaviour. This will continue for the first 12 months or at least until 6 months following completion and commissioning of the processing areas and haul roads.

As well as reviewing monitoring frequency, the parameters to be measured should be reviewed after 12 months to ascertain which, if any, could be deleted from future monitoring runs due to adequate data being gathered to discern quality variations.

Construction Phase Management
The construction (establishment) phase of the sand extraction development and associated surface water quality management works must be properly managed to ensure environmental values are protected along the way. To do this, a Construction Management Plans (CMP) will need to be prepared to address construction-related impacts.

The CMP must include (but not be limited to) measures designed to prevent surface and stormwater runoff from the development from conveying water-borne pollutants into the Deep Creek and the Western Port Bay Ramsar site during the construction process. Key items to be factored into the CMP are set out in Section 5.2.

Neil M Craigie and Pat Condina

7. ABBREVIATIONS AND DEFINITIONS

AHD	Australian Height Datum. Common base for all survey levels in Australia. Refers to height in metres above mean sea level.
ARI	Average Recurrence Interval. The average length of time in years between two floods of a given size or larger
Ephemeral	Waterways which flow for only short periods of time after significant rainfall events. Also refers to wetlands which are either rarely inundated or only inundated for a very short period of time.
Evapotranspiration	The loss of water to the atmosphere by means of evaporation from free water surfaces (eg. Dams or lakes or wetlands) or by transpiration by plants
Groundwater	All water stored or flowing below the ground surface level
Ha	Hectare (10,000 square metres)
Km	Kilometre (1000 metres)
m^3/s	Unit of discharge = cubic metre/second
ML	Megalitre (1000 cubic metres)
Pond	A small artificial body of open water (eg. Dam or small lake)
Retarding basin	A flood storage dam which is normally empty. May contain a lake or wetland in its base
Sedimentation basin (sediment pond)	A pond that is used to remove sediments from inflowing water mainly by settlement processes. Edge zones may have similar appearance to wetland margins.
Surface water	All water stored or flowing above the ground surface level
Swale	A drainage line with essentially trapezoidal cross-sectional form. Can have rocky or soil bed form, be fully vegetated with indigenous species, or grassed. The base can be fitted with a filter zone to further assist in pollutant removal (termed a bio-retention swale). Foundations can be ripped to encourage seepage losses in suitable soils.
Waterlogging	Term used to describe saturated surface soil conditions where some free surface water may also be present
Wetland	A transitional area between land and water systems which is either permanently or periodically inundated with shallow water and either permanently or periodically supports the growth of aquatic macrophytes (eg. Swamp, marsh, fen, bog)
Bioretention basin	Bioretention basins operate by passing runoff through prescribed filtration media, commonly planted with vegetation that provides treatment through fine filtration, extended detention and some biological uptake. They also provide flow retardation and are particularly efficient at removing very fine sediments and nutrients. Should be located downstream of a sediment basin to protect against excess coarse to medium sediment inputs.

8. REFERENCES

Institution of Engineers, Australia (2006), *Australian Runoff Quality –A Guide to Water Sensitive Urban Design*
Institution of Engineers, Australia (1987), *Australian Rainfall and Runoff, A Guide to Flood Estimation*
Stormwater Committee, Victoria (1999), *Urban Stormwater Best Practice Environmental Management Guidelines.* Pub. CSIRO
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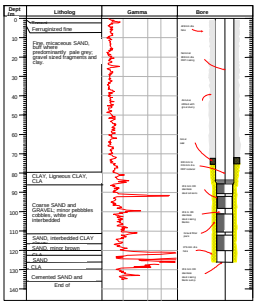
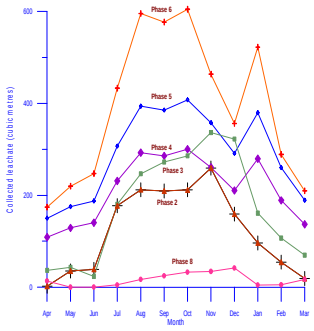
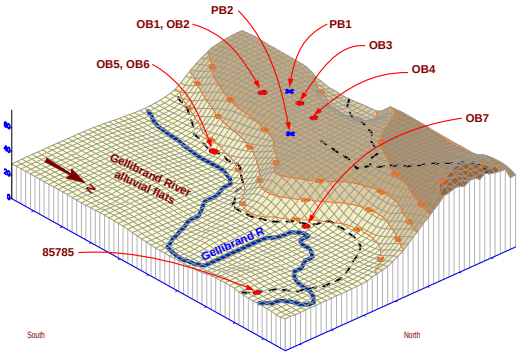
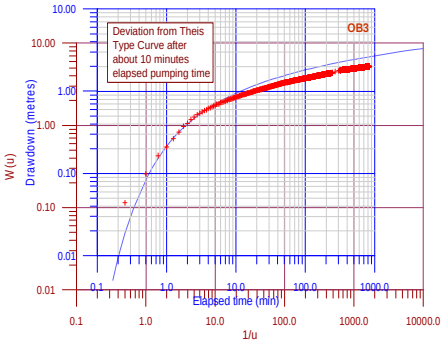
APPENDIX 3 Hydrogeological Assessment

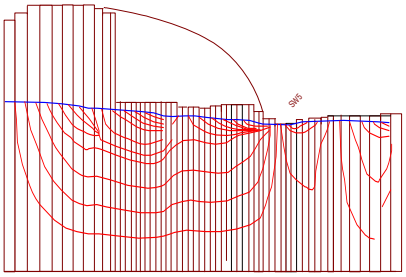
DANDY PREMIX QUARRIES PTY LTD

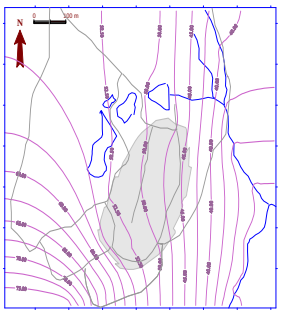












HYDROGEOLOGICAL ASSESSMENT
SAND EXTRACTION PROPOSAL,
1381-1395 BASS HIGHWAY, GRANTVILLE

May 2012

Ref. No.:GW-12/008

JOHN LEONARD CONSULTING SERVICES

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B Bore Completion Reports
C MGT-Labmark Analytical Report

1.0 INTRODUCTION

JOHN LEONARD CONSULTING SERVICES Pty Ltd (JLCS) was engaged by Dandy Premix Quarries Pty Ltd (DPQ) to prepare a Hydrogeological Assessment of a Greenfield site at 1381-1395 Bass Highway, Grantville.

This report was prepared as technical background for an application to the Department of Primary Industries (DPI) for a Work Authority (WA) to develop a quarry at Dandy Premix's Grantville property. [The report will also form part of the Bass Coast Shire Council Planning permit application.] The proposal has been assigned WA1488 by DPI under the provisions of the Mineral Resources Sustainable Development Act 1990.

WA1488 covers an area of about 153.4 ha and is located about 85 km SSE of the Melbourne Central Business District and about one km NNE of the small township of Grantville (Figure 1.1) in the parish of Corinella, Bass Coast Shire. The site is within the Koo Wee Rup Water Supply Protection Area.

WA1488 is bordered by Deep Creek to the north and Colbert Creek along part of its southern boundary, with rural land to the east and Bass Highway frontage to the west. Western Port Bay is approximately 500 metres further west of the Bass Highway. The site is currently mostly used for grazing beef cattle and fodder crop production. The exceptions are the two residential blocks at the front of the property and an uncleared area in the eastern portion of the property (Figure 1.2).

The WA1488 Work Plan seeks approval for an Extraction Pit of approximately 20 hectares in area to an average depth of about 20 metres below natural ground level, but importantly, does not seek to extract below the water table. [The water table position will be mapped by monitoring three purpose installed on-site bores around the proposed extract pit.]

Extraction Pit Design:

The proposed WA1488 Extraction Pit was designed by Bell Cochrane & Associates Extractive Industries (BCA) in liaison with DPQ. The sand extraction development plan is based on onsite dry blending of insitu and imported sands with all extraction being above the water table. The development plan incorporates:

- Extraction to a base level - five m AHD with a maximum pit extent of about 16 ha;
- Site access track from the Highway to the processing area;
- Vegetated screening bund along the highway exposure frontage;
- Sand screening and stockpile area (-5 ha);
- Office, shed and weighbridge (-1 ha);
- Overburden storage (-2ha);
- Gravel haul roads between the pit and the processing area and the overburden storage;
- Surface water management facilities.

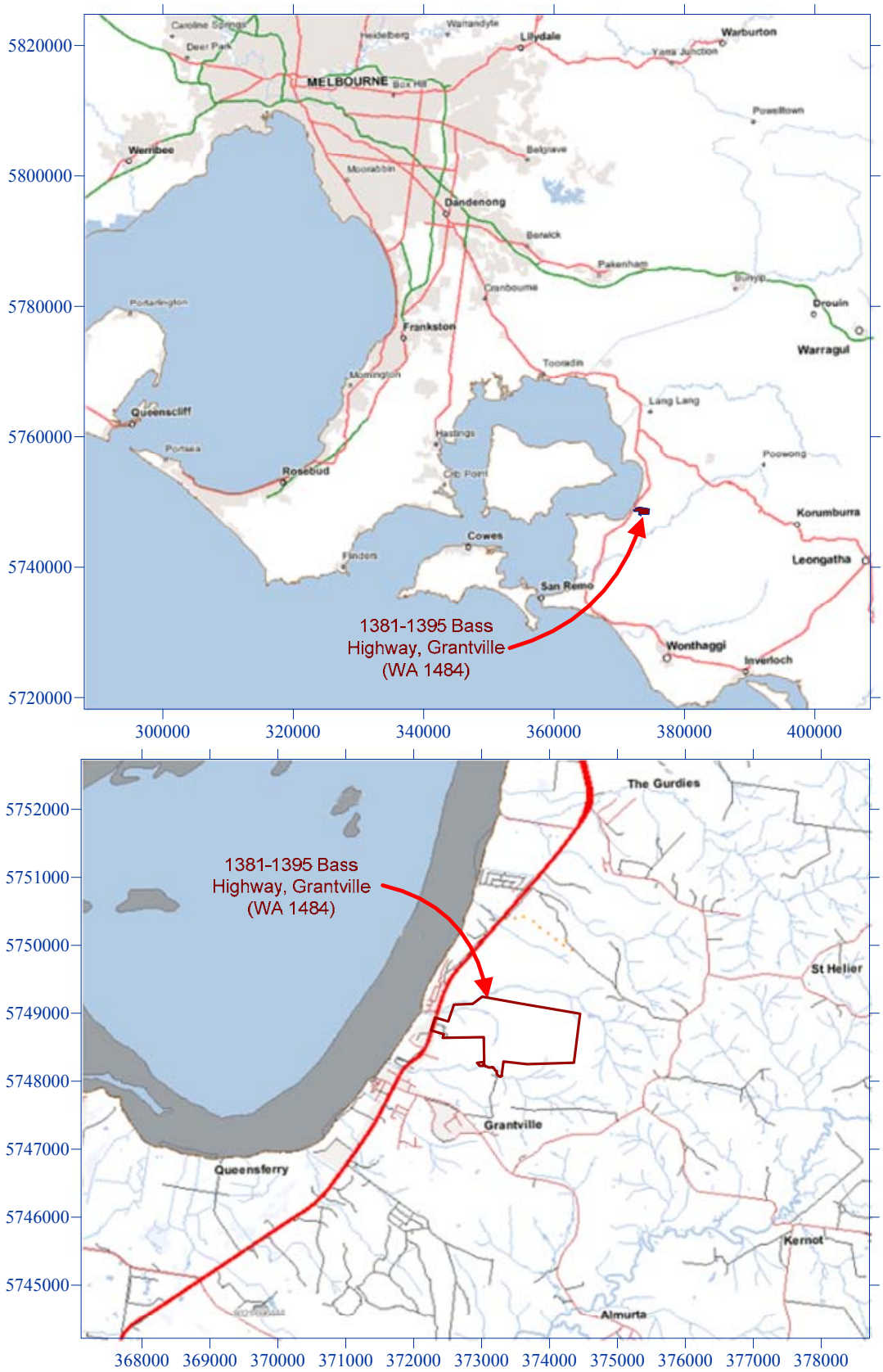


FIGURE 1.1: 1381-1395 Bass Highway Grantville Site Location

FIGURE 1.2 Grantville Area Satellite Image

The Extraction Pit location and design, along with that of the Processing Plant Hard Stand Area was guided by the proponents to mitigate the environmental impact of the proposal in so far as it seeks to:

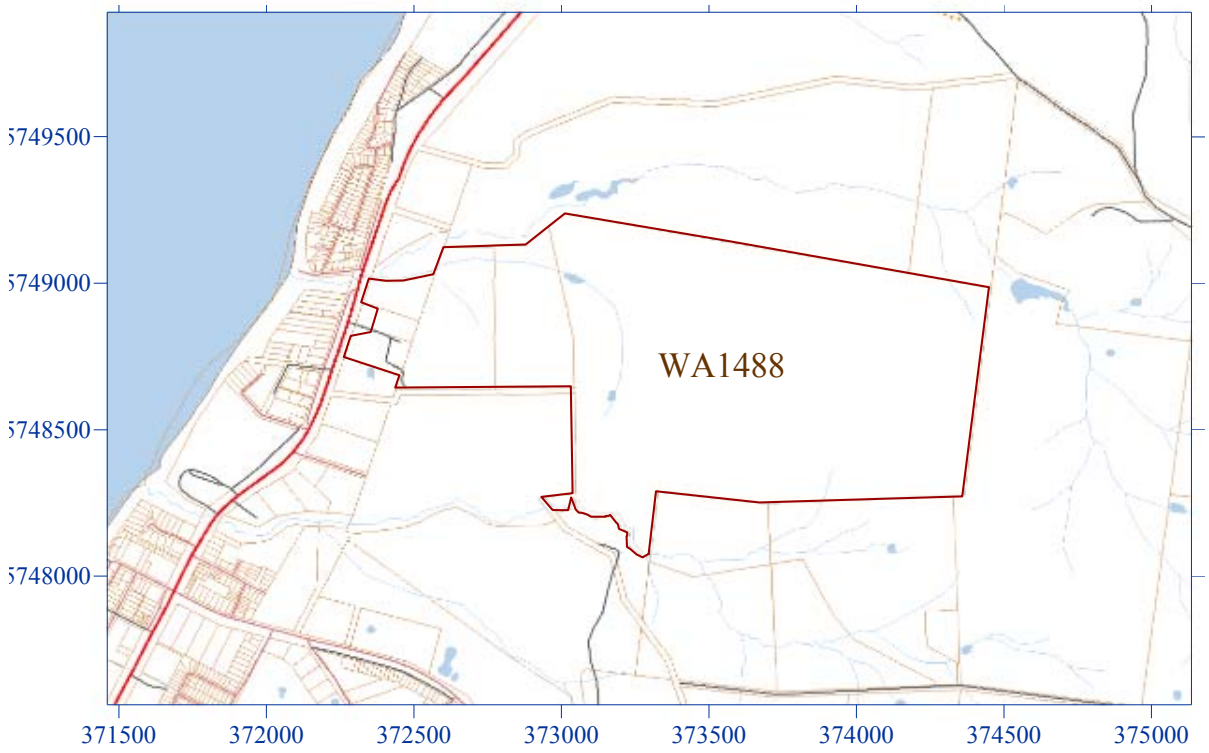


FIGURE 1.4 WA1488 Detailed Location

- Exploit the large volume of clean, free running fine to medium/coarse sands accessible above groundwater in the western portion of the site confirmed by extensive geological investigations;
- Operate a simple, modern and efficient (including low power consumption) dry blending and screening sand processing plant – no washing of sands or slimes processing and storage dams;
- Avoid potential impacts to Deep Creek and Colbert Creek and as a consequence Western Port Bay;
- Avoid potential impacts on the local groundwater and drawdown interference in existing supply bores;
- Minimise the amount of native vegetation to be removed;
- Minimise the volume of overburden to be removed to access the sand resources;
- Minimise any visual impact of the Extraction Pit disturbance; and
- Minimise the potential impact of operating and truck movement noise and dust creation through strategic location of the Processing Plant Hard Stand Area, the sealed Site Access Track and the provision of adequate water storage for dust suppression and the watering of screening bunds and vegetation

1.1 INFORMATION SOURCES

Information used in preparing the Hydrogeological Assessment was obtained from a number of sources including site-specific investigations. Key data sources include:

- Government groundwater databases including the Groundwater Management System (GMS; current edition; December 2011), Victorian Water Resources Data Warehouse, and .State Groundwater Data Bases (SGDB, last update 2002).
- GEDIS geological data base.
- GeoScience Victoria geological maps (hardcopy and digital).
- Site rainfall measurements for 1985 to present collected by the former property owner (R Blackmore).
- Detailed site contours of existing surface provided by Landair
- Regional 10 m contours digitised from published topographic maps and/or from map downloaded from the DPI Explore Victoria Online website.
- Sand resource exploration bore logs and grain size analyses results provided by Bell Cochrane & Associates.
- Pit design drawings prepared by Bell Cochrane.
- Drainage and water quality management report prepared by Neil M Craigie Pty Ltd (Craigie, 2012).
- Condition of Deep Creek by Pat Condina & Associates (Condina, 2012).
- Groundwater Management Plan. Koo Wee Rup Water Supply Protection Area. Southern Rural Water (SRW, 2010).

JLCS compiled a project dataset from the various data sources. A number of regional, local and site two- and three-dimensional maps were prepared as background to developing a conceptual hydrogeological model of the proposed sand extraction site and surrounding area. Digital elevation models (DEMs) were prepared for 1) the current topography and 2) proposed initial quarry (maximum proposed depth).

The various maps produced for this report were georegistered to the UTM MGA94 coordinate system, and elevations referenced to the Australian Height Datum (AHD).

2.0 QUARRY LAYOUT, STAGING AND OPERATIONS

The description of the development of the proposed sand quarry is based on the Development Plan prepared by Bell Cochrane & Associates (and notes provided by DPQ (G Cranny email dated 5 May 2012). Details of surface water management were extracted from the Drainage and Water Quality Management report prepared by Neil M Craigie Pty Ltd (Craigie, 2012).

2.1 QUARRY DEVELOPMENT

The initial development of the will be in the western portion of WA1488 (Figures 2.1 and 2.2). The main site development features include Sand Excavation Pit, Ancillary Stand Area (processing plant, sand stockpile area, weighbridge and site office), Water Storage Dams, Sediment Ponds, the Bioretention Basin, temporary overburden stockpile area and Site Access Track Overburden that is not used as base for the hard stand area and access track will be progressively used to backfill, contour and shape the worked out areas of the Extraction Pit until it is fully rehabilitated and returned as pasture for grazing.

The Extraction Pit is designed to be worked to a pit floor design elevation of five m AHD in three stages, commencing at the north east quadrant of the pit and progressing in westerly and southerly directions. Stage 2 involves extraction continuing west in the northern half of the pit to the western terminal boundary. Stage 3 involves extraction to the southern terminal boundary, commencing at the eastern terminal face and again progressing in a westerly direction.

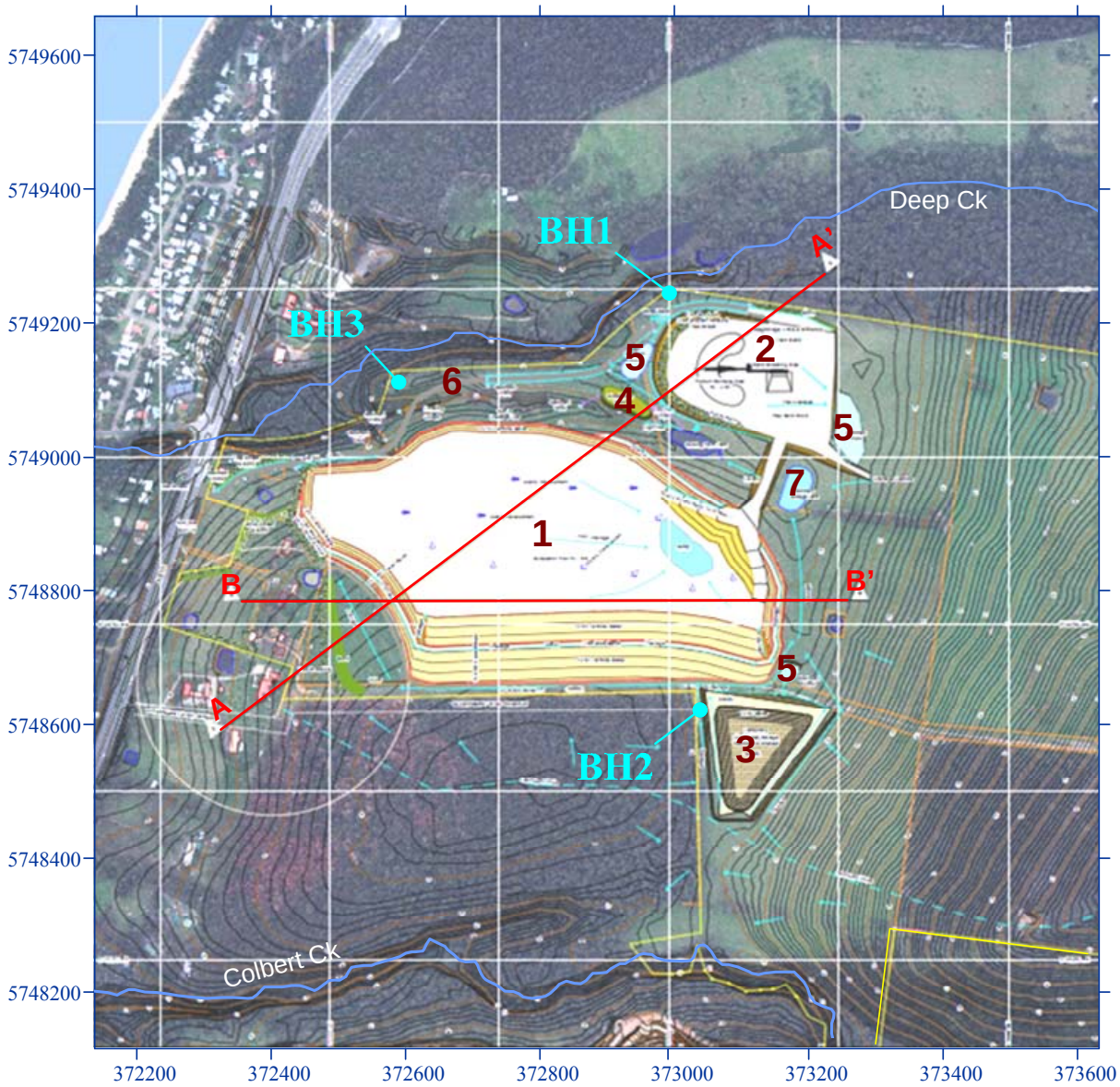
The Deep Creek tributary drainage line upstream of the main online dam to the southern farm access track will be fenced out to exclude stock and allow natural regeneration of sedges and shrubs to occur. This will enhance its already high capacity to slow drainage and filter runoff sourced from the surrounding hillslopes.

The design of both the overburden storage and any associated drainage/water management works will ensure there is no runoff from the site to Colbert Creek to the south, regardless of the magnitude of any rainfall event.

Coarser sediments entrained in any runoff from the overburden storage will be initially captured in the existing farm dam which abuts its northern face and the existing farm access track. This dam is referred to as the South Storage Dam. Thereafter the runoff discharging from this dam will pass overland along the existing tributary drainage line for further fine suspended and colloidal sediment removal.

The main quarry access haul track will cross the Deep Creek tributary at the downstream end of the existing dam. The Track embankment will be raised about two m above the existing bank to provide structural reinforcement, create additional water storage capacity to meet site demands, and to enhance water quality treatment performance.

Stabilised drainage swales and/or pipes discharging from the processing area and haul roads will be fitted with small coarse sediment basin traps to mitigate sediment buildup in the North Storage Dam.



1 Sand excavation pit
2 Ancillary hard stand area
3 Overburden storage area
4 Bioretention basin
5 Sediment pond
6 Access road
7 Dam

A A' BCA profile section line

BH2 Monitoring bore

FIGURE 2.1 WA1488 Sand Extraction Development Layout (Modified after Bell Cochrane & Associates Drawing NS-1164 Rev2, 17 May 2012).

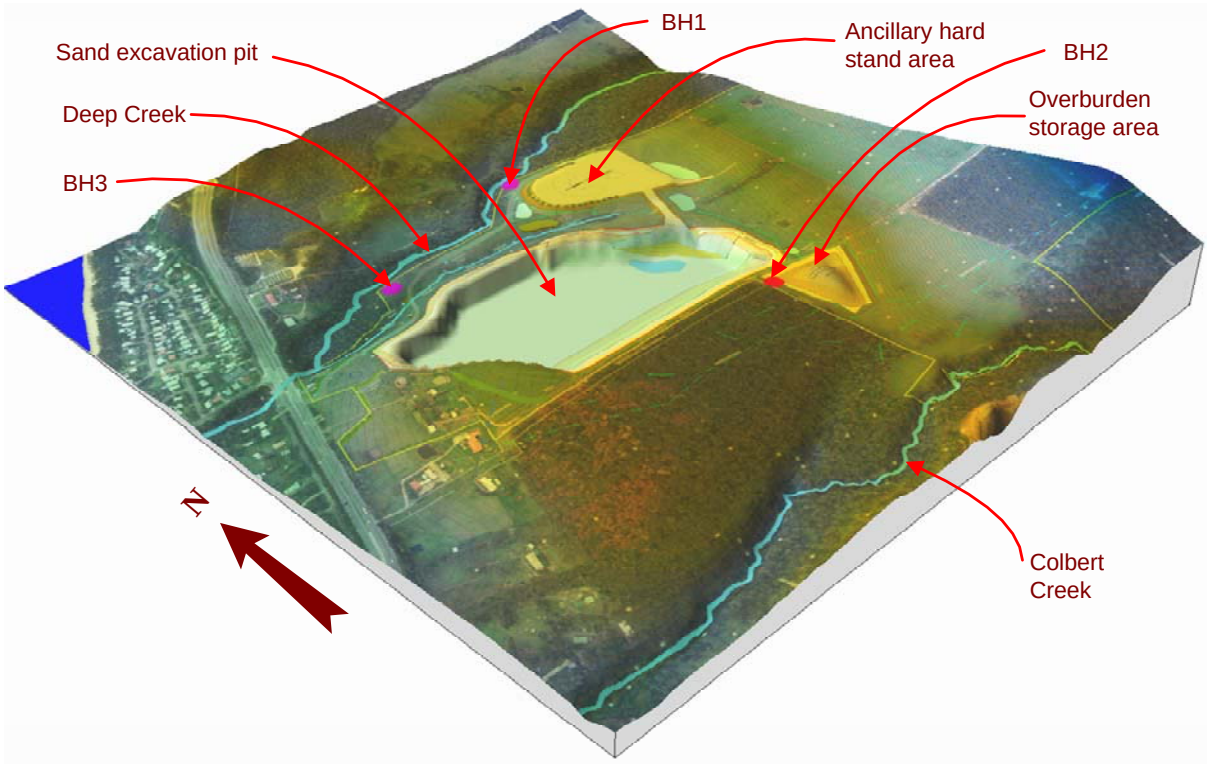


FIGURE 2.2 WA1488 Sand Extraction Development Digital Elevation Model

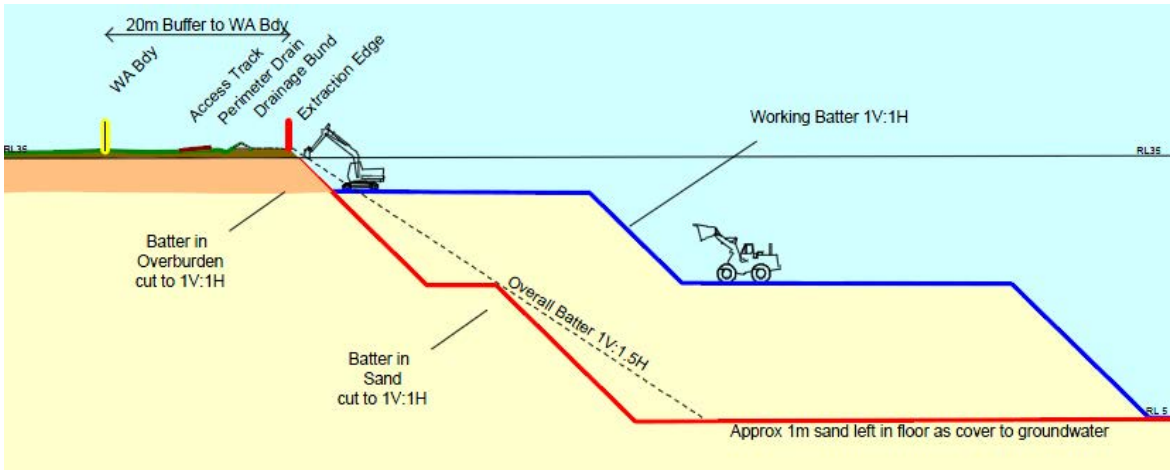


FIGURE 2.2 WA1488 Typical Sand Extraction Method (After Bell Cochrane & Associates Drawing NS-1164 Rev 2, 17 May 2012).

Initial outflows from the North Storage Dam will be directed to a bioretention basin to be constructed on the north side of the gully as shown in Figure 2.1. Excess overflows from the North Storage Dam will flow under the haul track via a culvert control structure and continue north-west in the incised tributary gully towards its eventual Deep Creek confluence.

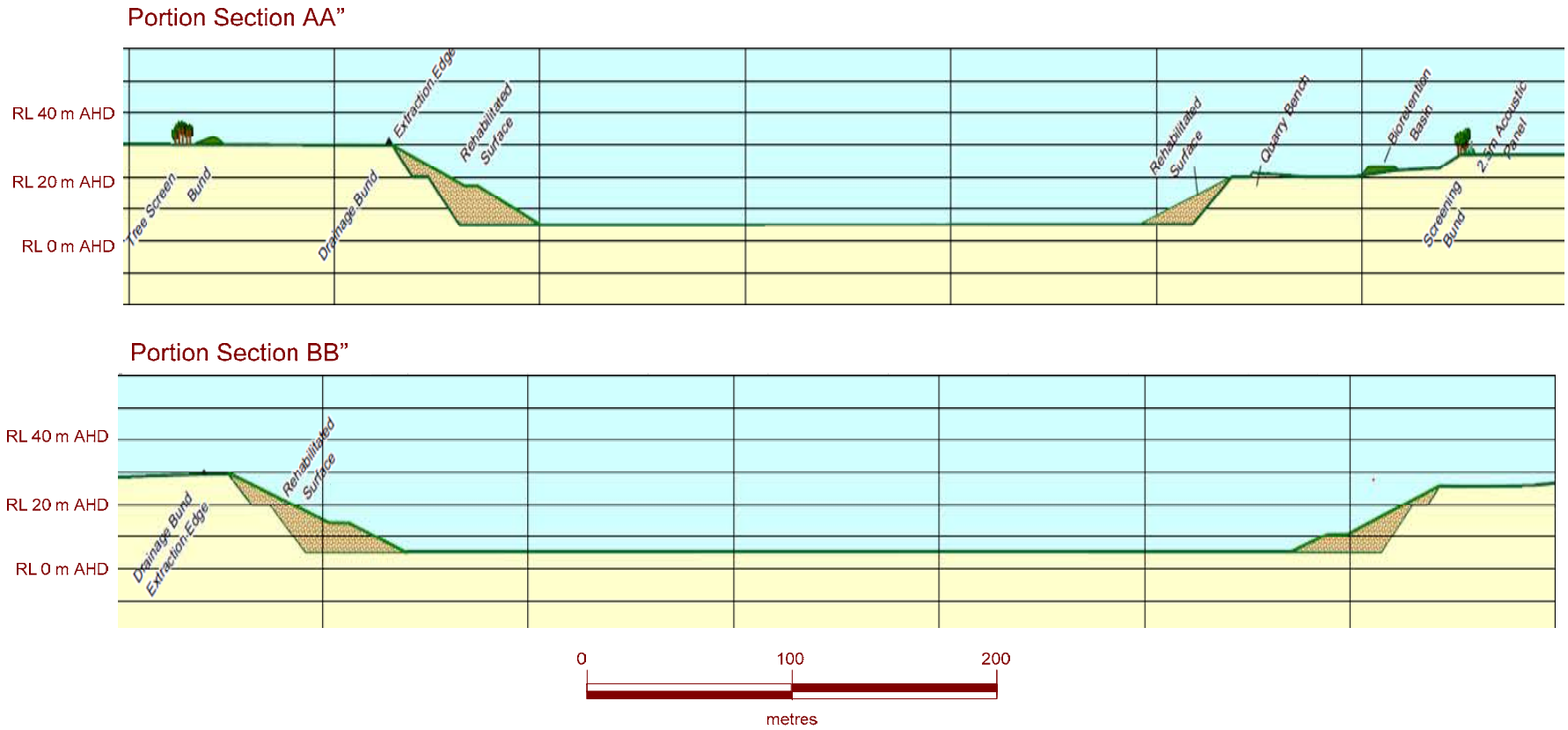


FIGURE 2.3 Portion of BCA Sections Through Proposed Sand Extraction Pit (Modified after Bell Cochrane & Associates Drawing NS-1164 Rev2, 17 May 2012).

The incised gully requires stabilization works in places to resolve existing bed and bank erosion. These works will be undertaken in compliance with relevant MWC standards and guidelines.

Additional sediment ponds will be formed in the gully at the access track crossing and at an existing farm access crossing. All drainage lines serving the access track will be formed as vegetated swales incorporating graded rock stabilization as necessary to respond to grade controls.

2.2 DEVELOPMENT STAGES

The likely development stages are indicated below:

Year 1	Clayey overburden stripped from extraction pit commencing at northeastern end of pit. The overburden will be used to construct the foundations of the main access track which will be sealed, the administration/processing pad and the main pit haul access track. Sand extraction/processing commences. Drainage swales and all sediment ponds and bioretention basin established and the Deep Creek tributary fenced out and revegetated)
Year 2	Overburden stripped from a further 25 per cent of the pit working westwards from the Stage 1 area to the final pit face. Excess volumes transferred to storage at south end or sold offsite. Deep extraction and processing of sands continues. Terminal faces progressively rehabilitated.
Year 3-4	Overburden stripped from the balance of the pit working south along the full face. Excess volumes transferred to storage at south end or sold offsite. Deep extraction and processing of sands continues. Terminal faces progressively rehabilitated.
Years 4-15	Deep extraction and processing of sands continues above water table. Terminal faces progressively rehabilitated.

2.3 GROUNDWATER MONITORING BORES

Three monitoring bores were installed around the proposed Extraction Pit during March 2012 (Figures 2.1 and 2.2). The investigation bores were installed by John Agostinelli (Driller Licence No. 0865), Aquasearch Drilling Contractors as sub-contractor to Statewide Drilling Victoria Pty Ltd. The bores were installed using the mud rotary drilling technique under Southern Rural Water (SRW) Licence to Construct Works, Works Licence ID: WLE054614, issued to Dandy Premix Quarries Pty Ltd as the Licence Holder. A copy of the bore construction licence is presented in Appendix A. Bore completion reports prepared by the drilling contractor are provided in Appendix B. The bore construction details are summarised in Table 2.1.

Fences enclosures have been erected around each of the monitoring bore to ensure that the bores are not inadvertently damaged during site development works and operational activities.

TABLE 2.1 Monitoring Bore Details

Bore	MGA coordinates		Elevation (m AHD)		Depth (m bgl)	Screened interval (m bgl)	Bentonite plug (mbgl)
	Easting	Northing	NS	TOC			
BH1	373002.8	5749247.9	20.14	20.60	26.0	20.0 to 26.0	18.0 to 19.0
BH2	373048.5	5748624.0	33.00	33.39	38.0	32.0 to 38.0	30.0 to 31.0
BH3	372599.4	5749114.6	16.69	17.05	21.3	15.3 to 21.3	14.0 to 15.0

Water levels in the three monitoring bores will be measured quarterly commencing after the WA1488 application is approved. The data will be reviewed and used to determine the depth limit of the Extraction Pit to ensure the pit floor does not extend below the established standing water level.

3.0 GROUNDWATER MANAGEMENT AND PROTECTION

Sand extraction sites can alter the water table by direct pumping of groundwater from a bore or pit sump, or passively via evaporation loss from a sump below the water table. Additional some activities at quarry sites can result in groundwater contamination, e.g., leaking fuel storage tanks. The main Victorian legislation and policies related to consumptive use of groundwater including dewatering and groundwater extraction impacts (Groundwater Resource Management) and potential contamination (Groundwater Quality Protection) are briefly discussed in the following Sections.

3.1 GROUNDWATER RESOURCE MANAGEMENT

Groundwater resources ("quantity") management is achieved under the provisions of the Water Act 1989, as amended. Southern Rural Water (SRW) has delegated responsibility for managing groundwater resources across southern Victoria.

The provisions of the Water Act 1989 require that potential groundwater users obtain 1) a license to construct a bore, and 2) a separate licence to take and use groundwater for commercial uses. [Extracting groundwater for stock watering and/or domestic use is a statutory right under the Water Act and does not require an extraction licence.] Licensing authorities are also required to ensure that allocation of a new groundwater licence does not undermine environmental water reserves or surface water allocations. In considering applications for a groundwater extraction licences the Rural Water Authorities including SRW have to take a number of matters into consideration including, 1) the existing and projected availability of water in the area, 2) any adverse effect that the allocation or use of water under the entitlement is likely to have on existing authorised uses of water, a waterway or an aquifer, 3) the need to protect the environment, including the riverine and riparian environment, and 4) government policies concerning the preferred allocation or use of water resources.

Areas of the State that have a high level of groundwater development or potential for development are designated as Groundwater Management Areas (GMAs). The Victorian legislation provides for the setting of an upper limit on the amount of groundwater that can be allocated or taken from a GMA. The limiting volume was initially referred to as Permissible Annual Volume but is now designated as Permissible Consumptive Volume (PCV). Where groundwater in a GMA is identified as being under threat of over use (usually where the volume of groundwater allocated within a GMA exceeds 70 percent of the PCV), the area is declared a Water (or in some cases a Groundwater) Supply Protection Area (WSPA) and extractions are managed in accordance with an approved management plan. Areas of the state not covered by a GMA or WSPA are known as "unincorporated areas".

No new licences can be issued in areas where groundwater is fully allocated. New licences can only be obtained by temporary or permanent trading of existing licences. Trades have to be approved by the water corporation. A traded licence may have its licence conditions altered based on the properties of the local groundwater resource (DSE, 2009). Water trading in Victoria is governed by rules set by the Minister for Water.

Rural Water authorities area required to consider the matters outlined in Section 40 & 53 of the Water Act 1989 when assessing groundwater licence applications including applications for trading licences (and by extensions activities that could impact on resource availability) and applications for licence trading whether the application is from an incorporated or unincorporated area including:

- the existing and projected availability of water in the area;
- any adverse effect that the allocation or use of water under the entitlement is likely to have on existing authorised uses of water; or a waterway or aquifer;
- the conservation policy of the government;
- the proper management of the aquifer;
- the purposes for which the water is to be used;
- the needs of other potential applicants.

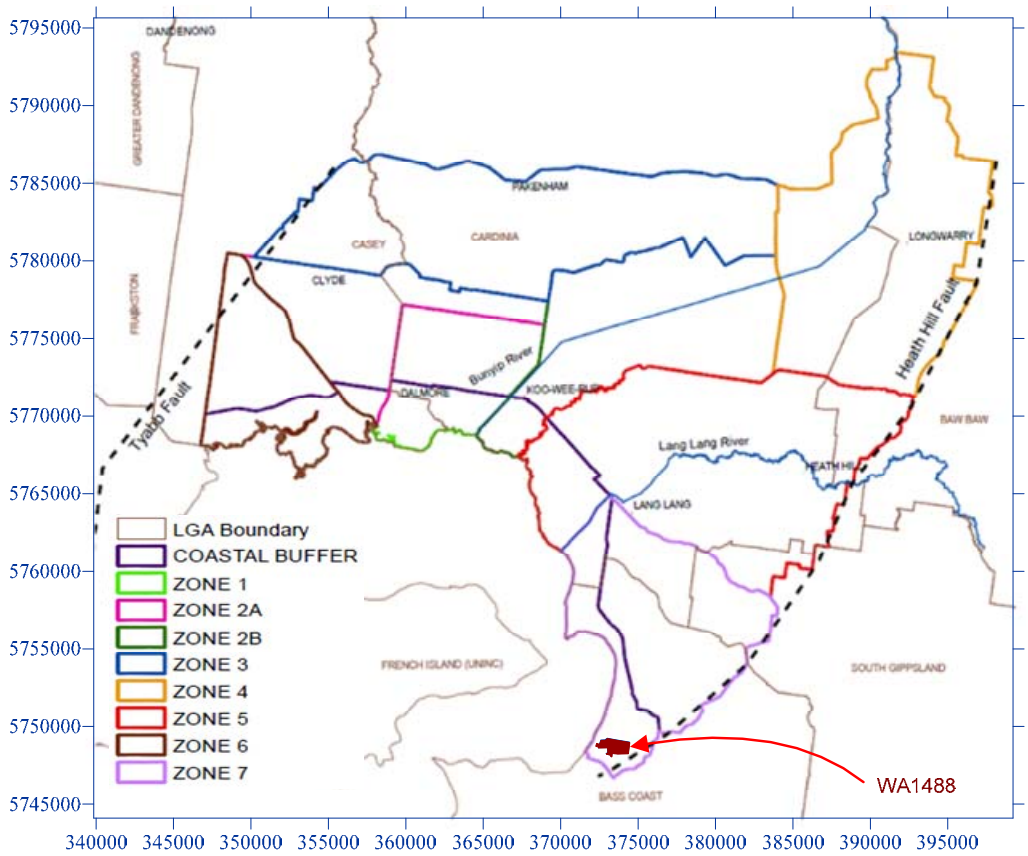
3.1.1 Koo Wee Rup WSPA

The Koo Wee Rup Water Supply Protection Area (Koo Wee Rup WSPA) covers most of the Western Port (geological) Basin (Figure 3.1) The area covered by the WSPA was declared a groundwater conservation area, the "Koo Wee Rup Groundwater Conservation Area", in 1971 under the former Groundwater Act 1969 and subsequently declared a WSPA under the Water Act 1989 in 2002.

The Koo Wee Rup WSPA has been divided into seven zones to facilitate groundwater management. WA1488 is with Zone 7 (Figure 3.2). Zone 7 was added to the WSPA zones following amalgamation of the Koo Wee Rup and Lang Lang areas into the one WSPA (Sinclair Knight Merz, 2000. 2002). This zone was intended to encompass the aquifer areas that are recharged from the Heath Hill area, but which are south of the main extraction areas. The main technical reason for this zone was to ensure that the full aquifer (sic) is included within the WSPA (SKM, 2003).

A "Coastal Buffer" is shown in the various figures in the Koo Wee Rup WSPA Groundwater Management Plan but is not described in the plan. – JLCS understands that the Coastal Buffer was incorporated into the plan following recommendation in a 2003 technical assessment by Sinclair Knight Merz for the purposes of limiting water trade so that the total volume of groundwater extracted within the coastal sub-zone is not permitted to increase to further minimise the potential for sea water intrusion (SKM, 2003).

The PCV for the Koo Wee Rup WSPA is 12,915 ML (Tables 3.1 and 3.2). The PCV embraces "all formations from the ground surface". Although groundwater within the Koo Wee Rup WSPA is fully allocated the actual usage in Zone 7 during 2009/10 reported by SRW was only about 38 per cent of the total licensed volume (Table 3.3).



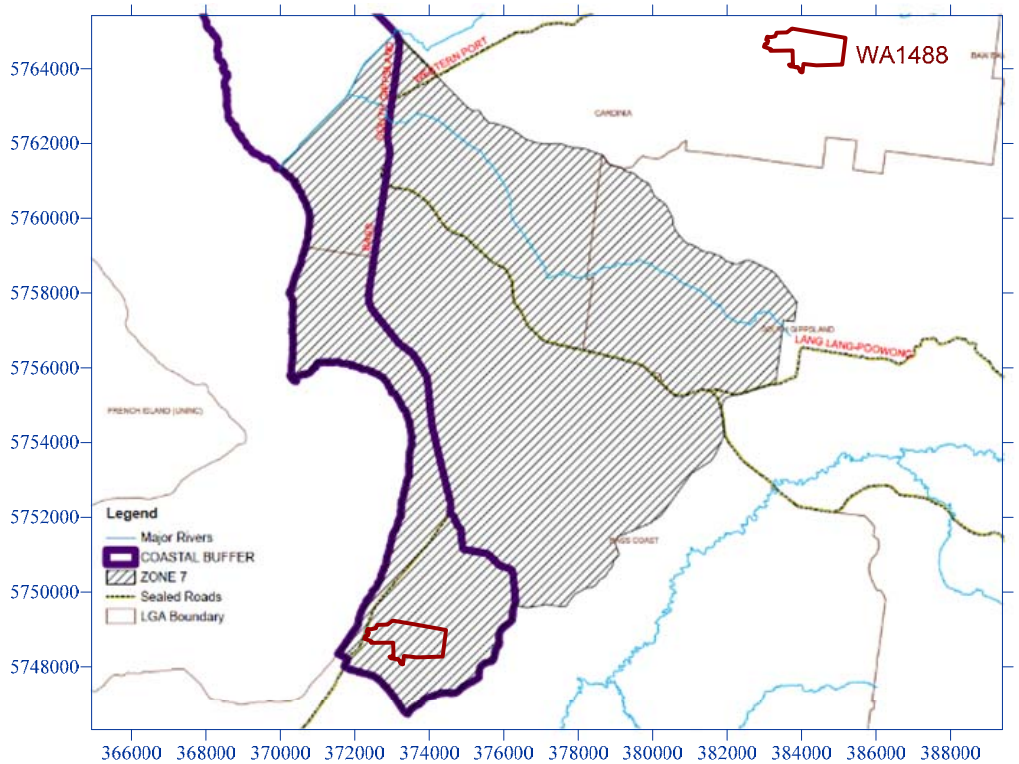


FIGURE 3.1 Koo Wee Rup WSPA Boundary and Zones (Modified after SRW, 2010)

TABLE 3.1 Koo Wee Rup Water Supply Protection Area Gazette Details

Column A	Column B	Column C	Column D
Groundwater area name	**Plan number**	**Stratum, formation or zone**	**PCV**
Koo Wee Rup Water Supply	LEGL./04-230	All formations below the surface	12,915

Source: Victorian Government Gazette No. G 28 Thursday 14 July 2011. p 1642

3.1.2 Koo Wee Rup WSPA Groundwater Management Plan

A Groundwater Management Plan for the Koo Wee Rup WSPA was approved by Minister for Water in August 2010. The stated objective of the management plan is to ensure that the water resources of the area are managed in an equitable manner so as to ensure the long-term sustainability of those resources. "Long term sustainability" is the continued availability and security of supply of suitable quality water for all consumptive users (domestic, stock, irrigation, dairy and urban supply), and for the needs of the environment. A key objective of the Koo Wee Rup WSPA Management Plan is to preserve the environmental values and health of water ecosystems, including their biodiversity, ecosystem functioning, quality of water and other uses that depend on environmental condition (as required under the Water Act 1989). This objective will be achieved by: (SRW, 2010):

- Prohibiting the issue of new groundwater licences that would result in the current level of groundwater allocations increasing;
- Protecting groundwater discharges to Westernport Bay by ensuring that groundwater allocations remain stable or decrease in coastal zones;
- Establishing a program that monitors water levels in bores adjacent to surface water bodies to assess the level of interaction (if any); and
- Monitoring the salinity of groundwater across the protection area to identify potential degradation of the groundwater resource by intrusion of saline water from the ocean or saltier parts of the Westernport Basin.

In addition to the rules within the management plan, the Water Act 1989 requires SRW to consider the maintenance of the environmental objective when determining an extraction licence renewal or transfer. However, any changes to groundwater allocation across the WSPA would require amendments to the management plan through a consultative committee process.

TABLE 3.2 Koo Wee Rup WSPA Inventory Details

GMU Core Details	
GMU Name:	**Koo Wee Rup**
GMU Type:	WSPA
RWA:	Southern Rural Water
Aquifer Type:	Unconfined and Confined
Year Established:	2001
LEGL Number:	LEGL./04-230
Allocation Limit:	12915
PCV:	PCV

Formation Details	
Formation Name:	Western Port Group
Formation Type:	Non Bedrock
Minimum Age:	
Maximum Age:	

Allocation Usage	
Year:	2009/10
Licence Entitlement:	12915
No. of Licences:	382
Metered Volume (ML):	3378
Estimated Non Metered Use:	0
No. of D & S Bores:	1492
Estimated D & S Use (ML):	2984

Prescriptions and Principles	
Level Target:	0
Target Description:	
Licensing Transfer:	1
Transfer Description:	An embargo on new licences and permenent transfers has been in place as required by the Water Act since the declaration as a Water Supply Protection Area.
Prescriptions and Principles:	The Koo Wee Rup - Dalmore Groundwater Conservation area was declared in 1972 under the provisions of the Groundwater Act 1969. This was due to concerns about long term falling groundwater levels and risk of sea water intrusion. (The declines at KWR and failure of the Nhill groundwater supply prompted the government to establish the Groundwater Act). The arrangements under the conservation area establish a monitoring and metering program. In the mid 1980s licence entitlements were reduced significantly and a number of sub zones created to reduce the water level decline and prevent saline intrusion. The Koo Wee Rup WSPA was declared in 2001 amalgamating the KWR Conservation Area and the Lang Lang GMA. The Koo Wee Rup WSPA Groundwater Managment Plan was approved by the Minister for Water on 4 August 2010. A PCV of 12,915ML/yr was declared in 2006 (LEGL./04-230) for all formations. A 3D visualisation can be viewed at:http://www.spatialvision.com.au/html/GMU_VRML/Central/model.html
Limit Rationale:	Reflects licence entitlement at the time of the WSPA declaration.

Zone Information

Zone Name	Depth	Allocation Limit	PCV
Whole GMU	All formations	12915	PCV

TABLE 3.3 Koo Wee Rup WSPA Zone Groundwater Usage

KWR WSPA Zone	Total Use for 09/10 (ML)	Total Licensed Volume (ML)	Percentage of Total Licensed Volume Used for 09/10
Zone 1	416.3	1074.3	38.8%
Zone 2A	124.6	782.3	15.9%
Zone 2B	1014.7	2929.5	34.6%
Zone 3	33.5	529.3	6.3%
Zone 4	416.8	1664.2	25.0%
Zone 5	286.8	1508.8	19.0%
Zone 6	123.8	580.6	21.3%
Zone 7	961.1	2545.5	37.8%

Source; Koo Wee Rup Regional Update, SRW October 2010 (http://www.srw.com.au/Files/Seasonal_updates/0041_ssnlup_oct_kwr_region.pdf)

3.2 GROUNDWATER QUALITY PROTECTION

Groundwater quality protection is achieved under the provisions of the Environment Protection Act 1970 administered by EPA. The principal policy for groundwater quality protection is the State Environment Protection Policy (SEPP) "Groundwaters of Victoria" (Victoria Government Gazette, 1997). The SEPP Groundwaters of Victoria provides a number of beneficial use categories based on the salinity of the natural/uncontaminated groundwater. Segments of the groundwater environment and beneficial uses to be protected in each segment are indicated in Table 3.4. The SEPP requires that identified beneficial uses are protected and refers to various water quality guidelines for the assessment of water samples depending on the beneficial use category.

TABLE 3.4 Beneficial Uses of Groundwater Segments

Beneficial use	Segments (mg/L TDS)				
	A1 (0-500)	A2 (501-1,000)	B (1,001-3,500)	C (3,501-13,000)	D (> 13,000)
Maintenance of ecosystems	✓	✓	✓	✓	✓
Potable water supply –desirable	✓				
Potable water supply –acceptable		✓			
Potable mineral water supply	✓	✓	✓		
Agriculture, parks, gardens	✓	✓	✓		
Stock watering	✓	✓	✓	✓	
Industrial water use	✓	✓	✓	✓	✓
Primary contact recreation)	✓	✓	✓	✓	
Building and structures	✓	✓	✓	✓	✓

Source: SEPP Groundwaters of Victoria

The concentration of specific chemicals in groundwater and its physical properties dictate the suitability of (raw, untreated) groundwater for the various beneficial uses to be protected. The stipulated or referenced water quality objectives must be maintained to ensure that groundwater remains suitable for its identified beneficial uses.

The SEPP Groundwaters of Victoria applies to all individuals and organizations operating within Victoria. Government departments and other protection agencies with responsibility for activities that could impact on groundwater quality (such as rural water authorities) are required to consider the Groundwaters of Victoria policy when exercising their statutory powers and carrying out their duties. For example, planning authorities should consider any potential impacts on beneficial uses of groundwater when considering planning approvals in areas near vulnerable groundwater (EPA, 1998).

The SEPP Groundwaters of Victoria policy attainment measures (EPA, 1998):

- outline general requirements for activities that may pollute groundwater;
- provide for the delineation of groundwater zones of special significance for further protection;
- provide for the delineation of zones where groundwater is already polluted, as well as publication of these zones as a form of warning to potential users;
- allow for attenuation zones in strictly limited circumstances as recognition of the potential for some waste disposal authorities to impact on groundwater despite the application of best practice environmental management;
- require that where non-aqueous phase liquids (for example, petrol) are present as an uncontrolled source of groundwater contamination, they must be removed unless the party responsible can satisfy EPA that no unacceptable risk is posed to any beneficial use of groundwater.

4.0 CHARACTERISTICS

4.1 RAINFALL

Most groundwater recharge is derived from rainfall either via direct infiltration into the ground where the rainfall occurs or indirectly via infiltration through stream and lake beds where the water stage is above the water table. Reductions in the amount of rainfall such as occur during droughts decrease recharge resulting in falling water tables. Conversely, periods of higher rainfall result in increased groundwater recharge and higher water tables

The climate in the Grantville area is temperate and variable with moderate rainfall received in most months. Rainfall records have been kept by the previous owner of the property at 1393-1395 Bass Highway, Grantville commencing in 1985. – The annual rainfall is summarised in Table 4.1 and presented as a histogram in Figure 4.1. – Average and median annual rainfall over this period 1985 to 2011 were about 882 mm and 852 mm, respectively. Although the total amount of rain received is about the same for winter and summer, it falls on more days in winter than in summer. During summer the troposphere is warmer, and therefore can hold more moisture. For this reason rain tends to be heavier during the summer months. Lifting agents in the form of cold fronts, however, are weaker and are not as frequent as the succession of fronts that pass in winter, so rain days are less frequent in summer.

TABLE 4.1 Grantville 1985-2011 Annual Rainfall

Year	Rainfall (mm)	Year	Rainfall (mm)	Year	Rainfall (mm)
1985	858	1994	790	2003	728
1986	975	1995	1012	2004	929
1987	925	1996	1014	2005	833
1988	985	1997	653	2006	559
1989	1044	1998	813	2007	795
1990	831	1999	787	2008	747
1991	1084	2000	802	2009	720
1992	966	2001	889	2010	993
1993	1133	2002	686	2011	1260

Note: Data provided by R Blackmore

4.2 GEOMORPHOLOGY, TOPOGRAPHY AND DRAINAGE

Topography is not only one of the main controls on surface water runoff but also has a significant influence on water table position; the water table configuration is a subdued reflection of the surface topography. The influence of topography is more pronounced in hilly and mountainous terrain with high relief, however topography can be an important consideration is areas of low relief. Direct groundwater discharge occurs where the water table intersect the ground surface (natural and man-made such as in quarries) or indirectly via evapotranspiration where the water table is close to the ground surface.

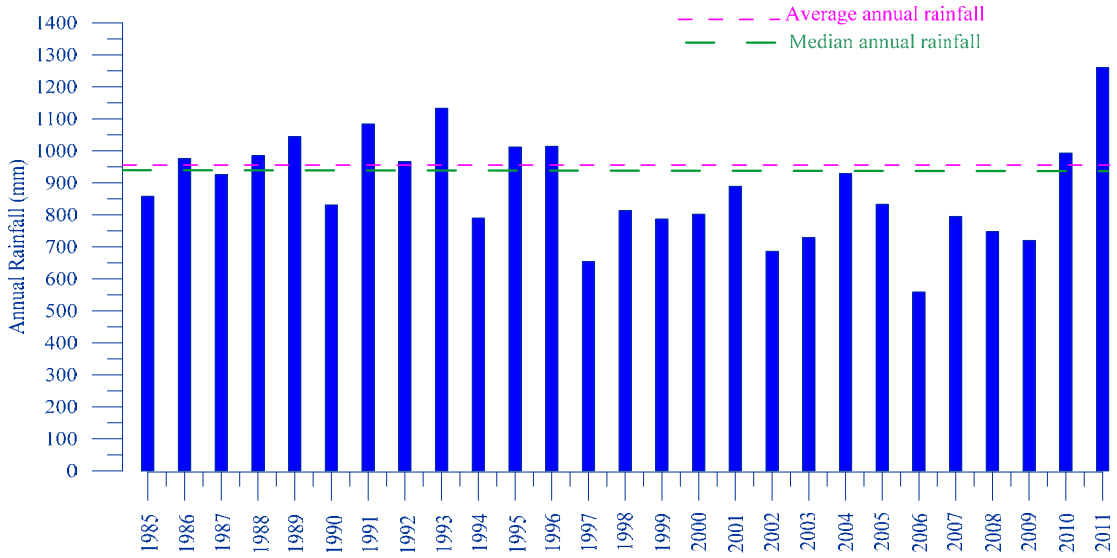


FIGURE 4.1 Grantville 1985-2011 Annual Rainfall (Data provided by R Blackmore))

The Grantville area is located on a coastal plain between Western Port Bay to the west and the foothills of the Strzelecki Ranges to the east (Figure 4.2). The inland margin of the coastal plain is marked by a relatively abrupt rise trending approximately northeast-southwest (Figure 4.2). This rise extends from south of Grantville to west of Drouin and forms the western margin of the elevated block-faulted terrain of the Strzelecki Ranges.

The topography is the Grantville area is shown as Digital Elevation Model (derived from 10 m contour data) in Figure 4.3 and illustrated as a relief map in Figure 4.4. Local relief varies from near sea level along the coast to about 150 m Australian Height Datum (AHD) along the Strzelecki Ranges.

The drainage pattern in the Grantville area is shown in Figure 4.4. The density of streams in the hilly terrain of the Strzelecki Ranges east of WA1488 is significantly higher than that on the adjoining coastal plain. WA1488 is located within the catchment of Deep Creek, a relatively small catchment of about 450 ha.

The topography across WA1488 and immediate adjoining land was mapped from one m elevation contour provided by Landair (Landair-LM_aerial 1.0m Contours_07 Oct '11.pdf). Elevations in areas not covered by the Landair survey were obtained from 10 m contours, and spot heights on DSE online maps. The site elevation ranges from less than 10 m AHD along the base of the Deep Creek tributary near the northwestern corner of WA 1488 up to more than 120 m AHD on the hill in the eastern portion of the site. – The site topography is illustrated by the "filled" contours in Figure 4.5 and the DEM of the quarry site presented in Figure 4.6. Terrain slope vectors which are indicative of runoff directions are shown in Figure 4.7.

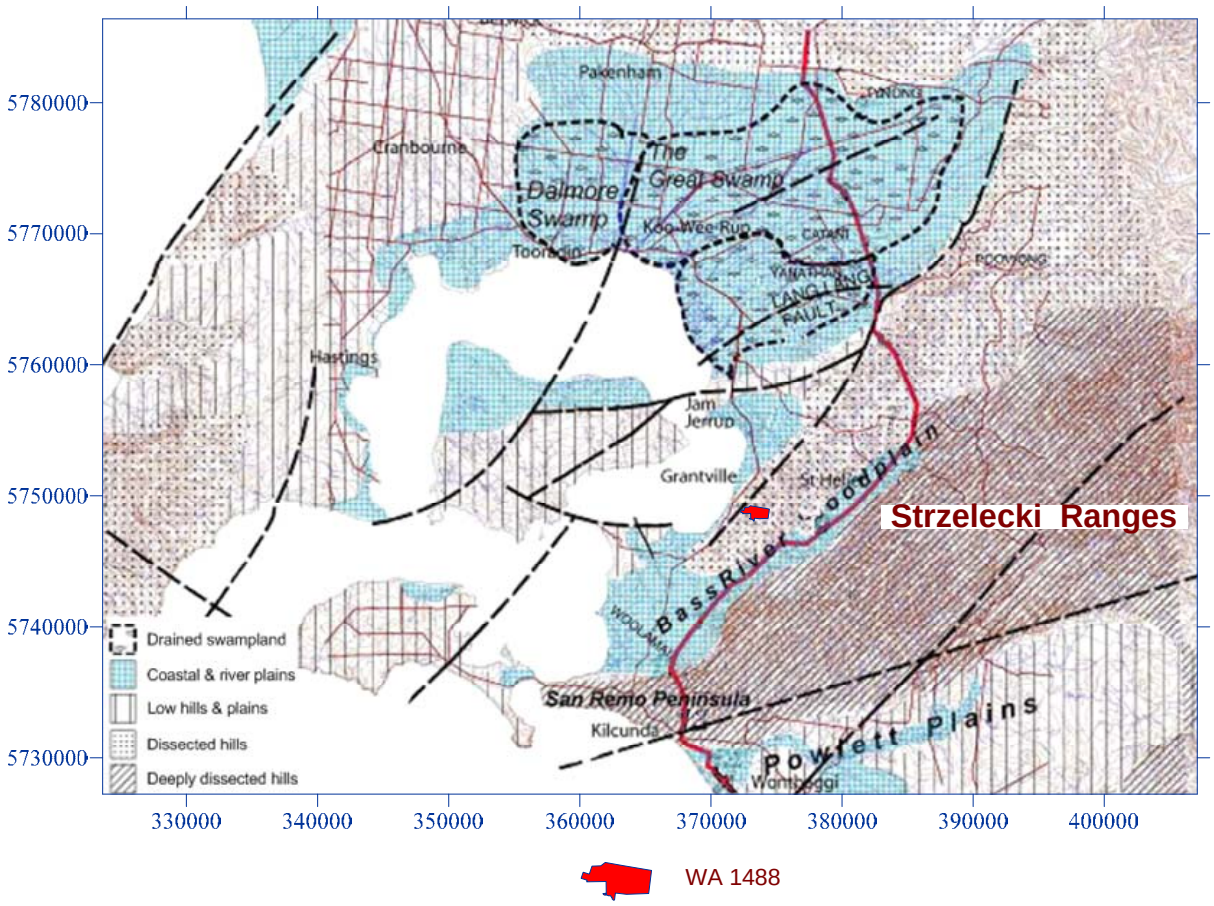


FIGURE 4.2 Western Port Geomorphic Units

The majority of WA1488 site drains to Deep Creek along the northern site boundary with a small area draining to Colbert Creek to the south (Figure 4.7). Both Deep Creek and Colbert Creek are intermittent streams except for short stream tracts west of Bass Highway. The Deep Creek channel is well defined with a number of shallow depressions in the streambed; small disconnected pools form in the depression after rainfall events.

The proposed initial development area in the western portion of WA1488 is wholly contained within the catchment of the short unnamed Deep Creek tributary (Craigie, 2012).

4.3 GEOLOGY

The geological history of an area controls the number and type of aquifers, their lateral and vertical extent, and configuration (depth, outcrop pattern), hydraulic properties and degree of interconnection. Surface/outcrop geology controls the recharge/discharge regime of aquifer systems whilst subsurface geology controls the distribution and flow of groundwater. Near surface geology can also control development of soil waterlogged condition or perched water tables above the main water table.

PLATE .1 Deep Creek Streambed: A) 60 m Upstream from Bass Highway (Photograph by P Condina), and B) Upstream of Confluence with Tributary Channel

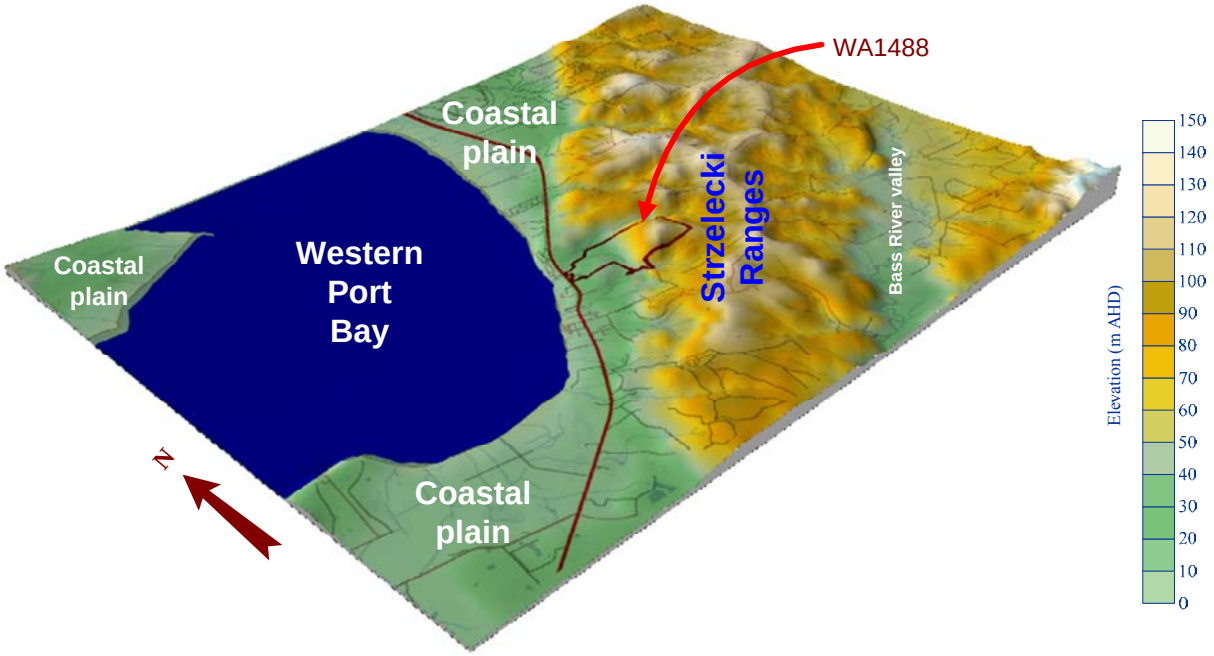


FIGURE 4.3 Grantville Area Digital Elevation Model

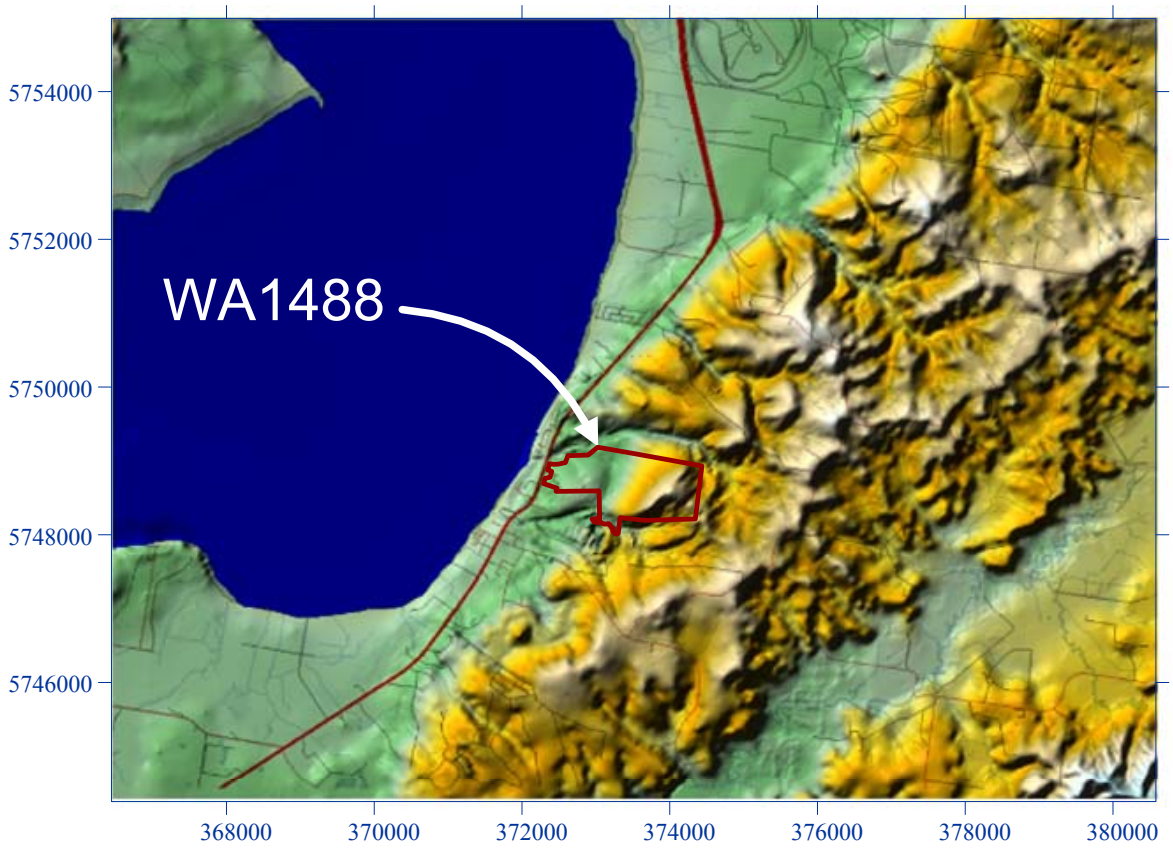


FIGURE 4.4 Grantville Area Relief Model

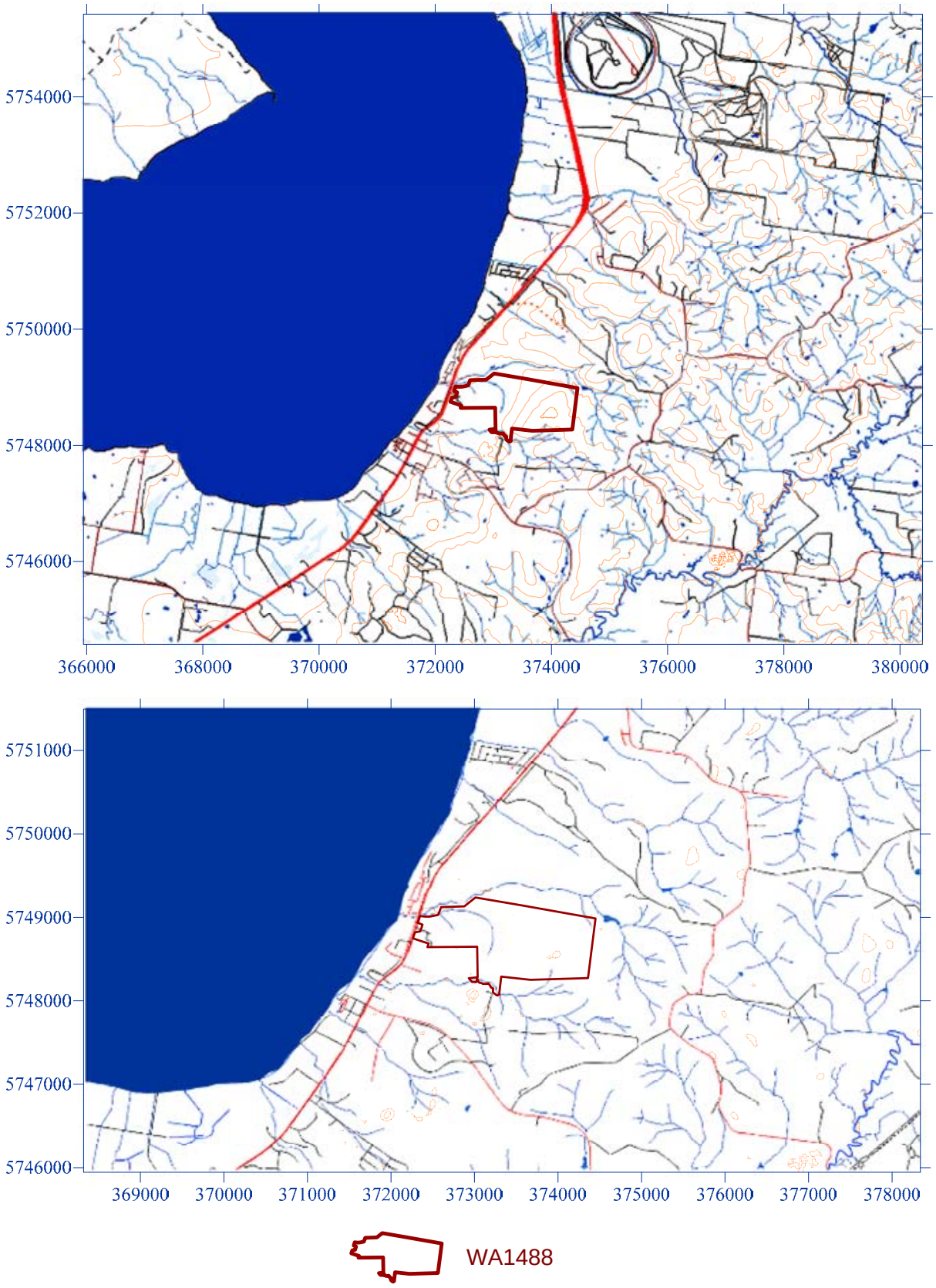


FIGURE 4.5 Grantville Area Drainage Pattern

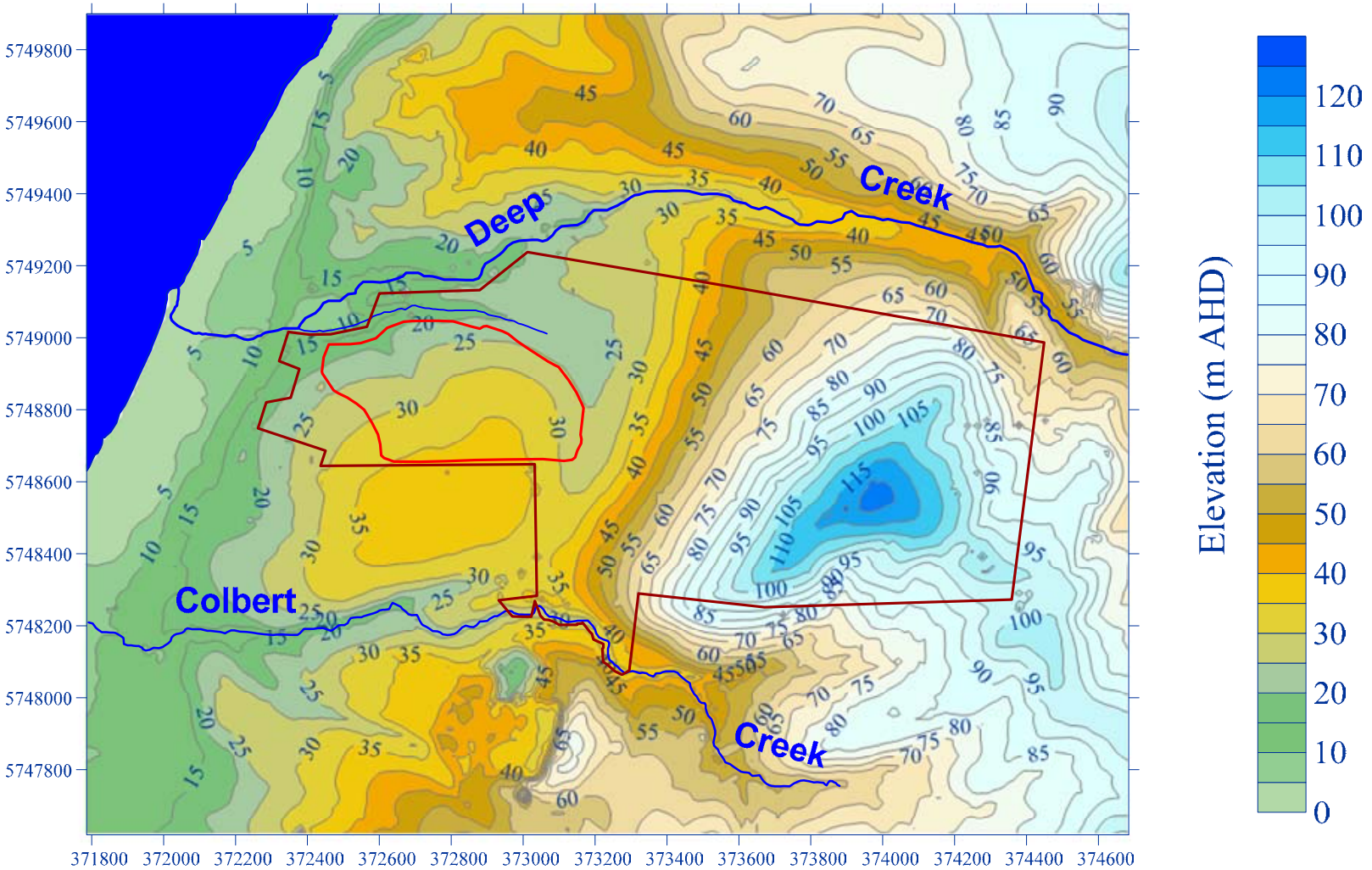


FIGURE 4.6 WA1488 and Surrounds Filled Topographic Contours

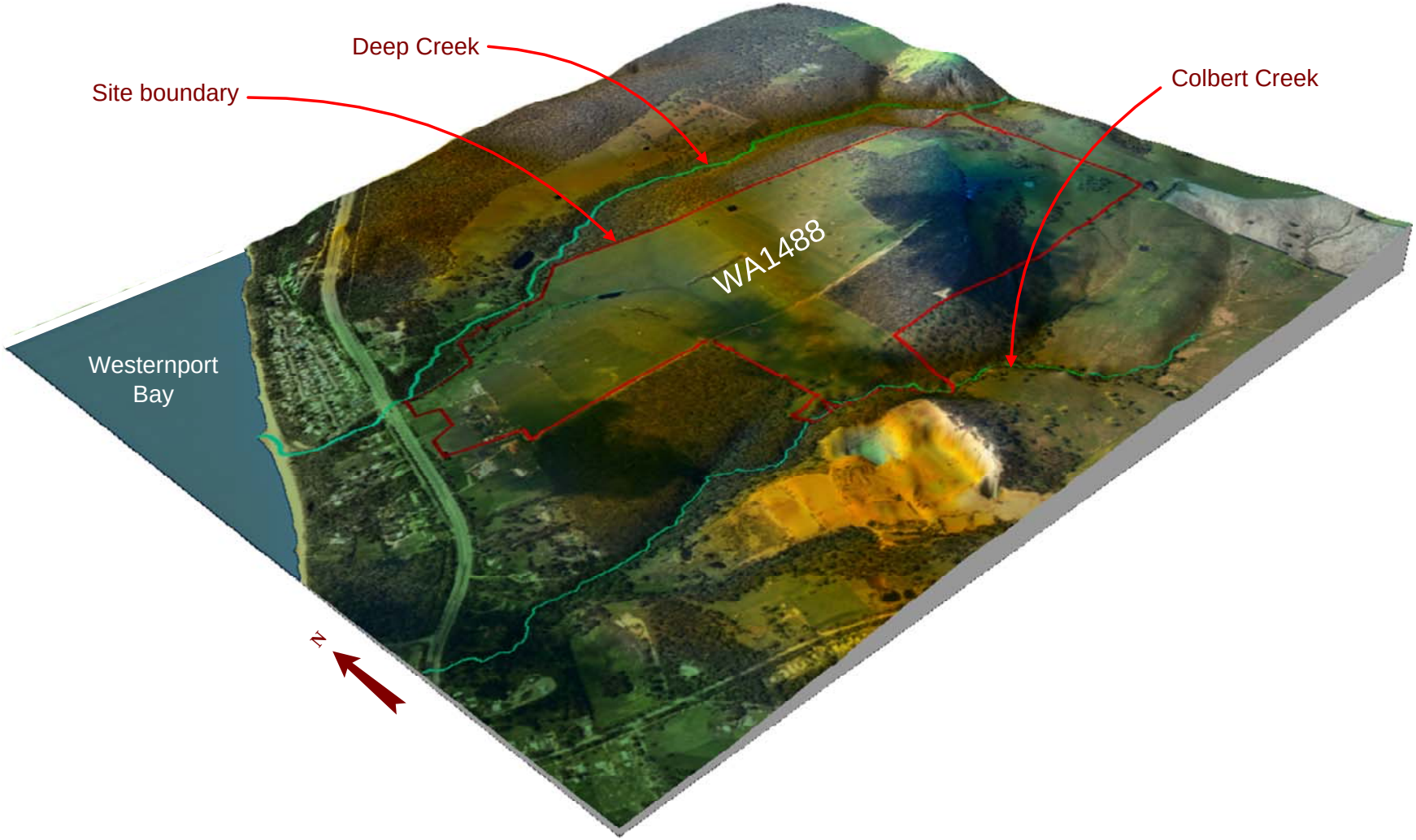


FIGURE 4.7 WA1488 Satellite Image Draped Over Digital Elevation Model

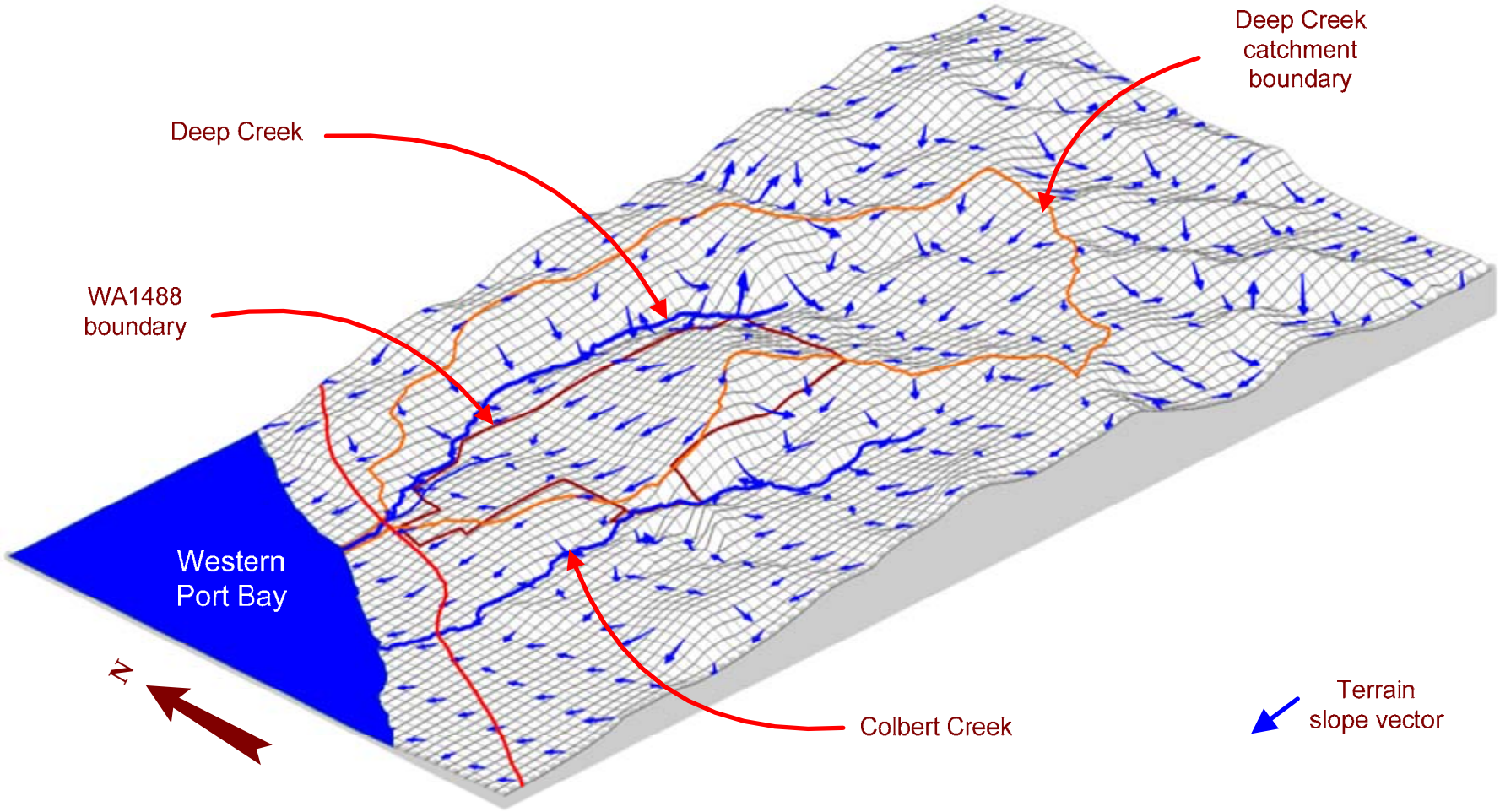


FIGURE 4.8 WA1488 Terrain Slop Vectors Plotted on Three-Dimensional Wireframe Model

4.3.1 Geological Setting

WA1488 is located along the eastern margin of the Western Port Basin, a small (900 km^2), relatively shallow geological basin which has been infilled by Cainozoic sedimentary and volcanic rocks. The thickness of this sequence ranges from less than 50 m to over 300 m in the southeastern part of the Basin. The main stratigraphic units are (from oldest to youngest):

- Strzelecki Group (siltstone, mudstone, sandstone, black coal)
- Childers Formation (sand, clay, gravel, conglomerate, thin brown coal seams)
- Older Volcanics (basalt, basaltic clay)
- Yallock Formation (sand, gravel)
- Brighton Group (formerly referred to as "Baxter Formation") (silt, sand, clay)
- Unnamed Quaternary deposits (clay, peat, silt, sand minor gravel)

The outcropping geology in the Grantville area is shown in Figure 2.5 and the geological map is draped over a digital elevation model in Figure 2.6. The outcropping sediments material on the west of the Heath Hill fault scarp in the Grantville area were mapped by Jenkin (1962, 1974) as Grantville Gravels formed as alluvial fan materials developed from scarp erosion and retreat. Thompson (1974) and Spencer-Jones *et al*. (1975) regarded these as an upper unit of the Baxter Formation (now referred to as Brighton Group) and not the result of the process described by Jenkin (1962, 1974). The distribution of Brighton Group/Baxter Sandstone (and Older Volcanics), and the position of the trace of the Heath Hill Fault has been shown differently on at least four published maps, namely 1) Jenkin (1962); 2) Mines Department (1971) undated by NNRE (1997); Thompson (1974) and DPI (2010). The outcrop geology shown in the latter report which was prepared as part of the DPI Seamless Geology Project is shown in Figure 4.9.

The principal control of relief and geological outcrop pattern in the Grantville area is the Heath Hill Fault which is of late Pliocene or early Pleistocene age. In the Heath hill area, uplift of up to 150 metres to the east is indicated by the relative elevations of Older Volcanics on both sides of the fault. North of the Lang Lang River at Heath Hill the scarp is prominent, rising almost 100 metres above the flood plain. The Heath Hill Fault is not shown in the DPI (2010) published map (Map 51 Western Port-Warragul). Review of the relief along the eastern side of the Western Port (geological) basin and the DPI (2010) mapped outcrop pattern indicates that there is probably a number of (sub-) parallel basement faults trending southwest-northeastern through the Grantville area rather than a single fault (here referred to as the "Heath Hill Fault Zone"; the position of the Heath Hill faults in the Grantville area inferred by JLCS are shown in Figure 4.9.). Movement along the fault zone most likely dragged-up Brighton Group and other Tertiary stratigraphic units on the western side of the fault which would explain the reported steep dips in the Tertiary sediments and the greater than expected thickness of the Brighton Group close to the Tertiary-Cretaceous contact.

Based on the recent DPI geological mapping, the sands and gravels to be extracted at WA1488 are now referred to as Brighton Group.

Quaternary	Qa1	Alluvium (unnamed)	Silt, clay, gravel, sand
	Qg	Coastal lagoon deposits (unnamed)	Silt, clay, gravel, sand
Tertiary	Nb	Brighton Group	Sand, gravel; ferruginised in part
	Pum	Older Volcanics	Basalt, pyroclastics, plugs and dykes
Cretatous	Ksw	Wonthaggi Formation	Sandstone, siltstone, mudstone, black coal
		WA1488	Heath Hill Fault traces (positions inferred by JLCS)

FIGURE 4.9 Outcrop Geology, Grantville Area (modified after DPI, 2011)

The upper (near surface) portion of the Brighton Group across WA1488 is predominantly clay or silt which in the context of sand extraction referred to as "overburden". The thickness of the clay/silt overburden varies from absent to about 19 m and is mostly between five and 10 m across the lower elevated, western portion of the site but is thinner on the hill in the southeastern part of the site (Table 4.2). The variable distribution of silt/clay overburden across WA1488 is illustrated by the overburden isopach (equal thickness contours) presented in Figure 4.10.

4.4 HYDROGEOLOGY

The stratigraphic sequence in the Western Port Basin behaves as a leaky confined, horizontally stratified aquifer system (Lakey and Tickell, 1981) overlain in large part by generally low permeability Quaternary sediments especially swamp and lagoonal clays (Leonard, 1988, 2003). All stratigraphic units except the Older Volcanic basalts where deeply weathered and the Quaternary swamp deposits can be productive aquifers. The weathered volcanic clays can form aquitards (low permeability layer) between the underlying Childers Formation or fresh basalt and overlying younger Tertiary rocks which were collectively referred to as the "Western Port Group" by Lakey and Tickell (1981).

4.4.1 Strzelecki Group

The Strzelecki Group is predominantly a fractured rock type aquifer but where deeply weathered it can form a porous medium type aquifer or aquitard. The storage and transmitting capacity of the fresh rock is dependent on the frequency and degree of interconnection of joints and fractures. Groundwater in the outcropping Silurian bedrock varies from unconfined to semi-unconfined depending on the hydraulic characteristics of the material above the water table. The hydraulic conductivity of the unit is generally very low with the unit often considered as "groundwater basement" in regional groundwater resource assessment. The relatively high density of streams in the upthrown Strzelecki Group rock to the east of WA1488 is consistent with low hydraulic conductivity rocks. The water table hydraulic gradient in the Strzelecki Group would be (correspondingly) very steep.

4.4.2 Childers Formation

The basal Tertiary unit in the Western Port Basin is the Childers Formation. The occurrence of this unit which is composed of sand and gravel with interspersed lignite and clay beds is mainly restricted to the deeper parts of the basin. The aquifer is confined to leaky confined. The salinity of the contained groundwater varies from about 500 to 2,000 mg/L TDS. Groundwater from the Childers Formation aquifer is used to supply the Lang Lang towns.

Although the deep stratigraphy in the Grantville are has not been determined as part of the current project, the Childers Formation is possibly present at depth in the Grantville area.

TABLE 4.2 BCA Sand Resource Exploration Drillhole Details

Hole_ID	MGA coordinates		O/B Thick (m bgl)	RLNS	Depth (m bgl)		RL (m AHD)		Predominant Lithology	Aquifer or Aquitard
	Easting	Northing		(m AHD)	From	To	Top	Bttm		
AC11-01	373015	5748295	19.0	33.6	0.0	19.0	33.6	24.6	Silt/Clay	Aquitard
AC11-02	373145	5748291	5.0	40.0	0.0	5.0	40.0	35.0	Silt/Clay	Aquitard
AC11-03	373242	5748326	6.0	53.0	0.0	1.0	53.0	52.0	Silt/Clay	Aquitard
AC11-04	373273	5748476	10.0	48.2	0.0	10.0	38.2	-5.8	Silt/Clay	Aquitard
AC11-05	373100	5748611	16.0	30.0	0.0	16.0	30.0	14.0	Silt/Clay	Aquitard
AC11-06	373536	5748584	4.0	71.5	0.0	4.0	71.5	67.5	Silt/Clay	Aquitard
AC11-07	373520	5748316	10.0	92.5	0.0	7.0	92.5	85.5	Sand	Aquifer
AC11-08	373787	5748412	17.0	112.2	0.0	17.0	112.2	97.2	Silt/Clay	Aquitard
AC11-09	373658	5748344	0.0	108.2	0.0	24.0	108.2	84.2	Sand	Aquifer
AC11-10	373929	5748570	15.0	119.7	0.0	1.0	119.7	118.7	Sand	Aquifer
AC11-11	373731	5748572	0.0	100.0	0.0	21.0	100.0	79.0	Sand	Aquifer
AC11-12	373723	5748696	0.0	80.5	0.0	30.0	80.5	50.5	Sand	Aquifer
AC11-13	373905	5748915	12.0	78.4	0.0	12.0	78.4	66.4	Silt/Clay	Aquitard
AC11-14	374128	5748867	0.0	98.2	0.0	1.0	98.2	97.2	Silt/Clay	Aquitard
AC11-15	373660	5748930	5.0	60.2	0.0	5.0	60.2	55.2	Silt/Clay	Aquitard
AC11-16	373605	5748733	4.0	68.1	0.0	4.0	68.1	64.1	Silt/Clay	Aquitard
AC11-17	373247	5748898	10.0	25.2	0.0	10.0	25.2	15.2	Silt/Clay	Aquitard
AC11-18	373368	5748628	13.0	47.9	0.0	13.0	47.9	34.9	Silt/Clay	Aquitard
AC11-19	372950	5749021	4.0	22.2	0.0	4.0	22.2	20.2	Silt/Clay	Aquitard
AC11-20	372978	5748860	6.5	32.0	0.0	6.5	32.0	25.5	Silt/Clay	Aquitard
AC11-21	372991	5748701	8.0	35.3	0.0	8.0	35.3	27.3	Silt/Clay	Aquitard
AC11-22	372906	5748844	8.0	33.0	0.0	8.0	33.0	25.0	Silt/Clay	Aquitard
AC11-23	372709	5748965	4.0	24.5	0.0	4.0	24.5	20.5	Silt/Clay	Aquitard
AC11-24	373347	5748455	4.0	58.1	0.0	1.0	58.1	57.1	Sand	Aquifer
AC11-25	373335	5748353	5.0	65.8	0.0	5.0	65.8	60.8	Silt/Clay	Aquitard
AC11-26	373455	5748332	3.0	83.9	0.0	1.0	83.9	82.9	Sand	Aquifer
AC11-27	373468	5748433	1.0	76.0	0.0	1.0	76.0	75.0	Silt/Clay	Aquitard
AC11-28	373596	5748407	0.0	96.5	0.0	23.0	96.5	73.5	Sand	Aquifer
AC11-29	373649	5748500	0.0	95.0	0.0	6.0	95.0	89.0	Sand	Aquifer
AC11-30	373600	5748611	3.0	77.0	0.0	3.0	77.0	74.0	Silt/Clay	Aquitard
AC11-31	373647	5748609	2.0	85.0	0.0	2.0	85.0	83.0	Silt/Clay	Aquitard
AC11-32	373691	5748603	2.0	91.9	0.0	2.0	91.9	89.9	Silt/Clay	Aquitard
AC11-33	373835	5748708	1.0	96.8	0.0	1.0	96.8	95.8	Silt/Clay	Aquitard
AC11-34	373885	5748646	0.0	109.1	0.0	29.0	109.1	80.1	Sand	Aquifer
AC11-35	374147	5748925	1.0	90.8	0.0	1.0	90.8	89.8	Silt/Clay	Aquitard
AC11-36	374107	5748947	4.0	86.0	0.0	4.0	86.0	82.0	Silt/Clay	Aquitard
AC11-37	372615	5748786	7.0	30.0	0.0	7.0	30.0	23.0	Silt/Clay	Aquitard
AC11-38	372630	5748883	5.0	25.5	0.0	5.0	25.5	20.5	Silt/Clay	Aquitard
AC11-39	372811	5748753	8.0	33.8	0.0	8.0	33.8	25.8	Silt/Clay	Aquitard
AC11-40	372846	5748948	5.0	27.8	0.0	5.0	27.8	22.8	Silt/Clay	Aquitard
AC11-41	373078	5749113	9.0	24.3	0.0	9.0	24.3	15.3	Silt/Clay	Aquitard
AC11-42	373276	5749076	12.0	25.9	0.0	12.0	25.9	13.9	Silt/Clay	Aquitard
AC11-43	373474	5749041	5.0	41.0	0.0	5.0	41.0	36.0	Silt/Clay	Aquitard
AC11-44	373439	5748846	9.0	44.2	0.0	1.0	44.2	35.2	Silt/Clay	Aquitard
AC11-45	373670	5749007	5.0	56.2	0.0	5.0	56.2	51.2	Silt/Clay	Aquitard
AC11-46	373867	5748971	12.0	71.1	0.0	12.0	71.1	59.1	Silt/Clay	Aquitard
AC11-47	373749	5748890	8.0	70.1	0.0	8.0	70.1	62.1	Silt/Clay	Aquitard
AC11-48	373225	5748779	9.0	26.5	0.0	9.0	26.5	17.5	Silt/Clay	Aquitard

Notes: 1) MGA coordinates are approximate only, 2) Reduced Levels (elevations) determined by JLCS from plotting site Lidar contours, 3) Predominant lithology from BCA drillhole holes, and 4) aquifer/aquitard characteristics inferred by JLCS from BCA drillhole logs

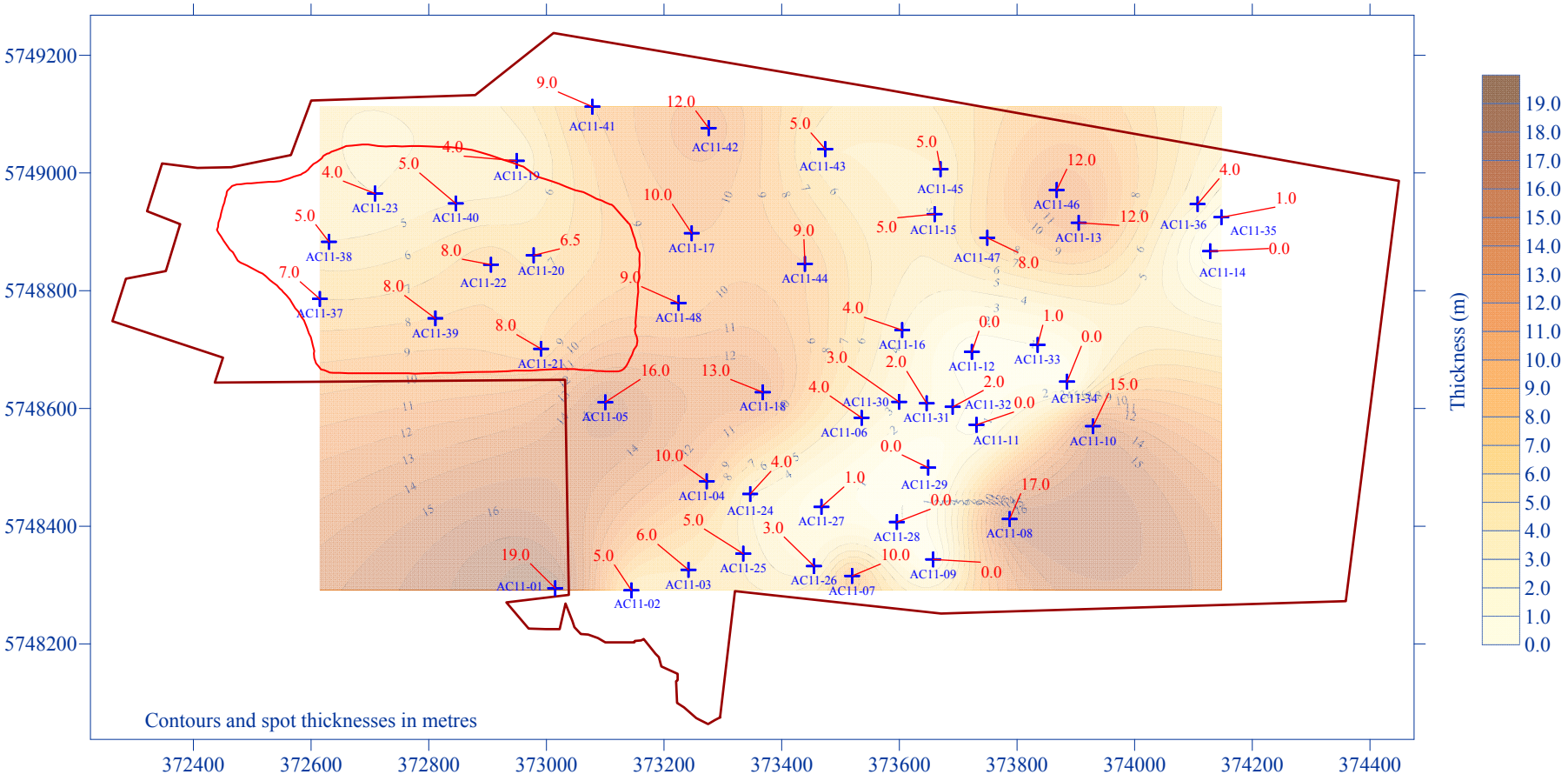


FIGURE 4.10 WA1488 Silt/Clay Overburden Isopach

4.4.3 Older Volcanics

Older Volcanic basalts occur at depth over much of the Western Port Basin. In the central and eastern Basin the basalt aquifer is relatively thick (up to 100 m) and is of sheet-like form. In these areas the basalt is overlain by a much thicker sequence (up to 200 m) of younger sediments. Pumping tests indicate complex boundary conditions with bore yields depend on the infiltration and drainage characteristics of adjacent sediments as wells as on the hydraulic characteristics of the basalts.

Sporadic occurrence of Older Volcanic outcrops have been mapped in the Grantville area. However the mapped outcrops are shown at different locations of different published (hard copy and digital) geological maps.

4.4.4 Western Port Group

The Western Port Group includes the Brighton Group (previously referred to as the Baxter Formation), Sherwood Formation and the Yallock Formation. These sediments provide more than 80 per cent of the total groundwater extraction from the Western Port Basin. The Brighton Group has been extensively utilised and is particularly important throughout the major irrigation areas in the Dalmore–Cora Lynn area. Yields in excess of 25 L/sec have been obtained from coarse the sand and gravels interbedded with clay layers .The coarse sand and gravel of the Yallock Formation are highly developed in the Cora Lynn area and form the major sand aquifer throughout the western part of the sedimentary basin. Over much of this area the aquifer is covered by up to 75 m of Quaternary clay and is consequently relatively unexploited. Yields in excess of 40 L/sec have been obtained from well-designed bores situated in the coarse sand and gravel in the Lang Lang area. The Sherwood Formation is of considerable importance in the area to the east of Koo Wee Rup. Much of the formation consists of fine calcareous sand, but irrigation supplies of 10 to 15 L/sec are obtained from coarse shelly beds and occasional lenses of fractured limestone (Lakey and Tickell, 1981).

The full thickness of the Brighton Group beneath WA1488 has not been determined but BCA drillhole logs indicate that the group is at least 30-40 metres thick.

The hydraulic conductivity of the Bright Group “sands” has not been tested however, the drillhole logs prepared by BCA indicate the much of the “sands” in the area of the proposed sand extraction pit are fine to medium grained well sorted clean sand. The grain size distribution and the hydraulic conductivity of two soil samples from drillholes within the extraction pit area (AC-19 and AC-20) sampled at depths near proposed pit floor final/design elevation (five m AHD) determined using “SizePerm – Hydraulic Conductivity from Size Analysis” software program (program calculates hydraulic conductivity using 10 common analytical solutions) are presented in Figures 4.11 and 4.12, respectively.

The calculated hydraulic conductivity values are presented in Table 4.3. — The values in bold font are from applicable method based on sand grain size distribution criteria (effective diameter, D10 and uniformity coefficient). — The applicable hydraulic conductivity values ranged from about 12 to 33 m/day with average and median values of 23.6 and 26.6 m/day, respectively.

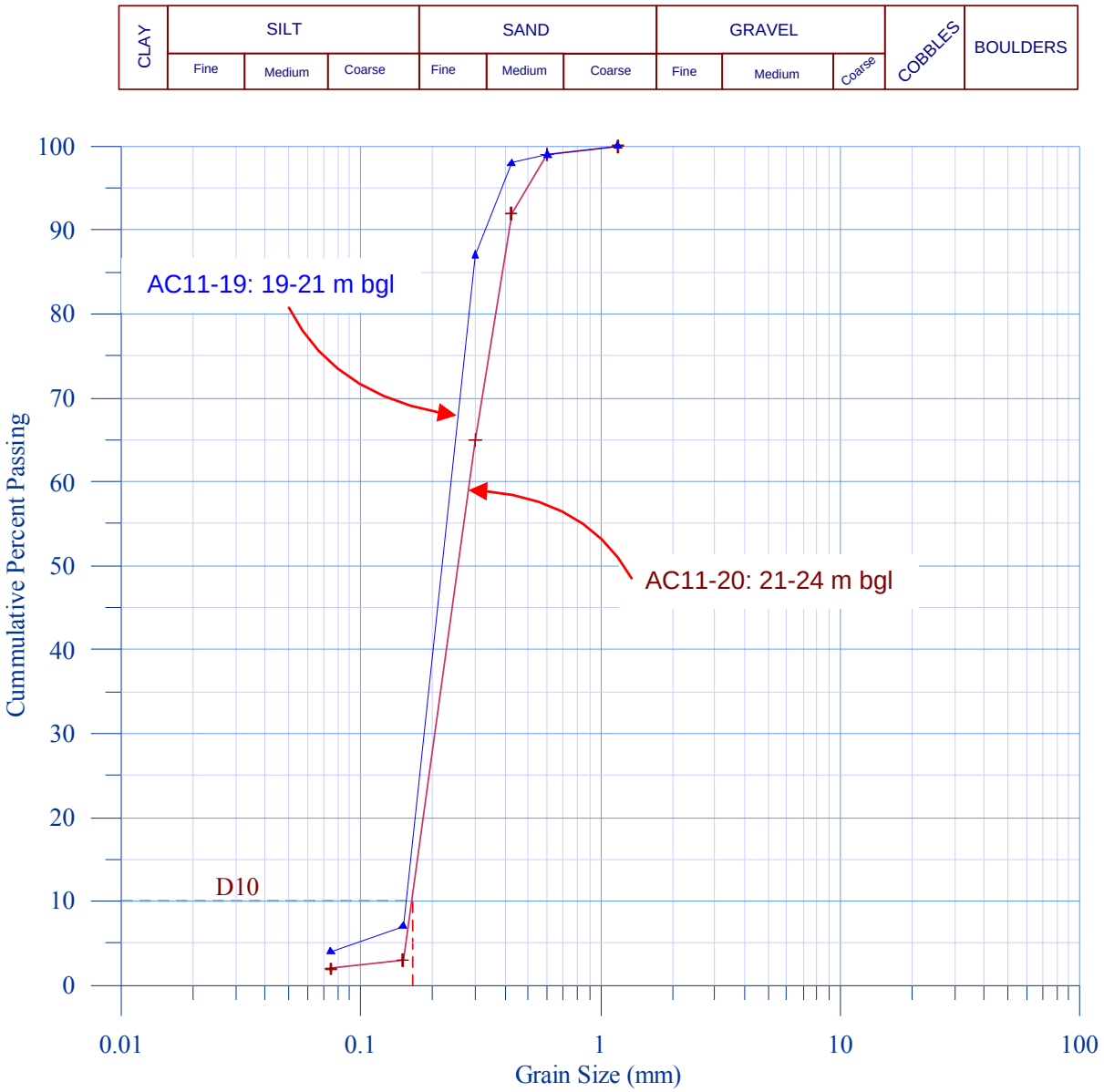
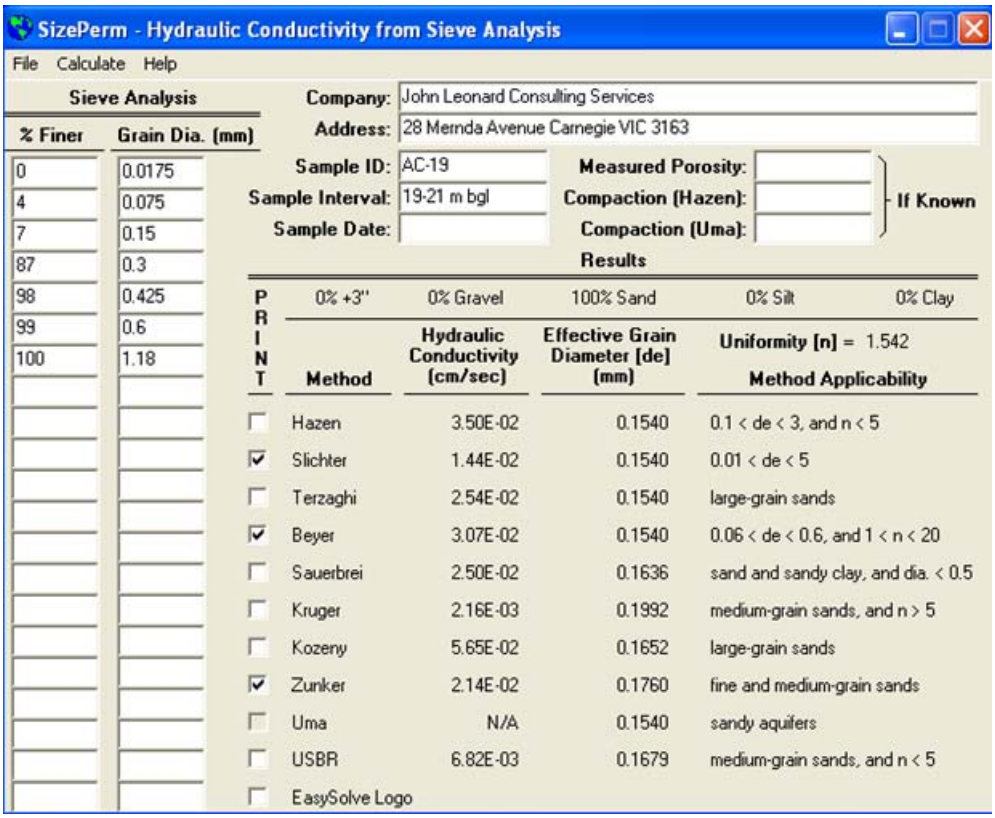


FIGURE 4.11 Example Fine Sand Grain Size Distribution Curves, WA1488 Sand Extraction Pit



SizePerm - Hydraulic Conductivity from Sieve Analysis

File Calculate Help

Sieve Analysis

% Finer	Grain Dia. (mm)
0	0.0175
4	0.075
7	0.15
87	0.3
98	0.425
99	0.6
100	1.18

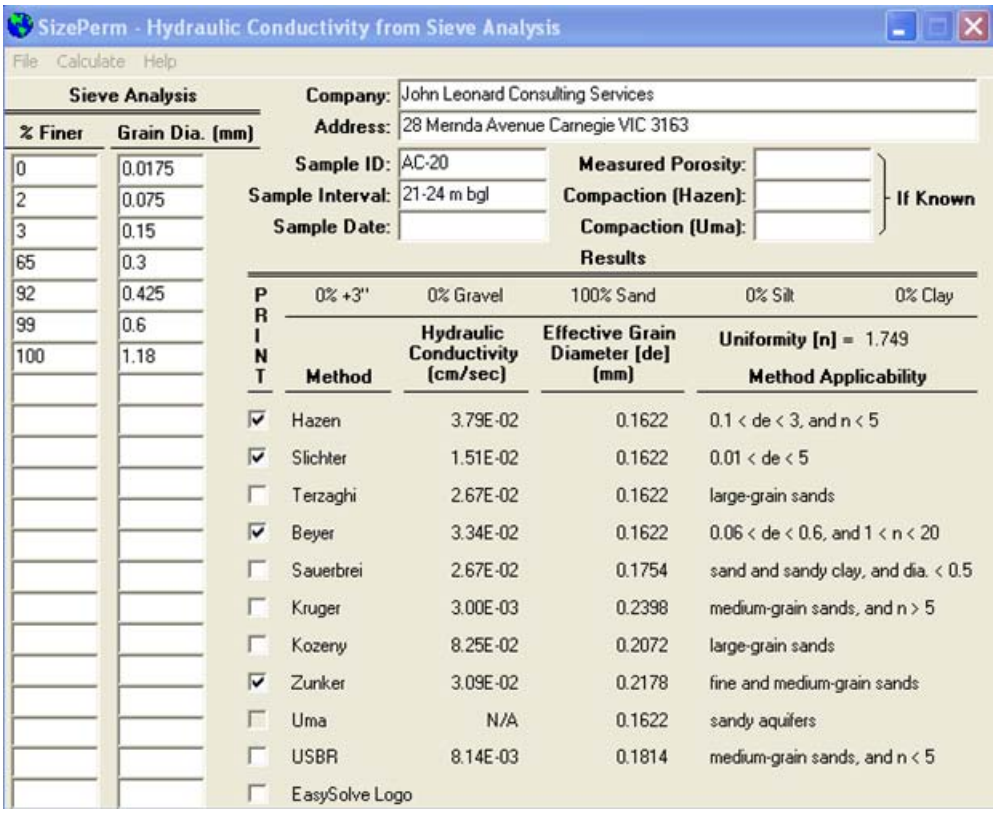
Company: John Leonard Consulting Services
Address: 28 Mernda Avenue Carnegie VIC 3163
Sample ID: AC-19
Sample Interval: 19-21 m bgl
Sample Date:
Measured Porosity:
Compaction (Hazen):
Compaction (Uma):
If Known

Results

0% +3" | 0% Gravel | 100% Sand | 0% Silt | 0% Clay

Uniformity [n] = 1.542

PRINT	Method	Hydraulic Conductivity (cm/sec)	Effective Grain Diameter [de] (mm)	Method Applicability
☐	Hazen	3.50E-02	0.1540	0.1 < de < 3, and n < 5
☑	Slichter	1.44E-02	0.1540	0.01 < de < 5
☐	Terzaghi	2.54E-02	0.1540	large-grain sands
☑	Beyer	3.07E-02	0.1540	0.06 < de < 0.6, and 1 < n < 20
☐	Sauerbrei	2.50E-02	0.1636	sand and sandy clay, and dia. < 0.5
☐	Kruger	2.16E-03	0.1992	medium-grain sands, and n > 5
☐	Kozeny	5.65E-02	0.1652	large-grain sands
☑	Zunker	2.14E-02	0.1760	fine and medium-grain sands
☐	Uma	N/A	0.1540	sandy aquifers
☐	USBR	6.82E-03	0.1679	medium-grain sands, and n < 5
☐	EasySolve Logo			



SizePerm - Hydraulic Conductivity from Sieve Analysis

File Calculate Help

Sieve Analysis

% Finer	Grain Dia. (mm)
0	0.0175
2	0.075
3	0.15
65	0.3
92	0.425
99	0.6
100	1.18

Company: John Leonard Consulting Services
Address: 28 Mernda Avenue Carnegie VIC 3163
Sample ID: AC-20
Sample Interval: 21-24 m bgl
Sample Date:
Measured Porosity:
Compaction (Hazen):
Compaction (Uma):
If Known

Results

0% +3" | 0% Gravel | 100% Sand | 0% Silt | 0% Clay

Uniformity [n] = 1.749

PRINT	Method	Hydraulic Conductivity (cm/sec)	Effective Grain Diameter [de] (mm)	Method Applicability
☑	Hazen	3.79E-02	0.1622	0.1 < de < 3, and n < 5
☑	Slichter	1.51E-02	0.1622	0.01 < de < 5
☐	Terzaghi	2.67E-02	0.1622	large-grain sands
☑	Beyer	3.34E-02	0.1622	0.06 < de < 0.6, and 1 < n < 20
☐	Sauerbrei	2.67E-02	0.1754	sand and sandy clay, and dia. < 0.5
☐	Kruger	3.00E-03	0.2398	medium-grain sands, and n > 5
☐	Kozeny	8.25E-02	0.2072	large-grain sands
☑	Zunker	3.09E-02	0.2178	fine and medium-grain sands
☐	Uma	N/A	0.1622	sandy aquifers
☐	USBR	8.14E-03	0.1814	medium-grain sands, and n < 5
☐	EasySolve Logo			

FIGURE 4.12 Brighton Group Fine Sand Hydraulic Conductivity from Grain Size Data

TABLE 4.3 Brighton Group Fine Sand Hydraulic Conductivity

Sample	0 % finer	Method	D10	Uniformity	K (cm/sec)	K (m/day)	Method Applicability
AC-19:	0.022	**Hazen**	**0.1540**	**1.542**	**0.0350**	**30.24**	**0.1 < de < 3, and n < 5**
19-21		**Slichter**	**0.1540**	**1.542**	**0.0144**	**12.44**	**0.01 < de < 5**
m bgl		Terzaghi	0.1540	1.542	0.0254	21.95	large-grain sands
		Beyer	**0.1540**	**1.542**	**0.0307**	**26.52**	**0.06 < de < 0.6, and 1 < n < 20**
		Sauerbrei	0.1636	1.542	0.0250	21.60	sand and sandy clay, and dia. < C
		Kruger	0.1992	1.542	0.0022	1.87	medium-grain sands, and n > 5
		Kozeny	0.1652	1.542	0.0565	48.82	large-grain sands
		Zunker	**0.1760**	**1.542**	**0.0214**	**18.49**	**fine and medium-grain sands**
		Uma	0.1540	1.542	N/A		sandy aquifers
		USBR	0.1679	1.542	0.0068	5.89	medium-grain sands, and n < 5
AC-20:	0.018	**Hazen**	**0.1622**	**1.749**	**0.0379**	**32.75**	**0.1 < de < 3, and n < 5**
21-24		**Slichter**	**0.1622**	**1.749**	**0.0151**	**13.05**	**0.01 < de < 5**
m bgl		Terzaghi	0.1622	1.749	0.0267	23.07	large-grain sands
		Beyer	**0.1622**	**1.749**	**0.0334**	**28.86**	**0.06 < de < 0.6, and 1 < n < 20**
		Sauerbrei	0.1754	1.749	0.0267	23.07	sand and sandy clay, and dia. < 0.5
		Kruger	0.2398	1.749	0.0030	2.59	medium-grain sands, and n > 5
		Kozeny	0.2072	1.749	0.0825	71.28	large-grain sands
		Zunker	**0.2178**	**1.749**	**0.0309**	**26.72**	**fine and medium-grain sands**
		Uma	0.1622	1.749			sandy aquifers
		USBR	0.1814	1.749	0.0081	7.03	medium-grain sands, and n < 5

4.5 BRIGHTON GROUP GROUNDWATER QUALITY

The three monitoring bores installed at the WA1488 site were all screened within the Brighton. Groundwater samples from the three monitoring bores were collected by JLCS and the samples were analysed by MGT-Labmark (MGT). The MGT analytical results are presented in Table 4.1 and the MGT laboratory analytical report is included in Appendix C.

The water samples were analysed for total dissolved salt concentration (TDS), electrical conductivity, pH, major ions, Nitrate-N and total phosphate by MGT Environmental Consulting. Analysis results are presented in Table 4.3. The ionic composition of tested water samples was determined using the AqQA software program (Rockware, 2005). The samples were all Na-Cl type water (see Piper Diagram presented in Figure 4.11).

The salinity of the groundwater in the Brighton Group in the beneath WA1488 is less than 600 mg/L TDS. The ambient, local groundwater is therefore within groundwater beneficial use Segment A (refer Table 3.1). The beneficial uses for groundwater segment A to be protected under the SEPP *Groundwaters of Victoria (1997)* are:

- maintenance of ecosystems
- potable mineral water supply
- agriculture, parks and gardens
- stock watering
- industry
- primary contact
- buildings and structures

TABLE 4.3 WA1488 Groundwater Chemistry Test Results

Analyte	Unit	PQL	BH1	BH2	BH3
Total Dissolved Solids	mg/L		540	560	480
Electrical Conductivity	µS/cm		900	1000	840
pH	pH units		6.1	6.1	5.8
Sodium	mg/L		160	190	150
Potassium	mg/L		1.7	1.3	1.4
Calcium	mg/L		8.9	10	7
Magnesium	mg/L		17	17	13
Chloride	mg/L		280	330	260
Bicarbonate as CaCO3	mg/L		< 20	< 20	< 20
Carbonate as CaCO3	mg/L		< 10	< 10	< 10
Sulphate	mg/L		11	9.4	5.3
Nitrate-N	mg/L		0.33	0.05	< 0.02
Phosphate, total	mg/L		0.1	< 0.25	< 0.25

Notes: 1) Units are mg/L except for EC (µS/cm) and pH (pH units), 2) HCO3 and CO3 as CaCO3,

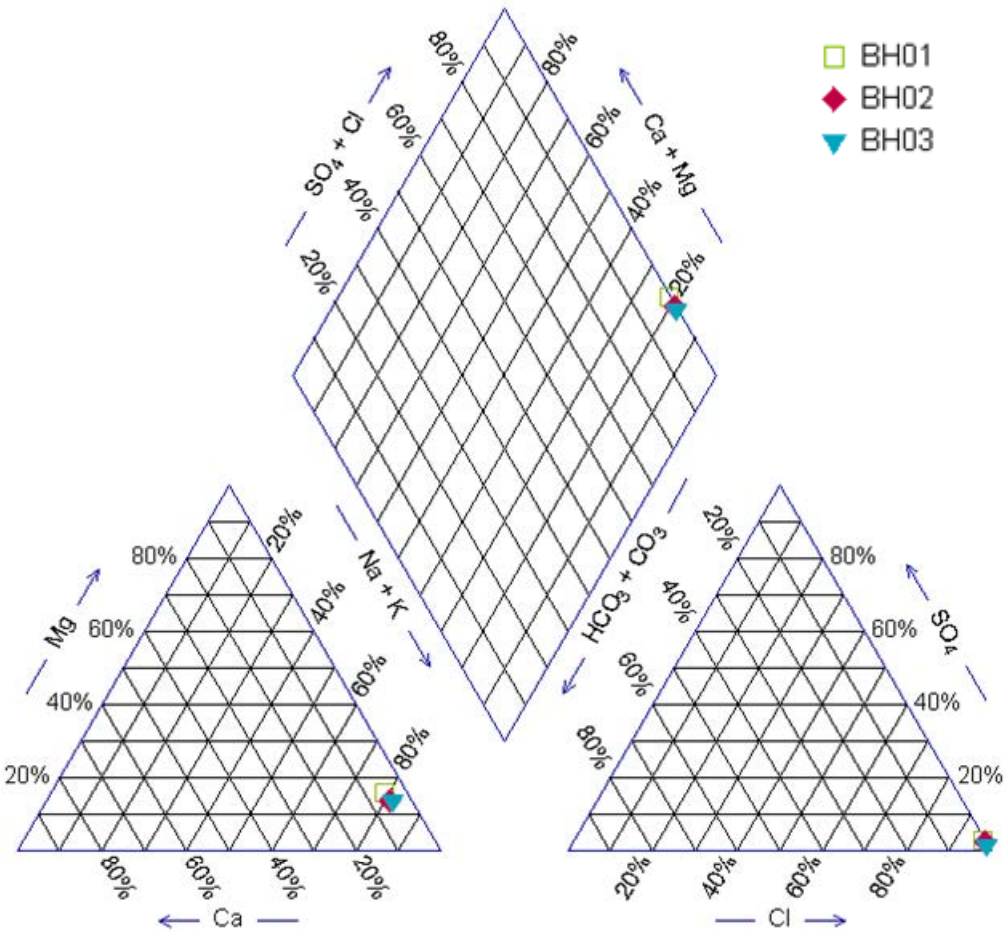


FIGURE 4.13 WA1488 Groundwater Piper Diagram

Potable Mineral Water Supply is not a protected beneficial use in the Grantville area as the groundwater is not classified as a mineral water in accordance with the definition in SEPP Groundwater of Victoria, is not effervescent (with respect to CO2) and the area is not a proclaimed Mineral Water Reserve under the Water Act 1989 or is a recognised mineral water province.

Any potentially contamination activities at the site such as storage and use of diesel fuel should be in accordance with best practice to ensure that local surface and groundwater resources are not contaminated.

4.6 GROUNDWATER FLOW SYSTEM ANALYSIS

4.6.1 Groundwater Recharge and Discharge

WA1488 is situated in a strip-like leaky aquifer system composed of Tertiary sediments bounded by up-thrown low permeability rocks of the Strzelecki Ranges to the east of the site and the sea to the west. The ground surface across WA1488 is well above the water table and is a groundwater recharge area. Groundwater flows from more elevated inland areas in a general westerly direction towards Western Port Bay. The (water table) hydraulic gradient is relatively flat because of the high hydraulic conductivity of the Brighton Group sands in the Grantville area although some variation is expected due to facie changes within the Brighton Group and differential infiltration rates through sediment above the water table (e.g., higher infiltration into more sandy surficial sediments and lower into more clayey surficial sediments).

Most groundwater moving through the Brighton Group is mostly discharged into the bay with some discharge occurring into the lower reach of Deep Creek to the west of the Bass Highway where the streambed is below the water table, Port Phillip Bay. Some groundwater would also be lost by evaporation along low lying land close to the bay where the water table is close to the ground surface.

Groundwater in the Brighton Group is hydraulically connected with the sea in Western Port Bay. Groundwater flows towards, and discharges into the sea. Because seawater is denser than fresh water, it intrudes into the aquifers at depth beneath the less dense coastward flowing fresh groundwater forming a saltwater wedge under the fresher groundwater draining into the ocean. This causes the fresher groundwater to flow upwards above the intruded saline water, towards the surface to discharge within a coastal outflow transition zone. The transition zone in the Grantville area would be relatively wide due to the shallow flat bay floor in the Grantville area (Plate 4.1) and the relatively high tidal fluctuations in Western Port Bay. The shape of the interface and extent of salt water intrusion landwards into the aquifer depends largely on the amount of freshwater flow passing seawards, which in turn is a reflection of the hydraulic conductivity of the aquifer and the hydraulic gradient. On approaching the coast, the flow lines converge, and curve upward, forcing discharge into the bay and near onshore coastal zone.

PLATE 4.1 Western Port Bay Mud Flats Offshore from Deep Creek Mouth (Photo courtesy P Condina, April 2012)

Review of existing outcrop geology and topography across WA1488 indicates that infiltration under existing per-quarrying conditions would be variable with higher infiltration rates (15 to 20 per cent of rainfall) on the more elevated eastern portion of the site where sands outcrops or subgroups beneath (very) thin layer of silt and clay, and lower (less than 10 per cent of rainfall) in the flatter-lying western portion of the site where the sand is overlaid by thicker layer of silt and clay.

The recharge regime will change with development of the sand extraction pit specifically with removed of the silt/clay overburden and exposure of the sands with high vertical hydraulic conductivity (Kv; assumed to about half the median calculated horizontal hydraulic conductivity, i.e., Kv ≈30 m/day) and associated high infiltration characteristics. However, it is expected that the opportunity for recharge through the floor of the pit would be reduced by sloping of the pit floor towards the sump near the access ramp in the northeastern corner of the pit.

4.6.2 Groundwater Depth

The depth to groundwater beneath WA1488 estimated based on a conservative hydraulic gradient of 0.004 (dimensionless) varies from more than 90 m bgl in the southeastern corner of the site to about 10 m bgl near the northwestern corner of the site (Figures 4.14, 4.15 and 4.16). The inferred depth to groundwater beneath the sand extraction pit (pit floor at RL 5 m AHD) would be about one m below the pit floor in the southeastern corner and increasing to about three m near the western edge of the pit floor. [This analysis is approximate only as the groundwater level is not static but changes in response to aquifer stresses such as recharge or groundwater extraction. – The actual depth will be confirmed by the proposed periodic groundwater monitoring.]

The water table depth below Deep Creek was also mapped by digitizing Lidar contours (1.0 m contour interval) along the creek track and plotting the elevation of the water table beneath the creek for an assumed hydraulic gradient of 0.004 (dimensionless). Although this analysis is only a first approximation, the resultant profile (Figure 4.17) indicates the streambed is above the water table along most of its course. The exception is the short segment downstream (west) of the Bass Highway. The profile indicates that the hydraulic gradient would have to be greater than 0.01 for the in order for the streambed upstream of the Bass Highway to intersect the Deep Creek streambed. Such a gradient would be inconsistent with gradient developed in permeable sands of the Brighton Group in the Grantville area.

This stream-groundwater model is consistent with initial groundwater depth measurements in the two DPQ monitoring bores adjacent to Deep Creek (BH1 and BH3) and with field observation along Deep Creek with no flow observed along the creek (Plate 4.1). The low salinity water reported in the pools upstream of the Bass Highway is consider to be surface water runoff and/or shallow interflow water derived from perched groundwater within the upper clays and silts of the Brighton Group.

Although there are a number of government observation bores in the broader Grantville none are constructed to monitor the water table in the Brighton Group.

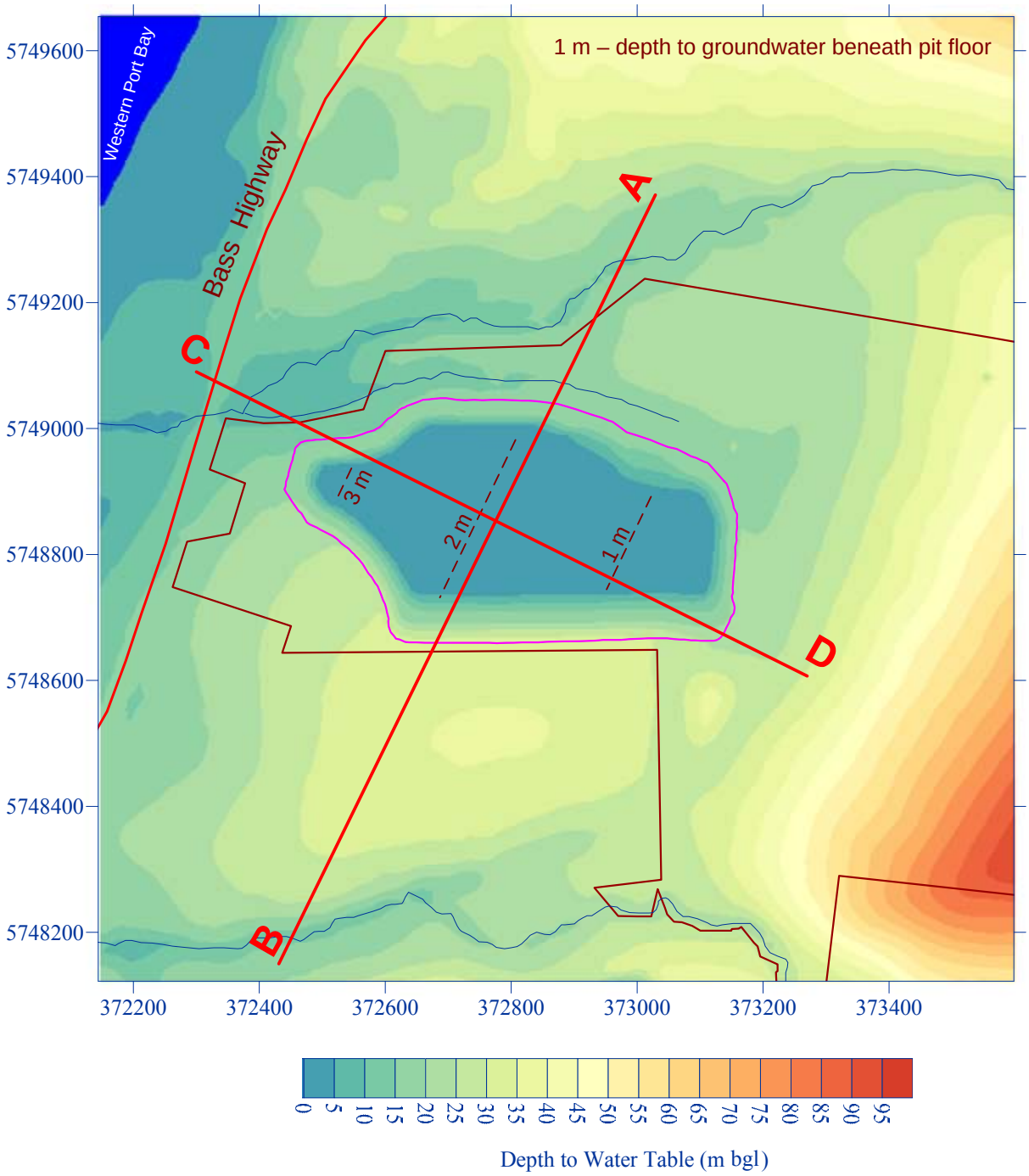


FIGURE 4.14 WA1488 Groundwater Depth Contours

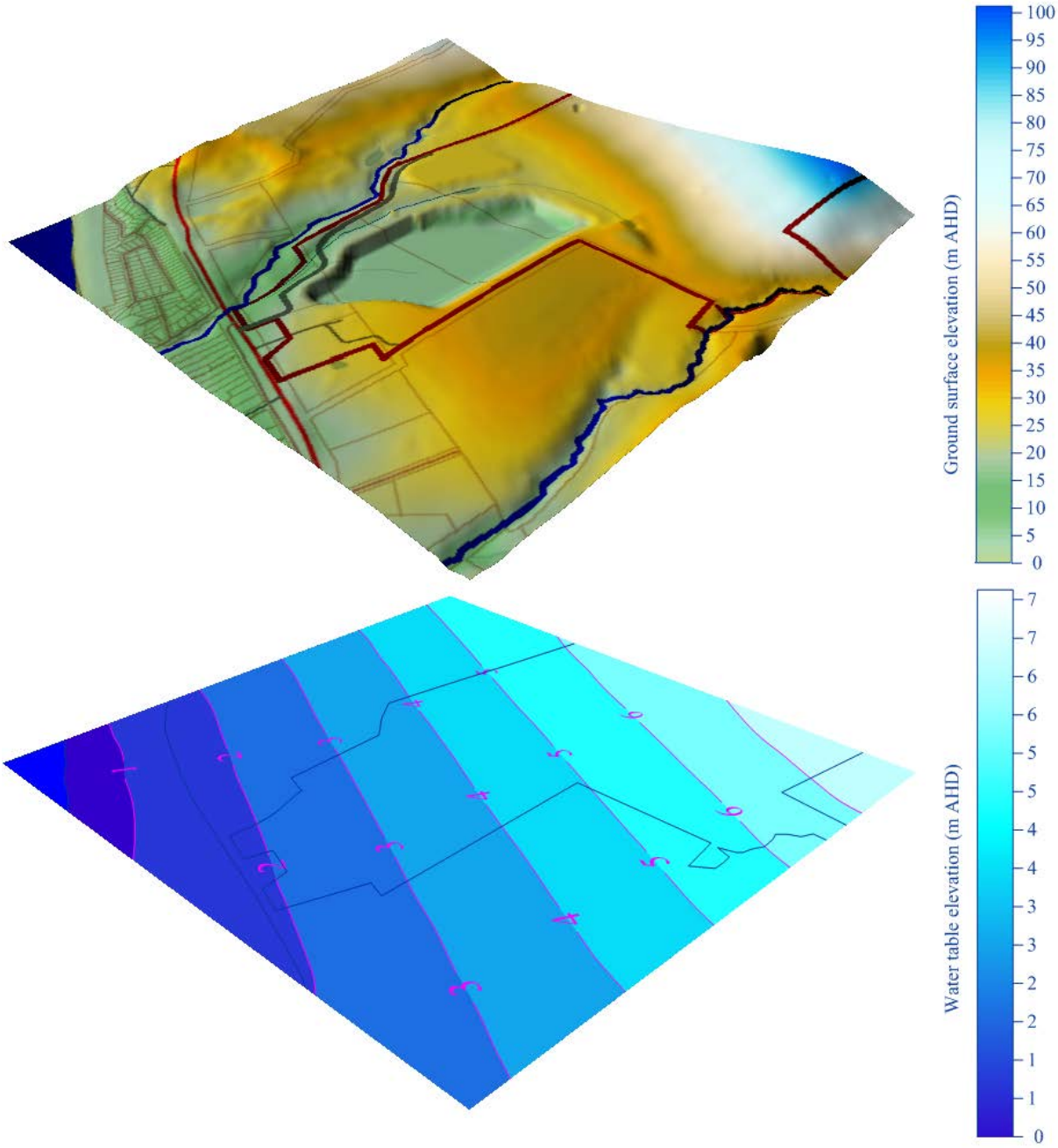


FIGURE 4.15 Perspective Diagrams Illustrating Relative Ground Surface and Water Table Elevation, WA1488 and Surrounding Area

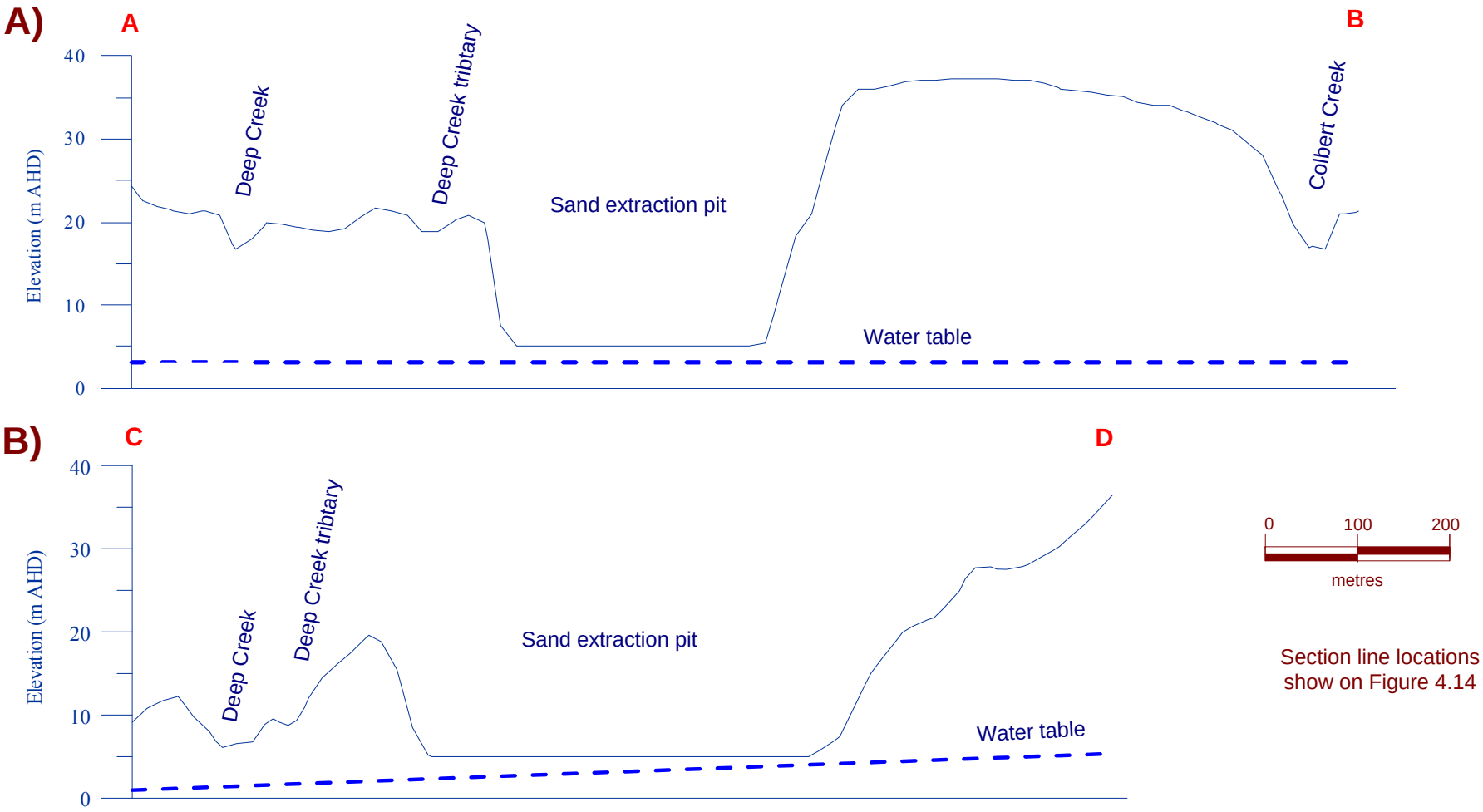


FIGURE 4.16 Northeast-Southwest (A) and Northwest-Southeast (B) Sections Through WA188 Sand Extraction Pit

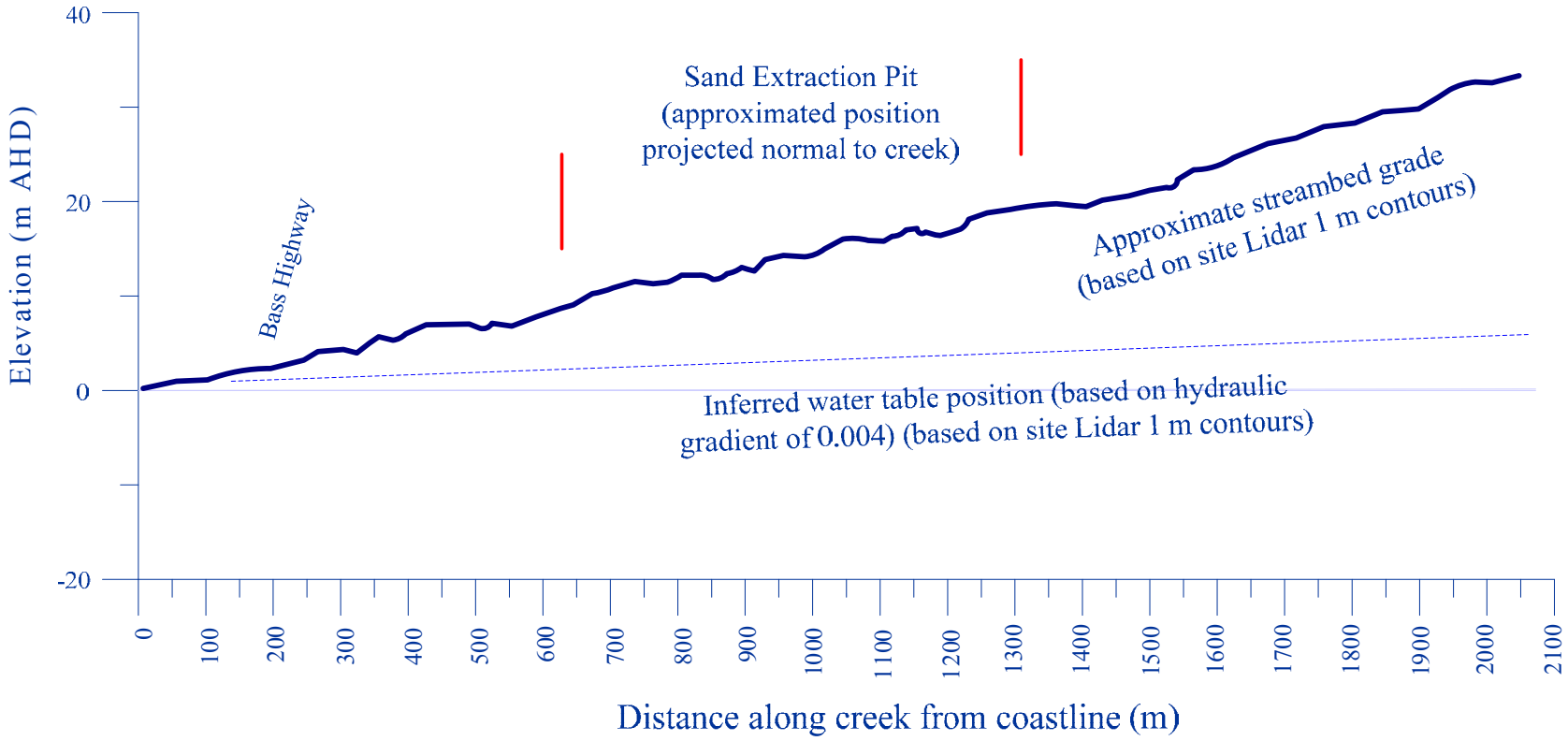


FIGURE 4.17 Deep Creek Streambed Profile and Water Table Elevation, WA1488 Northern Boundary

5.0 LOCAL GROUNDWATER USE

Records of bores within a three km radius of approximate centre of the WA1488 Sand Extraction Pit were extracted from state government Groundwater Management System (GMS; December 2011 update provided by DSE). The data subset was further culled to only include supply bores by removing bores classified as observation, non-groundwater (NG) or investigation bores. Sixty-six registered "supply" bores are located within the stipulated search radius. Bore locations and recorded uses of all supply bores within the search area are posted on a geological base maps in Figure 5.1). Two bores, 56908 and 56925, locate to the east of WA1488 were deleted from the project data subset as they are constructed in outcropping Strzelecki Group rocks.

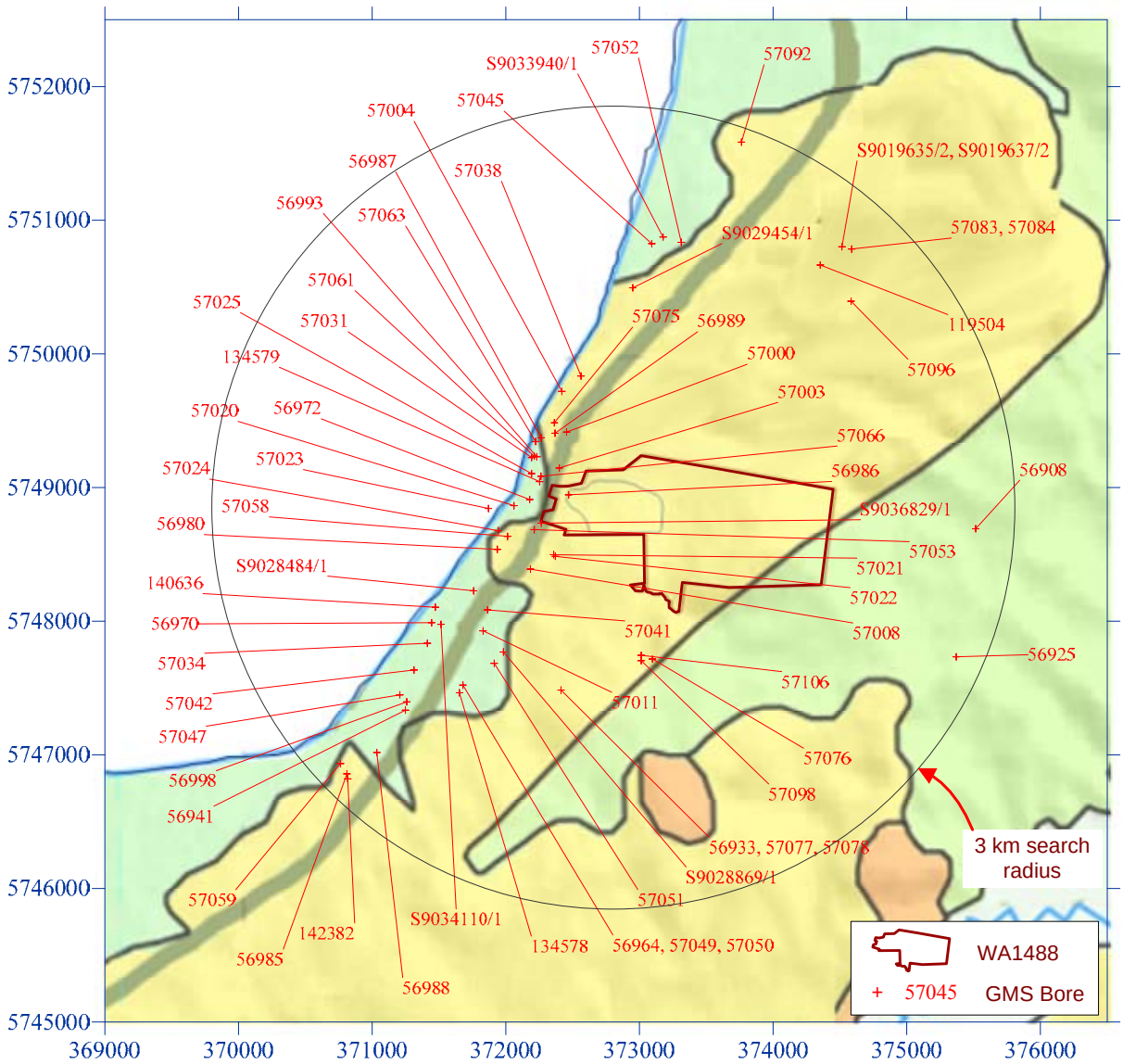


FIGURE 5.1 GMS Registered Supply Bores Within Three-km Search Radius Centred on WA1488 Sand Extraction Pit

The culled data subset contains a total of 64 bores supply bores 47 of which are Domestic and/or Stock bores, 6 are industrial bores and the use of the remaining 11 bores is not known or not recorded (Figure 5.2). Details of the bores in the project data subset are summarised in Table 5.2. The recorded depths of the bores range from about 4.3 to 143 m with a median depth of about 32.5 m with 73 per cent of the bores less than 50 m deep.

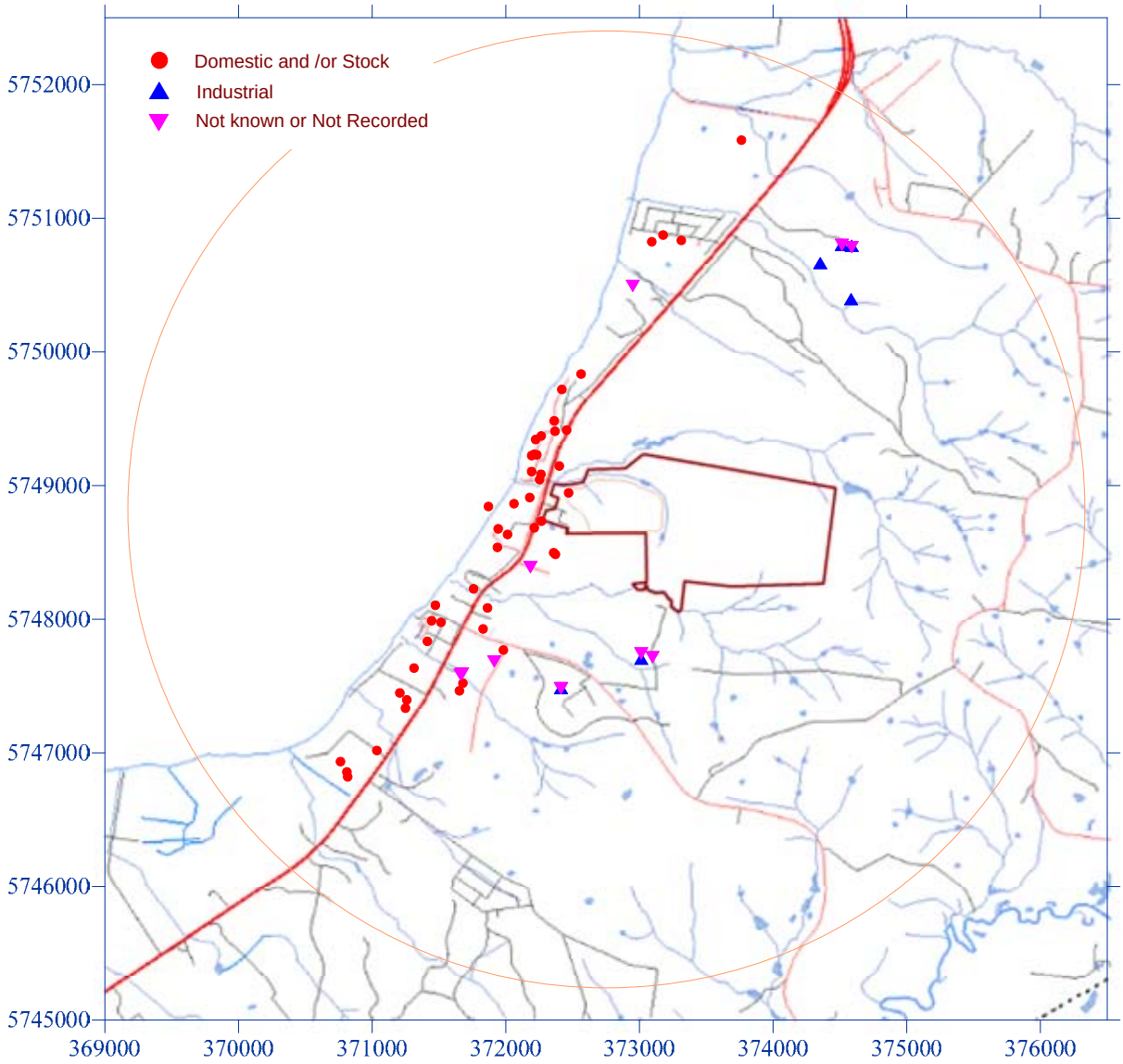


FIGURE 5.2 GMS Registered Supply Bores within Three-km Search Radius Centred on WA1488 Sand Extraction Pit by Registered Use

The bores registered as industry (IN) and unknown (NKN0 or with no recorded use were plotted on a DPI Base map showing other Work Authorities in the Grantville area in Figure 5.3. Four of the Industry bores (57084, 57096, 119504 and S9019637/2) plotted within WA210 and one bore (57098) with WA 470. The other Industry bore (57078) plotted to the

south of WA470 in an area that appears to be residential on a Google Satellite image of the Grantville area. Two of the "unknown" use bores (57083 and S9019635/2) plotted in WA210 and two (57076 and 57106) in WA470.

TABLE 5.1 Bore Records Summary

Bore ID	MGA coordinates		Completed	Depth (mbgl)	Screens		Water		TDS (mg/L)	Recorded Use(s)
	Easting	Northing			Top	Bttm	From	to		
56933	372413	5747484	15/01/1985	37.80			36.0	115.0	7,378	NKN
56941	371249	5747334	1/01/1970	42.60						ST
56964	371679	5747521	6/06/1972	42.36	39.62	42.36	39.6	42.4	214	ST
56970	371445	5747988	24/06/1974	21.33	15.24	21.33	15.2	20.7	765	DM ST
56972	372179	5748910	7/10/1974	47.24	33.52	47.24	33.2	47.2	310	DM ST
56980	371937	5748537	21/04/1976	9.00	6.40	7.92	6.4	8.2	420	DM ST
56985	370811	5746857	21/02/1977	17.60	9.75	15.24	10.0	15.2	825	DM
56986	372470	5748945	18/11/1976	5.00	3.04	4.87	3.0	5.0	669	DM ST
56987	372265	5749371	16/12/1976	4.26	3.04	4.26	3.0	4.3	921	DM ST
56988	371035	5747017	20/01/1977	18.00	14.93	17.06	15.0	17.5	758	DM ST
56989	372368	5749406	30/12/1975	16.70	0.00	16.70	14.3	16.8	273	DM ST
56993	372232	5749230	20/05/1977	6.00	4.50	5.48				DM
56998	371259	5747396	17/10/1977	42.00	37.00	38.80	37.0	38.8	583	DM ST
57000	372455	5749415	28/10/1977	20.00			17.5	20.0	498	DM
57003	372400	5749146	28/01/1978	9.10	5.13	9.10				DM ST
57004	372419	5749719	13/08/1978	7.61	7.31	7.61				DM
57008	372184	5748389	29/12/1977	50.00						NKN
57011	371830	5747927	8/12/1978	57.00	15.54	17.37				DM ST
57020	372061	5748864	6/07/1979	12.00	9.00	12.00	9.0	12.0	228	DM ST
57021	372358	5748497	4/08/1979	17.00	13.00	16.30	13.0	16.3	321	DM
57022	372371	5748485	4/01/1980	16.00	13.00	16.00	11.0	16.0	110	DM
57023	371870	5748843	13/12/1979	16.40	13.00	16.00	14.5	16.0	343	DM
57024	371943	5748676	13/02/1980	43.00	38.50	43.00	40.0	43.0	323	DM ST
57025	372193	5749104	8/01/1980	16.70	13.70	16.70				DM
57031	372193	5749224	18/12/1980	13.70	9.20	13.70	10.0	13.5	418	DM ST
57034	371413	5747834	3/12/1980	14.40	10.40	14.40	10.0	14.4	738	DM ST
57038	372563	5749834	10/11/1981	37.00	33.00	36.40	33.0	36.0	672	DM ST
57041	371863	5748084	7/01/1982	15.40	9.80	15.40	9.8	15.4	568	DM
57042	371313	5747634	2/03/1982	22.42	20.00	22.40	20.0	22.4	1,951	DM ST
57045	373092	5750824	7/09/1982	47.00	41.00	45.20				DM ST
57047	371207	5747448	24/10/1982	42.50	40.00	42.50	40.0	42.5	2,033	DM ST
57049	371663	5747584	14/11/1982	51.00						NKN
57050	371673	5747594	15/04/1983	24.00						NKN
57051	371913	5747684	8/04/1982	16.00						NKN
57052	373313	5750834	7/12/1982	52.00	42.00	52.00				DM
57053	372213	5748684	26/10/1982	15.69	0.00	15.69	12.0	15.7	321	DM
57058	372013	5748634	12/05/1983	18.00	14.70	18.00				DM ST
57059	370763	5746934	11/12/1982	34.90	33.50	34.90	33.5	34.9	1,820	DM
57061	372213	5749234	25/03/1983	30.00	18.00	20.00				DM
57063	372223	5749344	7/09/1983	16.20	12.00	16.20				DM
57066	372263	5749084	22/12/1983	12.20	9.00	12.20				DM ST
57075	372363	5749484	20/01/1979	5.18	3.96	5.18	3.7	5.2	1,041	DM
57076	373097	5747716	15/01/1985	62.40						NKN
57077	372413	5747484	18/01/1985	13.00						NKN
57078	372413	5747484	31/01/1985	122.00	36.00	115.00				IN
57083	374588	5750784	4/10/1985	25.00			36.5	37.6	870	NKN

TABLE 5.1 Bore Records Summary (continued)

Bore ID	MGA coordinates		Completed	Depth (mbgl)	Screens		Water		TDS (mg/L)	Recorded Use(s)
	Easting	Northing			Top	Bttm	From	to		
57084	374588	5750794	30/10/1985	37.60	36.50	37.60				IN
57092	373763	5751584	10/01/1987	50.15	46.00	50.00			500	DM ST
57096	374583	5750394	7/07/1988	62.40	39.00	57.00			1,609	IN
57098	373013	5747704	27/02/1985	62.50	45.00	62.00				IN
57106	373013	5747744	9/12/1986	79.00						NKN
119504	374353	5750664	28/09/1993	76.20	40.50	76.20			615	IN
57092	373763	5751584	10/01/1987	50.15	46.00	50.00			500	DM ST
57096	374583	5750394	7/07/1988	62.40	39.00	57.00			1,609	IN
57098	373013	5747704	27/02/1985	62.50	45.00	62.00				IN
57106	373013	5747744	9/12/1986	79.00						NKN
119504	374353	5750664	28/09/1993	76.20	40.50	76.20			615	IN
134578	371653	5747464	31/03/1998	42.60	38.00	42.50				ST
134579	372253	5749044	19/03/1998	38.50	34.50	38.00				DM
140636	371473	5748104	17/05/2000	24.00	21.50	24.00				DM
142382	370817	5746820	9/07/1999	76.00						ST
S9019635/2	374515	5750801		76.20						NR
S9019637/2	374515	5750801	27/05/2004	76.20						IN
S9028484/1	371759	5748227	12/02/2007	142.00						DM ST
S9028869/1	371982	5747769	1/03/2007	143.00						DM ST
S9029454/1	372950	5750494		30.00						NR
S9033940/1	373177	5750874	6/08/2008	46.50	41.50	46.50				DM ST
S9034110/1	371515	5747976	18/06/2008	57.00						DM
S9036829/1	372266	5748733	14/05/2009	73.00						DM

Note: GMS Registered bores within three km search radius of WA1488 Sand Extraction Pit

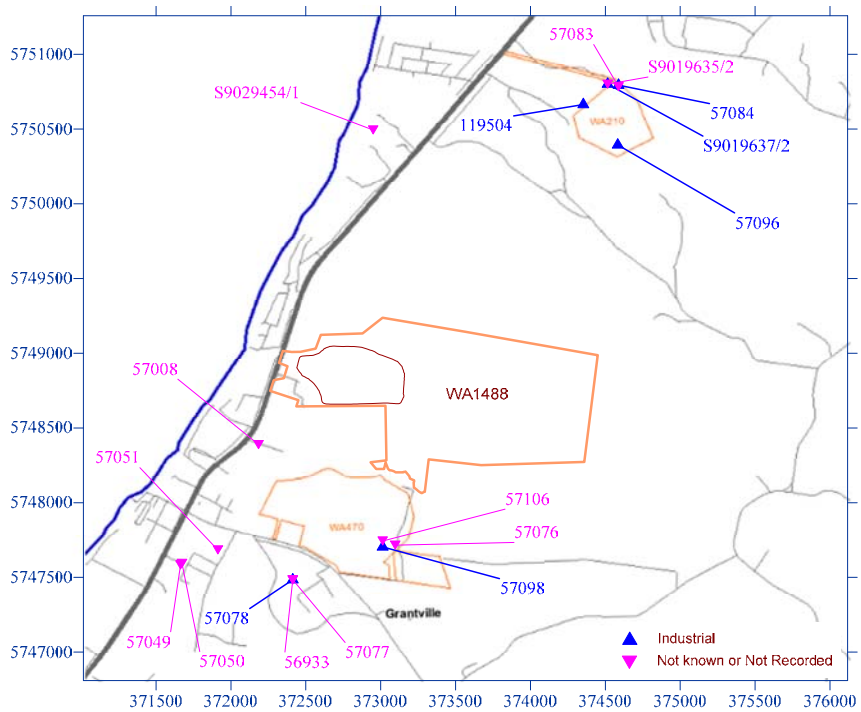


FIGURE 5.3 GMS Registered Industry (IN) and Unknown (UKN) Use Bores

6.0 CONCLUSIONS AND RECOMMENDATIONS

6.1 CONCLUSIONS

- WA1488 is located on outcropping Brighton Group (former Baxter Sandstone) sediments. The Brighton Group in the area of the proposed Sand Extraction Pit consists of from four to 10 m of silts and clays overlaying fine (predominantly) to coarse sand.

- WA1488 is within Zone 7 of the Koo Wee Rup Water Supply Protection Area. The amount of groundwater that can be extracted annually from Zone 7 is 2,545.5 ML; this volume has been fully allocated. Actual groundwater usage in Zone 7 is less than 40 per cent of the total allocated volume.

- The water table in the Brighton Group slopes in a general westerly direction towards Western Port Bay. The water table elevations beneath the proposed Sand Extraction Pit would be between about two and four m AHD (based on a conservative regional hydraulic gradient of 0.004).

- The water table is below the base of Deep Creek along the northern boundary of WA1488. The water table only intersects the streambed of Deep Creek west of the Bass Highway

- Rainfall recharge under existing per-quarrying conditions is variable with high infiltration rates (20 to 25 per cent) on the more elevated eastern portion of WA1488 where Brighton Group sands outcrop or subgroup beneath a thin layer of silt and clay, and lower (less than 10 per cent) in the flatter-lying western portion of the site where the sand is overlaid by a thicker layer of silt and clay.

- Groundwater discharges into the bay over a relatively wide discharge/transition zone, into local creeks including Deep Creek where the base of the creek is below the water table (west of the Bass Highway), or via evaporation along near shore areas along the bay where the water table is close to the ground surface. The length of Deep Creek that receives groundwater discharge (i.e., gaining stream tract) is very short, mostly at elevations below about two m AHD.

- The horizontal hydraulic conductivity of the predominantly fine sand in the area of the proposed Sand Extraction Pit is in the general range 20 to 30 m/day. The vertical hydraulic conductivity of these sands is expected to be about 10 to 12 m/day.

- The salinity of the groundwater in the Brighton Group beneath WA1488 was less than 500 mg/L TDS. The groundwater is in Groundwater Beneficial Use Environment Segment A as defined in the SEPP Groundwaters of Victoria. The groundwater beneficial uses to be protected are maintenance of ecosystems, potable mineral water supply, agriculture, parks and gardens, stock watering, industry, primary contact and buildings and structures.

- The recharge regime will change with development of the Sand Extraction Pit specifically with removed of the silt/clay overburden and exposure of the sands with high vertical hydraulic conductivity and associated high infiltration characteristics. However, it is

expected that the opportunity for direct recharge through the floor of the pit would be reduced by sloping of the pit floor towards the sump.

- Collected water in the sump will be lost by evaporation from the free water surface and by seepage through the sump flow to the underlying water table.

- The floor of the proposed WA1488 Sand Extraction Pit will not extend below the water table (design pit floor elevation ~ 5 m AHD).

- As the Sand Extraction Pit will not extend below the water table the pit will not cause any drawdown interference in local supply bores and will not cause any reduction in groundwater discharge (base flow) into Deep Creek.

- The potential impact of the Sand Extraction Pit on local groundwater or flow in Deep Creek does not depend on the shape ("footprint") of the pit or its location within WA1488 but on whether or not the pit intersects the water table. Consequently, any adjustment to the shape, extent and/or location of the pit will not cause drawdown interference or affect flow in Deep Creek provided that the pit does not extend below the water table.

6.2 RECOMMENDATIONS

- Daily rainfall should continue to be recorded at the WA1488 site.

- Groundwater levels in the three purpose-installed monitoring bores should be measured at least every three months to enable the depth to groundwater to be mapped and to establish the relationship between rainfall and water table elevation.

- Any potentially contamination activities at the site such as storage and use of fuel should be in accordance with best practice to ensure that local surface and groundwater resources are not contaminated.

7.0 REFERENCES

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8.0 LIMITATIONS OF THIS REPORT

The advice provided in this report relates only to the project described herein and must be reviewed by a competent Engineer or Scientist before being used for any other purpose. JOHN LEONARD CONSULTING SERVICES Pty Ltd accepts no responsibility for other use of the data.

Drill hole and laboratory tests used in this report was performed and recorded by others. This data is included and used in the form provided by others. The responsibility for the accuracy of such data remains with the issuing authority, not with JOHN LEONARD CONSULTING SERVICES Pty Ltd.

The advice tendered in this report is based on information obtained from the investigation locations, test points and sample points and is not warranted in respect to the conditions that may be encountered across the site at other than these locations. It is emphasized that the actual characteristics of the subsurface and surface materials may vary significantly between adjacent test points and sample intervals and at locations other than where observations, explorations and investigations have been made. Sub-surface conditions, including groundwater levels and contaminant concentrations can change in a limited time. This should be borne in mind when assessing the data.

An understanding of the site conditions depends on the integration of many pieces of information, some regional, some site specific, some structure-specific and some experienced-based. This report should not be altered, amended or abbreviated, issued in part and issued incomplete in any way without prior checking and approval by JOHN LEONARD CONSULTING SERVICES Pty Ltd. JOHN LEONARD CONSULTING SERVICES Pty Ltd accepts no responsibility for any circumstances which arise from the issue of the report which has been modified in any way as outlined above.

.....
May 2012

JOHN LEONARD CONSULTING SERVICES PTY LTD

APPENDIX A

BORE CONSTRUCTION LICENCE

Works Licence ID:

WLE054614

Printed on: 27 Mar 2012 3:26:54 pm

COPY OF RECORD IN THE VICTORIAN WATER REGISTER

LICENCE TO CONSTRUCT WORKS

under Section 67 of the Water Act 1989

The information in this copy of record is as recorded at the time of printing. Current information should be obtained by a search of the register. The State of Victoria does not warrant the accuracy or completeness of this information and accepts no responsibility for any subsequent release, publication or reproduction of this information.

This licence does not remove the need to apply for any authorisation or permission necessary under any other Act of Parliament with respect to anything authorised by the works licence.

Water used under this licence is not fit for any use that may involve human consumption, directly or indirectly, without first being properly treated.

This licence is not to be interpreted as an endorsement of the design and/or construction of any works (including dams). The Authority does not accept any responsibility or liability for any suits or actions arising from injury, loss, damage or death to person or property which may arise from the maintenance, existence or use of the works.

Each person named as a licence holder is responsible for ensuring all the conditions of this licence are complied with.

This licence authorises its holders to construct the described works, subject to the conditions.

Licence Holder(s)

DANDY PREMIX QUARRIES PTY LTD of PO BOX 4112
DANDENONG SOUTH VIC 3175

Licence Contact Details

DANDY PREMIX QUARRIES PTY LTD	PO BOX 4112 DANDENONG SOUTH VIC 3175

Licence Details

Expiry date	27 Mar 2013
Status	Active
Authority	Southern Rural Water
Name of waterway or aquifer	UNC-Corinella
Water system	Corinella (GMU)

Summary of Licensed Works

The details in this section are a summary only. They are subject to the conditions specified in this licence.

Works ID	*Works type*	*Use of water*
WRK068863	Bore	Observation or investigation
WRK068864	Bore	Observation or investigation
WRK068865	Bore	Observation or investigation

Description of Licensed Works

WORKS ID WRK068863

Works type	Bore
Works subtype	Drilled bore
Maximum depth	45.000 metres

Extraction Details

Use of water	Observation or investigation

Works location

Easting	*Northing*	*Zone MGA*
Nil		

Land description

Volume 10646 Folio 670
Lot 2 of Plan PS443067U

Property address

1393-1395 Bass highway, GRANTVILLE, VIC 3984

Description of Licensed Works

WORKS ID WRK068864

Works type	Bore
Works subtype	Drilled bore
Maximum depth	45.000 metres

Extraction Details

Use of water	Observation or investigation

Works location

Easting	*Northing*	*Zone MGA*
Nil		

Land description

Volume 10031 Folio 148
Lot 2 of Plan PS300991J

Property address

1393-1395 Bass highway, GRANTVILLE, VIC 3984

Description of Licensed Works

WORKS ID WRK068865

Works type	Bore
Works subtype	Drilled bore
Maximum depth	45.000 metres

Extraction Details

Use of water Observation or investigation

Works location

Easting	*Northing*	*Zone MGA*
Nil		

Land description

Volume 11044 Folio 476
Lot 5 of Plan PS604744H

Property address

1393-1395 Bass highway, GRANTVILLE, VIC 3984

Related Instruments

Related entitlements Nil

Related water-use entities Nil

Application History

Reference	*Type*	*Status*	*Lodged date*	*Approved date*	*Recorded date*
WLI017377	Issue	Approved	27 Mar 2012	27 Mar 2012	

Conditions

Licence WLE054614 is subject to the following conditions:

Siting and construction

1 The bore must be constructed on the land described in the licence, at coordinates E: 373002.0, N: 5749247.0, Zone: 55.

2 The bore(s) must be drilled at the location specified in the application approved by the Authority, but if after drilling a bore is considered unsatisfactory, a replacement bore may be drilled at an alternative site no greater than 20 metres from the authorised site and no closer to neighbouring bores or nearby waterways, or as authorised by the Authority before the commencement of drilling.

Preventing pollution

3 All earthworks must be carried out, and all drilling fluids and waters produced during construction and development must be disposed of, in ways that avoid contaminating native vegetation, waterways, aquifers, the riparian environment, the riverine environment or other people's property.

4 Construction must stop immediately if the Authority reasonably believes that fuel, lubricant, drilling fluid, soil or water produced during construction and development is at risk of being spilled into native vegetation, waterways, aquifers, the riparian environment, the riverine environment or other people's property.

5 The licence holder must construct and maintain bund walls, in accordance with the timeframe, specifications, guidelines or standards prescribed by the Authority, to prevent fuel, lubricant, drilling fluid, soil or water produced during construction and development from being spilled into native vegetation, waterways, aquifers, the riparian environment, the riverine environment or other people's property.

Construction standards

6 The bore(s) must be constructed, and where relevant decommissioned, in accordance with the ARMCANZ (2nd Edition September 2003) guidelines relating to monitoring bores.

Drilling licence and supervision requirements

7 The bore(s) must be constructed by, or under the direct supervision of, a driller licensed under the Water Act 1989 and endorsed as a Class 1, 2, or 3 driller, with appropriate endorsements.

8 The licence holder must ensure that the licensed driller notifies the Authority's Drilling Inspector at least one day prior to work commencing on any grouting operations and must not proceed with the work unless authorised by the Drilling Inspector.

Bore completion report

9 The licence holder must ensure that the licensed driller sends a Bore Completion Report to the Authority within twenty-eight working days of the bore(s) being completed.

10 The works referred to in the licence must not be made operational until the Authority acknowledges receipt of an acceptable Bore Completion Report.

11 The works referred to in the licence must not be made operational until the licence holder sends a water sample to the laboratory nominated by the Authority.

Protecting water resources

12 No more than 3 bore(s) may be brought to final development under this licence.

13 At the completion of drilling, and before the drilling rig leaves the site, all but 3 bore(s) must be decommissioned so as to eliminate physical hazards, conserve aquifer yield, prevent groundwater contamination and prevent the intermingling of desirable and undesirable waters.

Protecting water quality

14 The bore(s) must be constructed so as to prevent aquifer contamination caused by vertical flow outside the casing.

15 If two or more aquifers are encountered, the bore(s) must be constructed to ensure that an

impervious seal is made and maintained between each aquifer to prevent aquifer connection through vertical flow outside the casing; under no circumstances are two or more aquifers to be screened within the one bore or in any other manner to allow connection between them.

16 Boreheads must be constructed, to ensure that no flood water, surface runoff or potential subsurface contaminated soakage can enter the bore or bore annulus.

17 Drilling must not exceed the maximum depth unless the Authority approves, in advance, drilling beyond this depth.

Protecting other water users

18 The diameter of the bore-casing must not exceed 50 millimetres.

19 The licence holder must, at the licence-holder’s expense, if required by the Authority, conduct a pumping test and obtain a hydrogeological report, to the Authority's specification, on the potential for bore operation to interfere with any bore, aquifer, groundwater dependent ecosystem or waterway.

Fees and charges

20 The licence holder must, when requested by the Authority, pay all fees, costs and other charges under the Water Act 1989 in respect of this licence.

END OF COPY OF RECORD

APPENDIX B

BORE COMPLETION REPORTS

WATER ACT 1989

BORE COMPLETION REPORT

Southern Rural Water
Managing Water. Serving Communities.

SRW COPY –
To be sent to Southern Rural Water within 28 days of completion of bore.

BORE CONSTRUCTION LICENCE No. WRK068864

Report on site 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐

GPS CO-ORDS: E ☐ N ☐

Drilled Bore ☑ Sprearpoint ☐ Well or Shaft ☐ Dragline ☐

ZONE: 54 / 55 (delete as applicable) GDA 94/ADG66 (delete as applicable)

OFFICE USE ONLY
BORE NUMBER
BORE USES
GMA ..... ZONE .....

Bore Owner DANDY PRE MIX QUARRIES

Site Address 1393 - 1395 BASS HWY GRANTVILLE

Date Commenced 29 / 2 / 2012 Date Completed 5 / 3 / 2012 Total Depth 26 (m)

Was Bore Decommissioned? Y / N N If Yes, State Method

1. DRILLING AND WATER INTERSECTION DETAILS

DRILLING TECHNIQUE				WATER INTERSECTIONS (while drilling, measurements taken from natural surface)									OFFICE USE
Method	From (m)	To (m)	Bit diam (mm)	From (m)	To (m)	Test Method	Static Level (m)	Est. yield l/sec	Draw down (m)	Casing at test (m)	Depth at test (m)	Ec at 25 C (µS/cm)	Lithology
Mud Rotary	0	26	125										

2. CASINGS (CA) SCREENS (SC) SLOTS (SL) OPEN HOLE (OH)

GENERAL						CASING			SCREENS / SLOTS						OFFICE USE
Type CA	SC	SL	OH	From (m)	To (m)	Inner diam (mm)	Outer diam (mm)	Material	Inner diam (mm)	Outer diam (mm)	Material	Aperture (mm)	Filter Y / N	Trade Name	Lithology
☑	☐	☐	☐	0	20	50	60	PVC							
☐	☑	☐	☐	20	26				50	60	PVC	·4	Y		
☐	☐	☐	☐												
☐	☐	☐	☐												
☐	☐	☐	☐												

WELL HEAD FITTINGS Casing Shoe Y / N ☐ ~~Bullnose~~ / Endcap Y / N Y

3. CEMENT (C) BENTONITE (B) SEALS (S) PACKERS (P) GRAVEL (G)

Material C	B	S	P	G	From (m)	To (m)	Cement (bags)	Water (litres)	Seal / Packer type	Outer diam of seal (mm)	Artificial Gravel Packing Method of placement	Gravel size mesh passing (mm)
☑	☐	☐	☐	☐	0	18	8	120				
☐	☐	☐	☑	☐		19			Rubber			
☐	☑	☐	☐	☐	18	19			Bentonite			
☐	☐	☐	☐	☐								

4. FINAL BORE DEVELOPMENT

Method	Yield l/sec	Draw down (m)	Pumping Time (min)	Recovery Time (min)	Final Static Level	Ec at 25 C (µS/cm)
AIR	0·15		30		15	

5. DRILLER'S PUMPING TEST

Method	Static Level (m)	Yield l/sec	Pumping Level (m)	Draw down (m)	Pumping Time (min)	Recovery Time (min)	Ec at 25 C (µS/cm)

6. IF NOT A DRILLED BORE

Type	Length (m)	Width (m)	Diam (m)	Lining Material	From (m)	To (m)

7. SAMPLES

Have material samples been taken? Yes ☐ No ☑ If Yes From ..... (m)
Have water samples been taken? Yes ☐ No ☑ To ..... (m)
Samples taken by: Bore Owner ☐ Driller ☐ Project Geologist ☐

8. DISINFECTION

Was the Bore Disinfected? Yes ☑ No ☐
If yes, state method of disinfection: Chlorine Washed ☑ Steam Cleaned ☐
Other, please specify: .....

9. DRILLER'S LOG

Material	From (m)	To (m)
Clay	0	1·5
Fine White Sand	1·5	20
Medium Sand	20	23
Fine Sand with some silt	23	26

Driller's Name JOHN AGOSTARELLI Driller's Licence No. 0865
Driller's Signature J. Agostarelli Date 3 / 4 / 2012
Name of Plant Operator Aquasearch Drilling Contractors

WATER ACT 1989

BORE COMPLETION REPORT

Southern Rural Water
Managing Water. Serving Communities.

SRW COPY –
To be sent to Southern Rural Water within 28 days of completion of bore.

BORE CONSTRUCTION LICENCE No. WRK068863

Report on site 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐

GPS CO-ORDS: E ☐☐☐☐☐☐ N ☐☐☐☐☐☐☐

Drilled Bore ☑ Sprearpoint ☐ Well or Shaft ☐ Dragline ☐

ZONE: 54 / 55 (delete as applicable) GDA 94/ADG66 (delete as applicable)

OFFICE USE ONLY
BORE NUMBER
BORE USES
GMA ..... ZONE .....

Bore Owner DANDY PREMIX QUARRIES PTY. LTD.

Site Address 1393-1395 BASS HWY GRANTVILLE

Date Commenced 29/2/2012 Date Completed 5/3/2012 Total Depth 38 (m)

Was Bore Decommissioned? Y / N N If Yes, State Method

1. DRILLING AND WATER INTERSECTION DETAILS

DRILLING TECHNIQUE				WATER INTERSECTIONS (while drilling, measurements taken from natural surface)									OFFICE USE
Method	From (m)	To (m)	Bit diam (mm)	From (m)	To (m)	Test Method	Static Level (m)	Est. yield l/sec	Draw down (m)	Casing at test (m)	Depth at test (m)	Ec at 25 C (µS/cm)	Lithology
MUD ROTARY	0	38	125										

2. CASINGS (CA) SCREENS (SC) SLOTS (SL) OPEN HOLE (OH)

GENERAL						CASING			SCREENS / SLOTS						OFFICE USE
Type CA	SC	SL	OH	From (m)	To (m)	Inner diam (mm)	Outer diam (mm)	Material	Inner diam (mm)	Outer diam (mm)	Material	Aperture (mm)	Filter Y / N	Trade Name	Lithology
✓				0	32	50	60	PVC							
	✓			32	38				50	60	PVC	.4	Y		

WELL HEAD FITTINGS Casing Shoe Y / N ☐ ~~Bullnose~~ Endcap Y / N Y

3. CEMENT (C) BENTONITE (B) SEALS (S) PACKERS (P) GRAVEL (G)

Material C	B	S	P	G	From (m)	To (m)	Cement (bags)	Water (litres)	Seal / Packer type	Outer diam of seal (mm)	Artificial Gravel Packing Method of placement	Gravel size mesh passing (mm)
✓					0	30	13	195				
			✓			32			Rubber			
	✓				30	31			Bentonite			

4. FINAL BORE DEVELOPMENT

Method	Yield l/sec	Draw down (m)	Pumping Time (min)	Recovery Time (min)	Final Static Level	Ec at 25 C (µS/cm)
AIR	.2				20 Mtr	

5. DRILLER'S PUMPING TEST

Method	Static Level (m)	Yield l/sec	Pumping Level (m)	Draw down (m)	Pumping Time (min)	Recovery Time (min)	Ec at 25 C (µS/cm)

6. IF NOT A DRILLED BORE

Type	Length (m)	Width (m)	Diam (m)	Lining Material	From (m)	To (m)

7. SAMPLES

Have material samples been taken? Yes ☐ No ☑ If Yes From ..... (m)
Have water samples been taken? Yes ☐ No ☑ To ..... (m)
Samples taken by: Bore Owner ☐ Driller ☐ Project Geologist ☐

8. DISINFECTION

Was the Bore Disinfected? Yes ☑ No ☐
If yes, state method of disinfection: Chlorine Washed ☑ Steam Cleaned ☐
Other, please specify:

Driller's Name JOHN AGOSTINELLI Driller's Licence No. 0865
Driller's Signature J. Agostinelli Date 3 / 4 / 2012
Name of Plant Operator Aquasearch Drilling Contractors

9. DRILLER'S LOG

Material	From (m)	To (m)
Clay	0	1.5
Fine White Sand	1.5	10
Medium Sand	10	18
Med to Fine Sand	18	30
Fine Sand with Silt	30	38

WATER ACT 1989

BORE COMPLETION REPORT

Southern Rural Water
Managing Water. Serving Communities.

SRW COPY –
To be sent to Southern Rural Water within 28 days of completion of bore.

BORE CONSTRUCTION LICENCE No. WRW068865 17521

Report on site 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐

GPS CO-ORDS: E ☐ N ☐

Drilled Bore ☑ Sprearpoint ☐ Well or Shaft ☐ Dragline ☐

ZONE: 54 / 55 (delete as applicable) GDA 94/ADG66 (delete as applicable)

OFFICE USE ONLY
BORE NUMBER
BORE USES
GMA ..... ZONE .....

Bore Owner DANDY PREMIX QUARRIES PTY LTD

Site Address 1393-1395 BASS HWY GRANTVILLE

Date Commenced 29/2/2012 Date Completed 5/3/2012 Total Depth 21.3 (m)

Was Bore Decommissioned? Y / N N If Yes, State Method

1. DRILLING AND WATER INTERSECTION DETAILS

DRILLING TECHNIQUE				WATER INTERSECTIONS (while drilling, measurements taken from natural surface)									OFFICE USE
Method	From (m)	To (m)	Bit diam (mm)	From (m)	To (m)	Test Method	Static Level (m)	Est. yield l/sec	Draw down (m)	Casing at test (m)	Depth at test (m)	Ec at 25 C (µS/cm)	Lithology
Mud Rotary	0	21.3	125										

2. CASINGS (CA) SCREENS (SC) SLOTS (SL) OPEN HOLE (OH)

GENERAL						CASING			SCREENS / SLOTS						OFFICE USE
Type CA	SC	SL	OH	From (m)	To (m)	Inner diam (mm)	Outer diam (mm)	Material	Inner diam (mm)	Outer diam (mm)	Material	Aperture (mm)	Filter Y / N	Trade Name	Lithology
✓				0	15.3	50	60	PVC							
	✓			15.3	21.3				50	60	PVC	.4	Y		

WELL HEAD FITTINGS Casing Shoe Y / N ☐ ~~Bullnose~~ / Endcap Y / N Y

3. CEMENT (C) BENTONITE (B) SEALS (S) PACKERS (P) GRAVEL (G)

Material C	B	S	P	G	From (m)	To (m)	Cement (bags)	Water (litres)	Seal / Packer type	Outer diam of seal (mm)	Artificial Gravel Packing Method of placement	Gravel size mesh passing (mm)
✓					0	14	6	90				
			✓			15			Rubber			
	✓				14	15			Bentonite			

4. FINAL BORE DEVELOPMENT

Method	Yield l/sec	Draw down (m)	Pumping Time (min)	Recovery Time (min)	Final Static Level	Ec at 25 C (µS/cm)
AIR	0.15		30		14	

5. DRILLER'S PUMPING TEST

Method	Static Level (m)	Yield l/sec	Pumping Level (m)	Draw down (m)	Pumping Time (min)	Recovery Time (min)	Ec at 25 C (µS/cm)

6. IF NOT A DRILLED BORE

Type	Length (m)	Width (m)	Diam (m)	Lining Material	From (m)	To (m)

7. SAMPLES

Have material samples been taken? Yes ☐ No ☑ If Yes From ..... (m)
Have water samples been taken? Yes ☐ No ☑ To ..... (m)
Samples taken by: Bore Owner ☐ Driller ☐ Project Geologist ☐

8. DISINFECTION

Was the Bore Disinfected? Yes ☑ No ☐
If yes, state method of disinfection: Chlorine Washed ☑ Steam Cleaned ☐
Other, please specify: .....

9. DRILLER'S LOG

Material	From (m)	To (m)
Clay	0	1.5
Fine Sand	1.5	18
Fine Sand with some silt	18	21.3

Driller's Name JOHN AGOSTINELLI Driller's Licence No. 0865
Driller's Signature John Agostinelli Date 3/4/2012
Name of Plant Operator Aquasearch Drilling

APPENDIX C

MGTLabmark ANALYTICAL REPORT

mgt LabMark ENVIRONMENTAL LABORATORIES

ABN – 50 005 085 521 e.mail : enviro@mgtlabmark.com.au web : www.mgtlabmark.com.au

Melbourne
3-5 Kingston Town Close
Oakleigh VIC 3166
Phone : +61 3 9564 7055
NATA # 1261
Site # 1254

Sydney
Unit F6, Building F
16 Mars Road
Lane Cove West NSW 2066
Phone : +61 2 8215 6222
NATA # 1261 Site # 18217

Brisbane
1/21 Smallwood Place
Murarrie QLD 4172
Phone : +61 7 3902 4600
NATA # 1261 Site # 20794

Company Name: John Leonard Consulting Services
Address: 28 Mernda Avenue
Glenhuntly
Victoria 3163

Order No.:
Report #: 332849
Phone: 9569 2625
Fax: 9569 2625

Received: Apr 4, 2012 10:10 AM
Due: Apr 13, 2012 4:00 PM
Priority: 5 Day
Contact name: John Leonard

Client Job No.: DANDY PREMIX GRANTVILLE SITE

mgt-LabMark Client Manager: Andrew Thexton

Sample Detail					Bicarbonate Alkalinity-mg CaCO3/L	Calcium	Carbonate Alkalinity-mg CaCO3/L	Chloride	Conductivity	Magnesium	Nitrate (as N)	pH	Phosphate total (P)	Potassium	Sodium	Sulphate (S)	Total Dissolved Solids
Laboratory where analysis is conducted																	
Melbourne Laboratory - NATA Site # 1254 & 14271					X	X	X	X	X	X	X	X	X	X	X	X	X
Sydney Laboratory - NATA Site # 18217																	
Brisbane Laboratory - NATA Site # 20794																	
External Laboratory																	
Sample ID	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**													
BH01	Mar 19, 2012		Water	M12-Ap02373	X	X	X	X	X	X	X	X	X	X	X	X	X
BH02	Mar 19, 2012		Water	M12-Ap02374	X	X	X	X	X	X	X	X	X	X	X	X	X
BH03	Mar 19, 2012		Water	M12-Ap02375	X	X	X	X	X	X	X	X	X	X	X	X	X

mgt LabMark ENVIRONMENTAL LABORATORIES

Certificate of Analysis

John Leonard Consulting Services
28 Mernda Avenue
Glenhuntly
Victoria 3163

NATA Accredited
Accreditation Number 1261
Site Number 1254

Accredited for compliance with ISO/IEC 17025.
The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards.

Attention: John Leonard

Report	332849-W
Client Reference	DANDY PREMIX GRANTVILLE SITE
Received Date	Apr 04, 2012

Client Sample ID			**BH01**	**BH02**	**BH03**
Sample Matrix			**Water**	**Water**	**Water**
mgt-LabMark Sample No.			**M12-Ap02373**	**M12-Ap02374**	**M12-Ap02375**
Date Sampled			**Mar 19, 2012**	**Mar 19, 2012**	**Mar 19, 2012**
Test/Reference	LOR	Unit			
Chloride	1	mg/L	280	330	260
Conductivity	10	uS/cm	900	1000	840
Nitrate (as N)	0.02	mg/L	0.33	0.05	< 0.02
pH	0.1	units	6.1	6.1	5.8
Phosphate total (P)	0.05	mg/L	0.10	< 0.25	< 0.25
Sulphate (S)	5	mg/L	11	9.4	5.3
Total Dissolved Solids	10	mg/L	540	560	480
Alkalinity					
Bicarbonate Alkalinity-mg CaCO3/L	20	mg/L	< 20	< 20	< 20
Carbonate Alkalinity-mg CaCO3/L	10	mg/L	< 10	< 10	< 10
Alkali Metals					
Calcium	0.5	mg/L	8.9	10	7.0
Magnesium	0.5	mg/L	17	17	13
Potassium	0.5	mg/L	1.7	1.3	1.4
Sodium	0.5	mg/L	160	190	150

Sample History

Where samples are submitted/analysed over several days, the last date of extraction and analysis is reported.

Description	Testing Site	Extracted	Holding Time
Chloride	Melbourne	Apr 04, 2012	28 Day
- Method: APHA 4500-Cl (Cl by Discrete Analyser)			
Conductivity	Melbourne	Apr 04, 2012	28 Day
- Method: APHA 2510 Conductivity by Direct Measurement			
Nitrate (as N)	Melbourne	Apr 04, 2012	2 Day
- Method: APHA 4500-NO3 Nitrate Nitrogen by FIA			
pH	Melbourne	Apr 05, 2012	0 Hours
- Method: APHA 4500 pH by Direct Measurement - ** Samples analysed outside holding time. Analysis should be performed in situ.			
Phosphate total (P)	Melbourne	Apr 05, 2012	2 Day
- Method: APHA 4500-P E. Phosphorous			
Sulphate (S)	Melbourne	Apr 04, 2012	28 Day
- Method: APHA 4500-SO4 (SO4 by Discrete Analyser)			
Total Dissolved Solids	Melbourne	Apr 10, 2012	7 Day
- Method: APHA 2540C Total Dissolved Solids			
Alkalinity	Melbourne	Apr 05, 2012	14 Day
- Method: APHA 2320 Alkalinity by Titration			
Alkali Metals	Melbourne	Apr 04, 2012	28 Day
- Method: USEPA 6010 Alkali Metals			

mgt-LabMark Internal Quality Control Review

General

1. Laboratory QC results for Method Blanks, Duplicates, Matrix Spikes, and Laboratory Control Samples are included in this QC report where applicable. Additional QC data may be available on request.
2. All soil results are reported on a dry basis, unless otherwise stated.
3. Actual PQLs are matrix dependant. Quoted PQLs may be raised where sample extracts are diluted due to interferences.
4. Results are uncorrected for matrix spikes or surrogate recoveries.
5. SVOC analysis on waters are performed on homogenised, unfiltered samples, unless noted otherwise.
6. Samples were analysed on an 'as received' basis.
7. This report replaces any interim results previously issued.

Holding Times

Please refer to 'Sample Preservation and Container Guide' for holding times (QS3001)

For samples received on the last day of holding time, notification of testing requirements should have been received at least

6 hours prior to sample receipt deadlines as stated on the Sample Receipt Acknowledgment

If the Laboratory did not receive the information in the required timeframe, and regardless of any other integrity issues, suitably qualified results may still be reported.

Holding times apply from the date of sampling, therefore compliance to these may be outside the laboratory's control.

****NOTE:** pH duplicates are reported as a range NOT as an RPD

UNITS

mg/kg:milligrams per Kilogram

µg/L:micrograms per litre

ppb: Parts per billion

org/100mL: Organisms per 100 millilitres

MPN/100mL: Most Probable Number of organisms per 100 millilitres

mg/L:milligrams per litre

ppm: Parts per million

%:Percentage

NTU: Nephelometric Turbidity Units

TERMS

Dry:	Where a moisture has been determined on a solid sample the result is expressed on a dry basis.
LOR:	Limit Of Reporting.
SPIKE:	Addition of the analyte to the sample and reported as percentage recovery.
RPD:	Relative Percent Difference between two Duplicate pieces of analysis.
LCS:	Laboratory Control Sample - reported as percent recovery.
CRM:	Certified Reference Material - reported as percent recovery.
Method Blank:	In the case of solid samples these are performed on laboratory certified clean sands. In the case of water samples these are performed on de-ionised water.
Surr - Surrogate:	The addition of a like compound to the analyte target and reported as percentage recovery.
Duplicate:	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
Batch Duplicate:	A second piece of analysis from a sample outside of the client's batch of samples but run within the laboratory batch of analysis.
Batch SPIKE:	Spike recovery reported on a sample from outside of the client's batch of samples but run within the laboratory batch of analysis.
USEPA:	U.S Environmental Protection Agency
APHA:	American Public Health Association
ASLP:	Australian Standard Leaching Procedure (AS4439.3)
TCLP:	Toxicity Characteristic Leaching Procedure
COC:	Chain Of Custody
SRA:	Sample Receipt Advice
CP:	Client Parent - QC was performed on samples pertaining to this report
NCP:	Non-Client Parent - QC was performed on samples not pertaining to this report, however QC is representative of the sequence or batch that client samples were analysed within

QC - ACCEPTANCE CRITERIA

RPD Duplicates: Global RPD Duplicates Acceptance Criteria is 30% however the following acceptance guidelines are equally applicable:

Results <10 times the LOR : No Limit

Results between 10-20 times the LOR : RPD must lie between 0-50%

Results >20 times the LOR : RPD must lie between 0-30%

Surrogate Recoveries : Recoveries must lie between 50-150% - Phenols 20-130%.

QC DATA GENERAL COMMENTS

1. Where a result is reported as a less than (<), higher than the nominated LOR, this is due to either matrix interference, extract dilution required due to interferences or contaminant levels within the sample, high moisture content or insufficient sample provided.
2. Duplicate data shown within this report that states the word "BATCH" is a Batch Duplicate from outside of your sample batch, but within the laboratory sample batch at a 1:10 ratio. The Parent and Duplicate data shown is not data from your samples.
3. Organochlorine Pesticide analysis - where reporting LCS data, Toxophene & Chlordane are not added to the LCS.
4. Organochlorine Pesticide analysis - where reporting Spike data, Toxophene is not added to the Spike.
5. Total Recoverable Hydrocarbons - where reporting Spike & LCS data, a single spike of commercial Hydrocarbon products in the range of C12-C30 is added and it's Total Recovery is reported in the C10-C14 cell of the Report.
6. pH and Free Chlorine analysed in the laboratory - Analysis on this test must begin within 30 minutes of sampling.Therefore laboratory analysis is unlikely to be completed within holding time. Analysis will begin as soon as possible after sample receipt
7. Recovery Data (Spikes & Surrogates) - where chromatographic interference does not allow the determination of Recovery the term "INT" appears against that analyte.
8. Polychlorinated Biphenyls are spiked only using Arochlor 1260 in Matrix Spikes and LCS's.
9. For Matrix Spikes and LCS results a dash " -" in the report means that the specific analyte was not added to the QC sample>
10. Duplicate RPD's are calculated from raw analytical data thus it is possible to have two sets of data below the LOR with a positive RPD - eg: LOR 0.1, Result A = <0.1 (raw data is 0.02) & Result B = <0.1 (raw data is 0.03) resulting in a RPD of 40% calculated from the raw data.

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Quality Control Results

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Method Blank							
Chloride	mg/L	< 1			1	Pass	
Nitrate (as N)	mg/L	< 0.02			0.02	Pass	
Phosphate total (P)	mg/L	< 0.05			0.05	Pass	
Sulphate (S)	mg/L	< 5			5	Pass	
Total Dissolved Solids	mg/L	< 10			10	Pass	
Method Blank							
Alkalinity APHA 2320 Alkalinity by Titration							
Carbonate Alkalinity-mg CaCO3/L	mg/L	< 10			10	Pass	
Method Blank							
Alkali Metals USEPA 6010 Alkali Metals							
Calcium	mg/L	< 0.5			0.5	Pass	
Magnesium	mg/L	< 0.5			0.5	Pass	
Potassium	mg/L	< 0.5			0.5	Pass	
Sodium	mg/L	< 0.5			0.5	Pass	
LCS - % Recovery							
Chloride	%	97			70-130	Pass	
Nitrate (as N)	%	111			70-130	Pass	
Phosphate total (P)	%	98			70-130	Pass	
Sulphate (S)	%	100			70-130	Pass	
LCS - % Recovery							
Alkali Metals USEPA 6010 Alkali Metals							
Calcium	%	90			70-130	Pass	
Magnesium	%	87			70-130	Pass	
Potassium	%	84			70-130	Pass	
Sodium	%	88			70-130	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Spike - % Recovery									
				Result 1					
Chloride	M12-Ap02376	NCP	%	103			70-130	Pass	
Nitrate (as N)	M12-Ap01916	NCP	%	100			70-130	Pass	
Phosphate total (P)	M12-Ap02419	NCP	%	107			70-130	Pass	
Sulphate (S)	M12-Ap02373	CP	%	95			70-130	Pass	
Spike - % Recovery									
Alkali Metals				Result 1					
Calcium	M12-Ap02373	CP	%	100			70-130	Pass	
Magnesium	M12-Ap02373	CP	%	102			70-130	Pass	
Potassium	M12-Ap02236	NCP	%	94			70-130	Pass	
Sodium	M12-Ap02373	CP	%	106			70-130	Pass	
Duplicate									
				Result 1	Result 2	RPD			
Chloride	M12-Ap02373	CP	mg/L	280	310	<1	30%	Pass	
Nitrate (as N)	M12-Ap01916	NCP	mg/L	4.0	4.0	1.0	30%	Pass	
Phosphate total (P)	M12-Ap02419	NCP	mg/L	0.25	0.32	24	30%	Pass	
Sulphate (S)	M12-Ap02373	CP	mg/L	11	11	1.0	30%	Pass	
Total Dissolved Solids	M12-Ap02418	NCP	mg/L	250	250	4.0	30%	Pass	
Duplicate									
Alkalinity				Result 1	Result 2	RPD			
Bicarbonate Alkalinity-mg CaCO3/L	M12-Ap02925	NCP	mg/L	66	67	1.0	30%	Pass	
Carbonate Alkalinity-mg CaCO3/L	A12-Ap02986	NCP	mg/L	< 10	< 10	<1	30%	Pass	
Duplicate									
Alkali Metals				Result 1	Result 2	RPD			
Calcium	M12-Ap02373	CP	mg/L	8.9	8.9	<1	30%	Pass	

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Magnesium	M12-Ap02373	CP	mg/L	17	17	<1	30%	Pass	
Potassium	M12-Ap02373	CP	mg/L	1.7	1.8	7.0	30%	Pass	
Sodium	M12-Ap02373	CP	mg/L	160	140	<1	30%	Pass	

Comments

Sample Integrity

Custody Seals Intact (if used)	N/A
Attempt to Chill was evident	No
Sample correctly preserved	Yes
Organic samples had Teflon liners	Yes
Sample containers for volatile analysis received with minimal headspace	Yes
Samples received within HoldingTime	Yes
Some samples have been subcontracted	No

Authorised By

Andrew Thexton	Client Services
Huong Le	Senior Analyst-Inorganic (VIC)
Mary Makarios	Senior Analyst-Metal (VIC)

Michael Wright
National Technical Manager

Final report - this Report replaces any previously issued Report

- Indicates Not Requested

* Indicates NATA accreditation does not cover the performance of this service

Uncertainty data is available on request

mgt-LabMark shall not be liable for loss, cost, damages or expenses incurred by the client, or any other person or company, resulting from the use of any information or interpretation given in this report. In no case shall mgt-LabMark be liable for consequential damages including, but not limited to, lost profits, damages for failure to meet deadlines and lost production arising from this report. This document shall not be reproduced except in full and relates only to the items tested. Unless indicated otherwise, the tests were performed on the samples as received.

APPENDIX 4 Ecological Assessment

Norris & Schoeffel
1295 Bullumwaal Rd
Mount Taylor Victoria 3875
Phone: (03) 5157 9264
Email: ken.norris@wideband.net.au

Norris & Schoeffel

Proposed Grantville Sand Pit
Dandy Premix Pty Ltd

Ecological Assessment

Report to
Dandy Premix Pty Ltd

prepared by

Ken Norris

May 24, 2012

Summary

- The proposal to extract sand from the property at Grantville will not affect matters of Environmental Significance on-site and is unlikely to affect matters of Environmental Significance off-site.
- The proposal to utilise cleared farmland for Extractive Industries instead of existing 'Native Vegetation' is generally supported by the Department of Sustainability and Environment.
- The removal of 'Native Vegetation' is restricted to some scattered grasses and shrubs that, collectively, are beneath the threshold of 25% that would trigger a 'Net Gain' assessment.
- Perimeter planting of 'screening' vegetation will be in keeping with the environment of the site and use indigenous, locally sourced seed as a preference.
- The proponent should be encouraged in their determination to rehabilitate the tributary of Deep Creek to augment and buffer the area of 'Swamp Scrub' on the patch of Crown Land downstream.

Aerial Photography flown by Landair Surveys 05/2012
Topographic Data supplied by Landair Surveys 07/2011
Site Plan produced by BCA

LEGEND

- Proposed Work Authority Boundary (Yellow)
- Proposed Extraction Boundary (Red) *
- Proposed Development (Grey/White) *

* Disturbed Area

Norris & Schoeffel

for

DANDY PREMIX QUARRIES PTY LTD

Drawing: BCA A4 1170 Revision: 0 Author: KN
Ref: Sheffen.WOR
Date: 19/05/2012

Ecological Assessment

Figure: 1

GRANTVILLE SAND PIT
GRANTVILLE

SITE PLAN

1 Introduction

1.1 Project background

Dandy Premix Pty Ltd contracted Norris and Schoeffel to complete a Native Vegetation assessment and flora and fauna study of part of their Grantville property (Figure 1.) to fulfil three objectives:

1. To investigate the potential impact of their proposed development to establish a Sand Extraction Pit (see Figure 5., Development Plan, Bell Cochrane and Associates 2012).
2. To design the proposed development to minimise any impact on flora and fauna and 'Native Vegetation'.
3. To explore and make allowance for any potential liability and resultant Offsets that would apply to the development of a new Sand Extraction Pit.

Note: This is an assessment of that part of Work Authority 1488 proposed to be subject to development as an extraction pit over the next decade. It does not deal with any flora and fauna or 'Native Vegetation' matters elsewhere on WA1488. A full description of the proposed WA1488 and development plans is included in Bell Cochrane and Associates (2012).

1.2 Objectives

To report on the flora and fauna attributes of the subject site and to evaluate the 'Native Vegetation' liability, where one exists, consistent with procedures outlined in *Native Vegetation Management Guidelines for the Earth Resources Industries* (DPI 2009).

1.3 Study area

Department of Primary Industries	**Work Authority 1488 (part)**
LGA	**BASS COAST**
Locality	**THE GURDIES**
SPI	**2\PS300991**
Address	**CULLY ROAD, THE GURDIES 3984**
Coordinates	
LL94	**38°23'54.3"S, 145°32'55.8"E**
MGA	**373280, 5748982 (55)**
VicRoads	**96 A8 (ed. 8)**
LGA	**BASS COAST**
Locality	**GRANTVILLE**
SPI	**1\TP515206, 1\TP398939, 176B\PP2453, 6~C\PP5348, 4&5\PS604744**
Address	**1381-1395 BASS HIGHWAY, GRANTVILLE 3984**
Coordinates	
LL94	**38°23'58.6"S, 145°32'43.5"E**
MGA	**372986, 5748846 (55)**
VicRoads	**96 A8 (ed. 8) & 714 E2 (ed. 8)**

2 Methods

2.1 Data and literature review

Records of plant and animal taxa Listed under provisions of the *Flora and Fauna Guarantee Act* 1988 (FFG Act) as 'rare or threatened' on the Department of Sustainability and Environment (DSE) advisory list were checked on the 'Biodiversity Interactive Map' of the DSE.

Taxa and communities listed by the *Environment Protection and Biodiversity Conservation Act* 1999 (EPBC Act) as present or possibly present were accessed using the Department of Environment and Heritage search tools.

2.2 Field survey

The site, including Site Access Track, Works and Stockpile Area and main Extraction Pit, was inspected and traversed thoroughly on one day, 14 May 2012. Given the nature and apparent historical land-use of the property, the investigation did not warrant an intensive fauna survey.

All plant species observed were either recorded when known or collected for later determination (Appendix I.).

All vertebrate fauna observed or heard were recorded (Appendix III.). Any moveable material that might provide shelter for vertebrates was inspected, turned over and replaced — given the history of land-use, there was little cover present.

2.3 Limitations

A study over one day will inevitably miss recording those species with a cryptic nature at this time of year and some of the later flowering species of plant that do not retain flowering parts throughout the year. But given that the area affected is entirely farmland pasture and one steep gully crossing, the chances of missing anything significant are slight.

Any migratory species of fauna that utilise this area of South Gippsland will likewise not be in evidence now; the general investment of southern areas by (Australian) migratory birds begins in earnest later in September each year and the species begin returning in March.

3 Ecological values

3.1 Vegetation

3.1.1 EVC/Communities

DSE interactive Map identifies EVC_16 Lowland Forest, a 'Vulnerable' EVC, as the vegetation type that once covered the proposed area of extraction and infrastructure. Downstream from the property boundary, DSE mapping has EVC_53 Swamp Scrub, an 'Endangered' EVC, extending across the Bass Highway.

That modelling agrees with observations on and adjoining the property. The trees associated with the tributary of Deep Creek are predominantly Messmate *Eucalyptus obliqua* with some Narrow-leafed Peppermint *Eucalyptus radiata* and Swamp Gum *Eucalyptus ovata*. From the property boundary, the vegetation type changes distinctly into a Swamp Scrub type dominated by Melaleuca and Tea-tree.

No remnant EVC exists on the area marked for the proposed works. The proposed crossing of the tributary of Deep Creek is through a gap in the trees and the proposed area of disturbance does not intrude within the Tree Retention Zone of trees along the gully.

Site Access Track, Bass Highway to Works and Stockpile Area

Subject to VicRoads affirmation, access from the Bass Highway to the site will not require removal of any 'Native Vegetation' either in the form of trees or habitat-hectares of vegetation community. The roadside vegetation at the point of entry is dominated by Kikuyu.

The proposed route on the contour across property SPIP 1\TP515206 involves removal of poor pasture dominated by Brown-top Bent and Couch; there are no native species present except for scattered Scrub Nettle on an old sheep camp beneath a dead Monterey Pine.

Across properties 4&5\PS604744, the pasture is of better quality and is dominated by Perennial Rye-grass, Yorkshire Fog and Subterranean Clover with a scattering of weeds of agriculture.

The crossing of the tributary of Deep Creek is at a deeply incised channel, the sides of which have bare soil exposed from the movement of livestock. The vegetation between these bare patches is mainly of exotic weeds of agriculture including Brown-top Bent, Panic Veldt Grass, Rough Dog's-tail and Sweet Vernal Grass. Scattered native species include Sweet Bursaria, Burgan, Austral Bracken and Weeping Grass; these species do not add to a cover of at least 25% that would trigger a 'Net Gain' assessment under terms of *The Framework'* The proposed alignment of the crossing avoids the Tree Retention Zone of trees in the gully. A few specimens of noxious weeds Blackberry and Sweet Briar are present upstream of the proposed crossing.

From the tributary to the Works Area, the proposed track traverses pasture of variable quality but composed entirely of exotic pasture species and weeds of agriculture.

Weighbridge, Office and Workshop and Sand Processing Area

At present this area is covered by a sole of poor pasture dominated by Brown-top Bent. There are no native species in evidence.

The Pit Excavation

The proposed Pit extends across several existing paddocks that vary in pasture quality depending on the time since renovation. There are no native species in evidence except for emergent Cumbungi in a small farm dam; as an artificial land-form, this does not trigger a 'Net Gain' requirement under terms of *The Framework*.

3.1.2 Flora species present

With the exception of the crossing of the tributary of Deep Creek, the area proposed for works is well covered with exotic pasture species. Along the tributary of Deep Creek, Messmate Stringybark, with some Narrow-leafed Peppermint and Swamp Gum, dominate the canopy and Sweet Bursaria and Burgan are present as scattered shrubs. Ground cover is predominantly exotic grasses or bare ground but some Weeping Grass and Austral Bracken is present.

3.1.3 Threatened flora species

Appendix II. lists 'Rare and Threatened' taxa of plants recorded within about 5km of the site. None of these taxa was observed on the site and none is likely.

Best or remaining 50% habitat

Table 1: Determination of best/remaining habitat for rare or threatened flora species

Habitat Zone: HZ1 & HZ2					
Species	**Conservation status**	**Steps**	**Determination of Best 50% / Remaining 50%**	**Conservation significance**	**Notes**
Atriplex paludosa subsp. paludosa	r		N/A	N/A	
Avicennia marina subsp. australasica	r		N/A	N/A	
Caladenia flavovirens	v		N/A	N/A	
Entolasia stricta	k		N/A	N/A	
Pterostylis chlorogramma	r		N/A	N/A	
Pterostylis grandiflora	r		N/A	N/A	
Salsola tragus subsp. pontica	r		N/A	N/A	

3.2 Fauna

3.2.1 Environment for fauna

With the exception of the creek crossing, the area proposed for works, including Site Access Track, Pit and screening area is well covered with exotic pasture species and weeds of agriculture. The farm dam in the centre of the proposed Excavation Pit has emergent Cumbungi suitable for species of frog. At the time of survey, the general wet conditions in the area provided frogs with a wide prospective range.

3.2.2 Fauna species present

Vertebrate taxa present are typical of farmland pasture throughout southern Victoria (Appendix III.).

The one exception is Pacific Gull; a flock of about 50 flew over the site during the survey. Pacific Gull is rated 'near threatened' in DSE's threatened species list. Pacific Gull is a near-coastal species predominantly of beaches; the species will not utilise the proposed works area.

The farm dam in the centre of the proposed pit had one species of frog, Common Froglet. The two other frog species were recorded in wet soaks associated with the tributary of Deep Creek.

3.2.3 Threatened fauna species

Appendix IV. lists the 'Threatened' taxa reported within about 10km of the site. At least two of these reports are doubtful. It is likely that neither *Pogona barbata* nor *Melanodryas cucullata* have ever been in this area, at least not in the wild.

Best or remaining 50% habitat

Table 2: Determination of best/remaining habitat for threatened fauna species

Habitat Zone:					
Species	**Conservation status**	**Steps**	**Determination of Best 50% / Remaining 50%**	**Conservation significance**	**Notes**
Antechinus minimus	nt		AD	N/A	Heathland
Cercartetus nanus	nt		AD	N/A	Forest
Cinclosoma punctatum	nt		AD	N/A	Open forest
Hylacola pyrrhopygia	v		AD	N/A	Heathland
Isoodon obesulus	nt		AD	N/A	Heathland
Larus pacificus	nt		AD	N/A	Beaches
Lissolepis coventryi	v		AD	N/A	Wet heathland
Litoria raniformis	e		AD	N/A	Water and surrounding environment
Megascolides australis	v		AD	N/A	Deep mountain soils
Melanodryas cucullata	nt		AD	N/A	Dry open forest/woodland/mallee
Mugilogobius platynotus	v		AD	N/A	Westernport Bay
Pogona barbata	k		AD	N/A	NW Victoria
Pseudemoia rawlinsoni	nt		AD	N/A	Grassy open forest
Pseudophryne semimarmorata	v		AD	N/A	Heathland
Varanus varius	v		AD	N/A	Open forest

3.2.4 Likely impacts

A direct impact of the proposed works on threatened fauna is unlikely.

4 Policy and Legislative Implications

4.1 Commonwealth

4.1.1 EPBC Act

- Is the proposed action likely to have a significant impact on a matter of national environmental significance?
- Is the proposed action likely to have a significant impact on the environment in general (for actions by Commonwealth agencies or actions on Commonwealth land) or the environment on Commonwealth land (for actions outside Commonwealth land)?

The subject site has no apparent liability arising from requirements of the Environment Protection and Biodiversity Conservation Act 1999.

EPBC Act identifies the possible presence of one 'Wetland of International Significance', no 'Threatened Ecological Communities', forty 'Threatened Species' and fifty-six 'Migratory Species' (Appendix V.).

Westernport Bay is listed as a Wetland of International Significance under the EPBC Act. The proposed development is unlikely to affect the wetland deleteriously. The projected water quality egress from the site is an improvement on present conditions (Craigie 2012).

DSE records (Appendix II. and Appendix IV.) show three species of EPBC-listed animals within about 5km of the site although the accuracy of these records is uncertain.

Others species listed on the EPBC website as possible for this area do not have habitat characteristics consistent with the environment on-site.

Red Fox and Blackberry are 'invasive' species listed under the EPBC Act that are present on-site.

4.2 Victorian

4.2.1 Flora and Fauna Guarantee Act 1988

No taxon of flora and fauna Listed under the provisions of the FFG Act were recorded on-site and none is likely except for flying over (e.g. Swift Parrot) or visiting water features during wet seasons (e.g. Eastern Great Egret).

4.2.2 Catchment and Land Protection Act 1994

Erosion matters that might arise from proposed development are dealt with in Craigie (2012).

In common with many areas of farmland, the site contains a few specimens of Noxious Weed (Appendix I.) for which there is an obligation to control.

4.2.3 Planning and Environment Act 1987

Planning and Environment Act considerations are dealt with elsewhere in the development application. The property is subject to a Bushfire Management Overlay. There is no Environment Significance Overlay on the property. The land is zoned Farming.

5 Victoria's Native Vegetation Management — A Framework for Action

5.1 Three-step approach

5.1.1 Avoiding impacts on Native Vegetation

Design of the extraction pit avoids impacts on 'Native Vegetation'. The pit is on grazing land without indigenous trees. The small farm dam present centrally in the proposed pit has emergent growth of Cumbungi that is introduced to this area.

The storage and works areas are on grazing land without trees. The crossing of the tributary of Deep Creek has some scattered Weeping Grass, Austral Bracken, Sweet Bursaria, Burgan and the environmental weed Sweet Pittosporum, all of which are native species, but collectively they do not comprise 25% or more of the ground flora.

Dandy Pre-Mix purchased property SPI 1\TP515206 in part to avoid possible interference with trees on the roadside south of driveway 1395 Bass Hwy, Grantville.

5.1.2 Minimising impacts on Native Vegetation

The Site Access Track is situated outside Tree Retention Zones.

Crossing of the gully tributary of Deep Creek occurs in a gap between the trees and avoids the Tree Retention Zones.

The Work Plan details screen planting and buffer zones to minimise/eliminate any potential affects of the proposal on 'Native Vegetation' on the adjoining property to the north and the area of Crown Land downstream of the tributary of Deep Creek. Details of these plans are included in Bell Cochrane and Associates (2012).

The Work Plan also proposes re-establishment of a gully vegetation type in the tributary of Deep Creek thus buffering the 'Endangered' vegetation downstream. The proponent is also aware of the relatively poor state of management vis-à-vis Noxious and other Environmental Weeds in the Crown Land and proposes a cooperative framework of management to include both areas.

5.1.3 Offsetting Native Vegetation losses

N/A

5.2 Assessing loss of Native Vegetation

5.2.1 Patches of Native Vegetation

N/A

6 Management of impacts

Any authorised works will be conducted under the Work Plan authorised by DPI. There are no exceptional affects on native flora and fauna on-site. The control of off-site impacts through noise and drainage is subject of the approved Work Plan.

Water

From the report on drainage implications of the proposed works (Craigie 2012):

- Reduction of annual flow from the tributary of Deep Creek is 20%
- Reduction of the flow in Deep Creek at Westernport Bay is 6%
- These reductions respectively leave a net annual flow about the same as (tributary) and greater (Deep Creek) than when the original forest was in place

Analysis of rainfall, projected water-use within the works and permeability of the substrate make it unlikely that water from the Pit will need to be pumped out. That scenario and treatment of runoff from other works during the construction and operational phases of the proposal are dealt with in Craigie (2012). The water quality monitoring model predicts a significant reduction in pollutant loads compared to present agricultural use.

Noise

Works will operate during daylight hours only. It is unlikely to affect fauna.

Dust

Dust suppression is an important part of the operational Work Plan. Dust is unlikely to affect flora and fauna off-site.

Future Management

The proposed Work Plan deals with essential perimeter planting that:

- Will be species of local provenance
- Will attempt to reconstruct a biological environment similar to the 1750 condition, within the constraints of an Extractive Industry operation

The proposed Work Plan projects a reclamation and replanting program for the tributary of Deep Creek that will add a native vegetation community to and buffer the patch of 'Swamp Scrub' immediately downstream of the Work Authority.

7 Conclusions and recommendations

The proposal to extract sand from the property at Grantville will not affect matters of Environmental Significance on-site and is unlikely to affect matters of Environmental Significance off-site.

The proposal to utilise cleared farmland for Extractive Industries instead of existing 'Native Vegetation' is generally supported by the Department of Sustainability and Environment.

The removal of 'Native Vegetation' is restricted to some scattered grasses and shrubs that, collectively, are beneath the threshold of 25% that would trigger a 'Net Gain' assessment.

Perimeter planting of 'screening' vegetation will be in keeping with the environment of the site and use indigenous, locally sourced seed as preference.

The proponent should be encouraged in their determination to rehabilitate the tributary of Deep Creek to augment and buffer the area of 'Swamp Scrub' on the patch of Crown Land downstream.

8 References and acknowledgements

Atlas of Victorian Wildlife, © The State of Victoria, Department of Sustainability and Environment (accessed via the 'Victorian Fauna Database', August 2010 - © Viridans Biological Databases).

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DSE (2005) Advisory List of Rare or Threatened Plants in Victoria. Department of Sustainability and Environment, Melbourne.

DSE (2007) *Native Vegetation Guide for assessment of referred planning permit applications.* Victorian Government, Department of Sustainability and Environment, East Melbourne.

DSE (2007a) Advisory List of Threatened Vertebrate Fauna in Victoria. Department of Sustainability and Environment, Melbourne.

Victorian Flora Site Database, © The State of Victoria, Department of Sustainability and Environment (accessed via the 'Flora Information System', August 2010 - © Viridans Biological Databases). The contribution of the Royal Botanical Gardens Melbourne to the database is acknowledged.

Appendix I. Flora recorded on-site

EPBC	AROT	VROT	Exotic	*Species from Vic Flora*	Common name	Family
			*	*Acetosella vulgaris*	Sheep Sorrel	Polygonaceae
			*	*Agrostis capillaris*	Brown-top Bent	Poaceae
			*	*Anthoxanthum odoratum*	Sweet Vernal-grass	Poaceae
			*	*Arctotheca calendula*	Cape Weed	Asteraceae
				Bursaria spinosa	Sweet Bursaria	Pittosporaceae
			*	*Cerastium glomeratum*	Common Mouse-ear Chickweed	Caryophyllaceae
			N	*Cirsium vulgare*	Spear Thistle	Asteraceae
			*	*Cynodon dactylon*	Couch	Poaceae
			*	*Cynosurus echinatus*	Rough Dog's-tail	Poaceae
			*	*Cyperus eragrostis*	Drain Flat-sedge	Cyperaceae
			*	*Ehrharta erecta*	Panic Veldt Grass	Poaceae
			*	*Eleusine tristachya*	American Crow's-foot Grass	Poaceae
				Eucalyptus obliqua	Messmate	Myrtaceae
				Eucalyptus ovata	Swamp Gum	Myrtaceae
				Eucalyptus radiata s.l.	Narrow-leaf Peppermint	Myrtaceae
			*	*Geranium molle*	Dovesfoot	Geraniaceae
				Gonocarpus tetragynus	Common Raspwort	Haloragaceae
			*	*Holcus lanatus*	Yorkshire Fog	Poaceae
			*	*Hypochaeris radicata*	Cat's Ear	Asteraceae
				Juncus flavidus	Yellow Rush	Juncaceae
				Kunzea ericoides	Burgan	Myrtaceae
			*	*Lolium perenne*	Perennial Rye-grass	Poaceae
			*	*Malva parviflora*	Small-flowered Mallow	Malvaceae
				Microlaena stipoides	Weeping Grass	Poaceae
			*	*Paspalum dilatatum*	Paspalum	Poaceae
			*	*Paspalum distichum*	Water Couch	Poaceae
			*	*Pennisetum clandestinum*	Kikuyu	Poaceae
				Persicaria decipiens	Slender Knotweed	Polygonaceae
			*	*Phytolacca octandra*	Red-ink Weed	Phytolaccaceae
				Pittosporum undulatum	Sweet Pittosporum	Pittosporaceae
				Plantago lanceolata	Ribwort	Plantaginaceae
				Pteridium esculentum	Austral Bracken	Dennstaedtiaceae
			N	*Rosa rubiginosa*	Sweet Briar	Rosaceae
			N	*Rubus fruticosus spp. agg.*	Blackberry	Rosaceae
			*	*Rumex conglomeratus*	Clustered Dock	Polygonaceae
			*	*Sonchus asper s.l.*	Rough Sow-thistle	Asteraceae
			*	*Trifolium campestre*	Hop Clover	Fabaceae
			*	*Trifolium medium*	Zigzag Clover	Fabaceae
			*	*Trifolium repens*	White Clover	Fabaceae
			*	*Trifolium subterraneum*	Subterranean Clover	Fabaceae
				Typha orientalis	Cumbungi	Typhaceae
				Urtica incisa	Scrub Nettle	Urticaceae

Appendix II. Rare and threatened plants within 5km

EPBC	VROT	Species from Vic Flora	Common name	Family
	r	*Atriplex paludosa subsp. paludosa*	Marsh Saltbush	Chenopodiaceae
	r	*Avicennia marina subsp. australasica*	White Mangrove	Verbenaceae
	r	*Caladenia flavovirens*	Summer Spider-orchid	Orchidaceae
	k	*Entolasia stricta*	Upright Panic	Poaceae
	v	*Pterostylis chlorogramma*	Green-striped Greenhood	Orchidaceae
	r	*Pterostylis grandiflora*	Cobra Greenhood	Orchidaceae
	r	*Salsola tragus subsp. pontica*	Prickly Saltbush	Chenopodiaceae

Appendix III. Fauna recorded on-site

nt = near threatened, * = introduced

EPBC	FFG	DSE	*Species*	Common Name	Family
			Acanthorhynchus tenuirostris	Eastern Spinebill	Meliphagidae
			Cacatua galerita	Sulphur-crested Cockatoo	Cacatuidae
			Chenonetta jubata	Australian Wood Duck	Anatidae
			Colluricincla harmonica	Grey Shrike-thrush	Pachycephalidae
			Corvus coronoides	Australian Raven	Corvidae
			Crinia signifera	Common Froglet	Myobatrachidae
			Gymnorhina tibicen	Australian Magpie	Artamidae
			Hirundo neoxena	Welcome Swallow	Hirundinidae
		nt	*Larus pacificus*	Pacific Gull	Laridae
			Limnodynastes tasmaniensis	Spotted Marsh Frog	Myobatrachidae
			Litoria ewingii	Ewing's Tree Frog	Hylidae
			Petroica phoenicea	Flame Robin	Petroicidae
			Rhipidura albiscapa	Grey Fantail	Dicruridae
			Rhipidura leucophrys	Willie Wagtail	Dicruridae
			Strepera graculina	Pied Currawong	Artamidae
			**Sturnus vulgaris*	Common Starling	Sturnidae
			Vombatus ursinus	Common Wombat	Vombatidae
			**Vulpes vulpes*	Fox	Canidae

Appendix IV. Threatened fauna within about 10km

EPBC	FFG	DSE	Species	Common Name	Family
	L	nt	*Antechinus minimus*	Swamp Antechinus	Dasyuridae
	I	nt	*Cercartetus nanus*	Eastern Pigmy-possum	Burramyidae
		nt	*Cinclosoma punctatum*	Spotted Quail-thrush	Cinclosomatidae
	L	v	*Hylacola pyrrhopygia*	Chestnut-rumped Heath-wren	Pardalotidae
EN	L	nt	*Isoodon obesulus*	Southern Brown Bandicoot	Peramelidae
	L	v	*Lissolepis coventryi*	Swamp Skink	Scincidae
VU	L	e	*Litoria raniformis*	Growling Grass Frog	Hylidae
VU	L	v	*Megascolides australis*	Giant Gippsland Earthworm	
	L	nt	*Melanodryas cucullata*	Hooded Robin	Petroicidae
	L	v	*Mugilogobius platynotus*	Pale Mangrove Goby	
		dd	*Pogona barbata*	Bearded Dragon or Jew Lizard	Agamidae
		nt	*Pseudemoia rawlinsoni*	Glossy Grass Skink	Scincidae
		v	*Pseudophryne semimarmorata*	Southern Toadlet	Myobatrachidae
		v	*Varanus varius*	Tree Goanna, Lace Monitor	Varanidae

Appendix V. EPBC Act Protected Matters Report

This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected.

Information on the coverage of this report and qualifications on data supporting this report are contained in the caveat at the end of the report.

Information about the EPBC Act including significance guidelines, forms and application process details can be found at http://www.environment.gov.au/epbc/assessmentsapprovals/index.html

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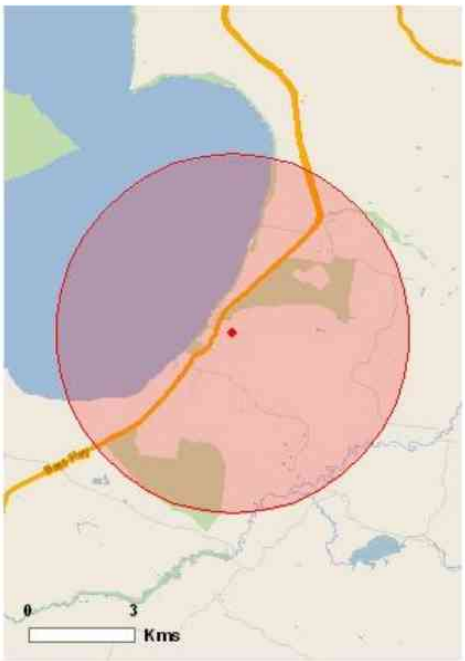

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Other Matters Protected by the EPBC Act

This part of the report summarises other matters protected under the Act that may relate to the area you nominated. Approval may be required for a proposed activity that significantly affects the environment on Commonwealth land, when the action is outside the Commonwealth land, or the environment anywhere when the action is taken on Commonwealth land. Approval may also be required for the Commonwealth or Commonwealth agencies proposing to take an action that is likely to have a significant impact on the environment anywhere.

The EPBC Act protects the environment on Commonwealth land, the environment from the actions taken on Commonwealth land, and the environment from actions taken by Commonwealth agencies. As heritage values of a place are part of the 'environment', these aspects of the EPBC Act protect the Commonwealth Heritage values of a Commonwealth Heritage place and the heritage values of a place on the Register of the National Estate. Information on the new heritage laws can be found at http://www.environment.gov.au/heritage/index.html

This part of the report summarises other matters protected under the Act that may relate to the area you nominated. Approval may be required for a proposed activity that significantly affects the environment on Commonwealth land, when the action is outside the Commonwealth land, or the environment anywhere when the action is taken on Commonwealth land. Approval may also be required for the Commonwealth or Commonwealth agencies proposing to take an action that is likely to have a significant impact on the environment anywhere.

A permit may be required for activities in or on a Commonwealth area that may affect a member of a listed threatened species or ecological community, a member of a listed migratory species, whales and other cetaceans, or a member of a listed marine species. Information on EPBC Act permit requirements and application forms can be found at http://www.environment.gov.

Commonwealth Lands:	None
Commonwealth Heritage Places:	None
Listed Marine Species:	55
Whales and Other Cetaceans:	8
Critical Habitats:	None
Commonwealth Reserves:	None

Extra Information

This part of the report provides information that may also be relevant to the area you have

Place on the RNE:	5
State and Territory Reserves:	6
Regional Forest Agreements:	None
Invasive Species:	14
Nationally Important Wetlands:	1

Details

Matters of National Environmental Significance

Wetlands of International Significance (RAMSAR)		[Resource Information]
Name		Proximity
Western port		Within Ramsar site

Threatened Species		[Resource Information]
Name	Status	Type of Presence
BIRDS		
Anthochaera phrygia		
Regent Honeyeater [82338]	Endangered	Species or species

Name	Status	Type of Presence
		habitat may occur within area
Botaurus poiciloptilus Australasian Bittern [1001]	Endangered	Species or species habitat likely to occur within area
Diomedea epomophora epomophora Southern Royal Albatross [25996]	Vulnerable	Species or species habitat may occur within area
Diomedea epomophora sanfordi Northern Royal Albatross [82331]	Endangered	Species or species habitat may occur within area
Diomedea exulans gibsoni Gibson's Albatross [82271]	Vulnerable	Species or species habitat may occur within area
Fregetta grallaria grallaria White-bellied Storm-Petrel (Tasman Sea), White-bellied Storm-Petrel (Australasian) [64438]	Vulnerable	Species or species habitat likely to occur within area
Lathamus discolor Swift Parrot [744]	Endangered	Species or species habitat likely to occur within area
Leipoa ocellata Malleefowl [934]	Vulnerable	Species or species habitat may occur within area
Macronectes giganteus Southern Giant-Petrel [1060]	Endangered	Species or species habitat may occur within area
Macronectes halli Northern Giant-Petrel [1061]	Vulnerable	Species or species habitat may occur within area
Neophema chrysogaster Orange-bellied Parrot [747]	Critically Endangered	Migration route likely to occur within area
Rostratula australis Australian Painted Snipe [77037]	Vulnerable	Species or species habitat likely to occur within area
Sternula nereis nereis Fairy Tern (Australian) [82950]	Vulnerable	Species or species habitat known to occur within area
Thalassarche bulleri Buller's Albatross [64460]	Vulnerable	Species or species habitat may occur within area
Thalassarche cauta cauta Shy Albatross, Tasmanian Shy Albatross [82345]	Vulnerable	Species or species habitat may occur within area
Thalassarche cauta salvini Salvin's Albatross [82343]	Vulnerable	Species or species habitat may occur within area
Thalassarche melanophris impavida Campbell Albatross [82449]	Vulnerable	Species or species habitat may occur within area
FISH		
Galaxiella pusilla Eastern Dwarf Galaxias, Dwarf Galaxias [56790]	Vulnerable	Species or species habitat likely to occur within area
Prototroctes maraena Australian Grayling [26179]	Vulnerable	Species or species habitat likely to occur

Name	Status	Type of Presence within area
FROGS		
Litoria raniformis Growling Grass Frog, Southern Bell Frog, Green and Golden Frog, Warty Swamp Frog [1828]	Vulnerable	Species or species habitat likely to occur within area
INSECTS		
Synemon plana Golden Sun Moth [25234]	Critically Endangered	Species or species habitat may occur within area
MAMMALS		
Dasyurus maculatus maculatus (SE mainland population) Spot-tailed Quoll, Spotted-tail Quoll, Tiger Quoll (southeastern mainland population) [75184]	Endangered	Species or species habitat may occur within area
Eubalaena australis Southern Right Whale [40]	Endangered	Species or species habitat known to occur within area
Isoodon obesulus obesulus Southern Brown Bandicoot [68050]	Endangered	Species or species habitat known to occur within area
Megaptera novaeangliae Humpback Whale [38]	Vulnerable	Species or species habitat likely to occur within area
Potorous tridactylus tridactylus Long-nosed Potoroo (SE mainland) [66645]	Vulnerable	Species or species habitat may occur within area
Pseudomys fumeus Konoom, Smoky Mouse [88]	Endangered	Species or species habitat may occur within area
Pseudomys novaehollandiae New Holland Mouse [96]	Vulnerable	Species or species habitat may occur within area
Pteropus poliocephalus Grey-headed Flying-fox [186]	Vulnerable	Foraging, feeding or related behaviour may occur within area
OTHER		
Megascolides australis Giant Gippsland Earthworm [64420]	Vulnerable	Species or species habitat likely to occur within area
PLANTS		
Amphibromus fluitans River Swamp Wallaby-grass [19215]	Vulnerable	Species or species habitat may occur within area
Caladenia fragrantissima subsp. orientalis Cream Spider-orchid [23873]	Endangered	Species or species habitat likely to occur within area
Prasophyllum frenchii Maroon Leek-orchid, Slaty Leek-orchid, Stout Leek-orchid, French's Leek-orchid, Swamp Leek-orchid [9704]	Endangered	Species or species habitat likely to occur within area
Pterostylis chlorogramma Green-striped Greenhood [56510]	Vulnerable	Species or species habitat likely to occur within area
Pterostylis cucullata Leafy Greenhood [15459]	Vulnerable	Species or species habitat likely to occur within area
Thelymitra epipactoides Metallic Sun-orchid [11896]	Endangered	Species or species

Name	Status	Type of Presence
		habitat likely to occur within area
Xerochrysum palustre Swamp Everlasting [76215]	Vulnerable	Species or species habitat likely to occur within area
REPTILES		
Caretta caretta Loggerhead Turtle [1763]	Endangered	Species or species habitat likely to occur within area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Species or species habitat likely to occur within area
SHARKS		
Carcharodon carcharias Great White Shark [64470]	Vulnerable	Species or species habitat may occur within area

Migratory Species

[Resource Information]

* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.

Name	Threatened	Type of Presence
Migratory Marine Birds		
Apus pacificus Fork-tailed Swift [678]		Species or species habitat may occur within area
Ardea alba Great Egret, White Egret [59541]		Species or species habitat may occur within area
Ardea ibis Cattle Egret [59542]		Species or species habitat may occur within area
Diomedea epomophora (sensu stricto) Southern Royal Albatross [1072]	Vulnerable*	Species or species habitat may occur within area
Diomedea gibsoni Gibson's Albatross [64466]	Vulnerable*	Species or species habitat may occur within area
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered*	Species or species habitat may occur within area
Macronectes giganteus Southern Giant-Petrel [1060]	Endangered	Species or species habitat may occur within area
Macronectes halli Northern Giant-Petrel [1061]	Vulnerable	Species or species habitat may occur within area
Sterna albifrons Little Tern [813]		Species or species habitat may occur within area
Thalassarche bulleri Buller's Albatross [64460]	Vulnerable	Species or species habitat may occur within area
Thalassarche cauta (sensu stricto) Shy Albatross, Tasmanian Shy Albatross [64697]	Vulnerable*	Species or species habitat may occur within area
Thalassarche impavida Campbell Albatross [64459]	Vulnerable*	Species or species habitat may occur within area

Name	Threatened	Type of Presence
Thalassarche salvini Salvin's Albatross [64463]	Vulnerable*	Species or species habitat may occur within area
Migratory Marine Species		
Balaenoptera edeni Bryde's Whale [35]		Species or species habitat may occur within area
Caperea marginata Pygmy Right Whale [39]		Species or species habitat may occur within area
Carcharodon carcharias Great White Shark [64470]	Vulnerable	Species or species habitat may occur within area
Caretta caretta Loggerhead Turtle [1763]	Endangered	Species or species habitat likely to occur within area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Species or species habitat likely to occur within area
Eubalaena australis Southern Right Whale [40]	Endangered	Species or species habitat known to occur within area
Lagenorhynchus obscurus Dusky Dolphin [43]		Species or species habitat may occur within area
Lamna nasus Porbeagle, Mackerel Shark [83288]		Species or species habitat likely to occur within area
Megaptera novaeangliae Humpback Whale [38]	Vulnerable	Species or species habitat likely to occur within area
Migratory Terrestrial Species		
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Species or species habitat likely to occur within area
Hirundapus caudacutus White-throated Needletail [682]		Species or species habitat may occur within area
Leipoa ocellata Malleefowl [934]	Vulnerable	Species or species habitat may occur within area
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area
Monarcha melanopsis Black-faced Monarch [609]		Breeding may occur within area
Myiagra cyanoleuca Satin Flycatcher [612]		Breeding likely to occur within area
Neophema chrysogaster Orange-bellied Parrot [747]	Critically Endangered	Migration route likely to occur within area
Rhipidura rufifrons Rufous Fantail [592]		Breeding may occur within area
Xanthomyza phrygia Regent Honeyeater [430]	Endangered*	Species or species habitat may occur within

Name	Threatened	Type of Presence
		area
Migratory Wetlands Species		
Actitis hypoleucos Common Sandpiper [59309]		Roosting known to occur within area
Ardea alba Great Egret, White Egret [59541]		Species or species habitat may occur within area
Ardea ibis Cattle Egret [59542]		Species or species habitat may occur within area
Arenaria interpres Ruddy Turnstone [872]		Roosting known to occur within area
Calidris acuminata Sharp-tailed Sandpiper [874]		Roosting known to occur within area
Calidris canutus Red Knot, Knot [855]		Roosting known to occur within area
Calidris ferruginea Curlew Sandpiper [856]		Roosting known to occur within area
Calidris ruficollis Red-necked Stint [860]		Roosting known to occur within area
Calidris tenuirostris Great Knot [862]		Roosting known to occur within area
Charadrius bicinctus Double-banded Plover [895]		Roosting known to occur within area
Charadrius leschenaultii Greater Sand Plover, Large Sand Plover [877]		Roosting known to occur within area
Charadrius mongolus Lesser Sand Plover, Mongolian Plover [879]		Roosting known to occur within area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]		Roosting may occur within area
Heteroscelus brevipes Grey-tailed Tattler [59311]		Roosting known to occur within area
Limicola falcinellus Broad-billed Sandpiper [842]		Roosting known to occur within area
Limosa lapponica Bar-tailed Godwit [844]		Roosting known to occur within area
Numenius madagascariensis Eastern Curlew [847]		Roosting known to occur within area
Numenius minutus Little Curlew, Little Whimbrel [848]		Roosting likely to occur within area
Numenius phaeopus Whimbrel [849]		Roosting known to occur within area
Pluvialis fulva Pacific Golden Plover [25545]		Roosting known to occur within area
Pluvialis squatarola Grey Plover [865]		Roosting known to occur within area
Rostratula benghalensis s. lat. Painted Snipe [889]	Vulnerable*	Species or species habitat likely to occur within area

Name	Threatened	Type of Presence
Tringa glareola Wood Sandpiper [829]		Roosting known to occur within area
Tringa stagnatilis Marsh Sandpiper, Little Greenshank [833]		Roosting known to occur within area
Xenus cinereus Terek Sandpiper [59300]		Roosting known to occur within area

Other Matters Protected by the EPBC Act

Listed Marine Species [Resource Information]

* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.

Name	Threatened	Type of Presence
Birds		
Actitis hypoleucos Common Sandpiper [59309]		Roosting known to occur within area
Apus pacificus Fork-tailed Swift [678]		Species or species habitat may occur within area
Ardea alba Great Egret, White Egret [59541]		Species or species habitat may occur within area
Ardea ibis Cattle Egret [59542]		Species or species habitat may occur within area
Arenaria interpres Ruddy Turnstone [872]		Roosting known to occur within area
Calidris acuminata Sharp-tailed Sandpiper [874]		Roosting known to occur within area
Calidris canutus Red Knot, Knot [855]		Roosting known to occur within area
Calidris ferruginea Curlew Sandpiper [856]		Roosting known to occur within area
Calidris ruficollis Red-necked Stint [860]		Roosting known to occur within area
Calidris tenuirostris Great Knot [862]		Roosting known to occur within area
Charadrius bicinctus Double-banded Plover [895]		Roosting known to occur within area
Charadrius leschenaultii Greater Sand Plover, Large Sand Plover [877]		Roosting known to occur within area
Charadrius mongolus Lesser Sand Plover, Mongolian Plover [879]		Roosting known to occur within area
Charadrius ruficapillus Red-capped Plover [881]		Roosting known to occur within area
Diomedea epomophora (sensu stricto) Southern Royal Albatross [1072]	Vulnerable*	Species or species habitat may occur within area
Diomedea gibsoni Gibson's Albatross [64466]	Vulnerable*	Species or species

Name	Threatened	Type of Presence
		habitat may occur within area
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered*	Species or species habitat may occur within area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]		Roosting may occur within area
Gallinago megala Swinhoe's Snipe [864]		Roosting likely to occur within area
Gallinago stenura Pin-tailed Snipe [841]		Roosting likely to occur within area
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Species or species habitat likely to occur within area
Heteroscelus brevipes Grey-tailed Tattler [59311]		Roosting known to occur within area
Heteroscelus incanus Wandering Tattler [59547]		Roosting known to occur within area
Himantopus himantopus Black-winged Stilt [870]		Roosting known to occur within area
Hirundapus caudacutus White-throated Needletail [682]		Species or species habitat may occur within area
Lathamus discolor Swift Parrot [744]	Endangered	Species or species habitat likely to occur within area
Limicola falcinellus Broad-billed Sandpiper [842]		Roosting known to occur within area
Limosa lapponica Bar-tailed Godwit [844]		Roosting known to occur within area
Macronectes giganteus Southern Giant-Petrel [1060]	Endangered	Species or species habitat may occur within area
Macronectes halli Northern Giant-Petrel [1061]	Vulnerable	Species or species habitat may occur within area
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area
Monarcha melanopsis Black-faced Monarch [609]		Breeding may occur within area
Myiagra cyanoleuca Satin Flycatcher [612]		Breeding likely to occur within area
Neophema chrysogaster Orange-bellied Parrot [747]	Critically Endangered	Migration route likely to occur within area
Numenius madagascariensis Eastern Curlew [847]		Roosting known to occur within area
Numenius minutus Little Curlew, Little Whimbrel [848]		Roosting likely to occur within area
Numenius phaeopus Whimbrel [849]		Roosting known to occur within area

Name	Threatened	Type of Presence
Pluvialis fulva Pacific Golden Plover [25545]		Roosting known to occur within area
Pluvialis squatarola Grey Plover [865]		Roosting known to occur within area
Recurvirostra novaehollandiae Red-necked Avocet [871]		Roosting known to occur within area
Rhipidura rufifrons Rufous Fantail [592]		Breeding may occur within area
Rostratula benghalensis s. lat. Painted Snipe [889]	Vulnerable*	Species or species habitat likely to occur within area
Sterna albifrons Little Tern [813]		Species or species habitat may occur within area
Thalassarche bulleri Buller's Albatross [64460]	Vulnerable	Species or species habitat may occur within area
Thalassarche cauta (sensu stricto) Shy Albatross, Tasmanian Shy Albatross [64697]	Vulnerable*	Species or species habitat may occur within area
Thalassarche impavida Campbell Albatross [64459]	Vulnerable*	Species or species habitat may occur within area
Thalassarche salvini Salvin's Albatross [64463]	Vulnerable*	Species or species habitat may occur within area
Thinornis rubricollis Hooded Plover [59510]		Roosting known to occur within area
Tringa glareola Wood Sandpiper [829]		Roosting known to occur within area
Tringa stagnatilis Marsh Sandpiper, Little Greenshank [833]		Roosting known to occur within area
Xenus cinereus Terek Sandpiper [59300]		Roosting known to occur within area
Mammals		
Arctocephalus forsteri New Zealand Fur-seal [20]		Species or species habitat may occur within area
Arctocephalus pusillus Australian Fur-seal, Australo-African Fur-seal [21]		Species or species habitat may occur within area
Reptiles		
Caretta caretta Loggerhead Turtle [1763]	Endangered	Species or species habitat likely to occur within area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Species or species habitat likely to occur within area

Whales and other Cetaceans

[Resource Information]

Name	Status	Type of Presence
Mammals		
Balaenoptera edeni Bryde's Whale [35]		Species or species

Name	Status	Type of Presence
		habitat may occur within area
Caperea marginata Pygmy Right Whale [39]		Species or species habitat may occur within area
Delphinus delphis Common Dophin, Short-beaked Common Dolphin [60]		Species or species habitat may occur within area
Eubalaena australis Southern Right Whale [40]	Endangered	Species or species habitat known to occur within area
Lagenorhynchus obscurus Dusky Dolphin [43]		Species or species habitat may occur within area
Megaptera novaeangliae Humpback Whale [38]	Vulnerable	Species or species habitat likely to occur within area
Tursiops aduncus Indian Ocean Bottlenose Dolphin, Spotted Bottlenose Dolphin [68418]		Species or species habitat likely to occur within area
Tursiops truncatus s. str. Bottlenose Dolphin [68417]		Species or species habitat may occur within area

Extra Information

Places on the RNE [Resource Information]

Note that not all Indigenous sites may be listed.

Name	State	Status
Natural		
Bass River Valley Area	VIC	Indicative Place
Grantville Flora and Fauna Reserve	VIC	Indicative Place
The Gurdies Nature Conservation Reserve	VIC	Indicative Place
French Island and Environs	VIC	Registered
Western Port	VIC	Registered

State and Territory Reserves [Resource Information]

Name	State
Colbert Ck	VIC
Corinella	VIC
Grantville	VIC
Grantville	VIC
Hurdy Gurdy Creek	VIC
The Gurdies	VIC

Invasive Species [Resource Information]

Weeds reported here are the 20 species of national significance (WoNS), along with other introduced plants that are considered by the States and Territories to pose a particularly significant threat to biodiversity. The following feral animals are reported: Goat, Red Fox, Cat, Rabbit, Pig, Water Buffalo and Cane Toad. Maps from Landscape Health Project, National Land and Water Resouces Audit,

Name	Status	Type of Presence
Mammals		
Felis catus Cat, House Cat, Domestic Cat [19]		Species or species habitat likely to occur within area

Name	Status	Type of Presence
Oryctolagus cuniculus Rabbit, European Rabbit [128]		Species or species habitat likely to occur within area
Sus scrofa Pig [6]		Species or species habitat likely to occur within area
Vulpes vulpes Red Fox, Fox [18]		Species or species habitat likely to occur within area
Plants		
Alternanthera philoxeroides Alligator Weed [11620]		Species or species habitat likely to occur within area
Asparagus asparagoides Bridal Creeper, Bridal Veil Creeper, Smilax, Florist's Smilax, Smilax Asparagus [22473]		Species or species habitat likely to occur within area
Carrichtera annua Ward's Weed [9511]		Species or species habitat may occur within area
Chrysanthemoides monilifera Bitou Bush, Boneseed [18983]		Species or species habitat may occur within area
Genista sp. X Genista monspessulana Broom [67538]		Species or species habitat may occur within area
Lycium ferocissimum African Boxthorn, Boxthorn [19235]		Species or species habitat may occur within area
Olea europaea Olive, Common Olive [9160]		Species or species habitat may occur within area
Rubus fruticosus aggregate Blackberry, European Blackberry [68406]		Species or species habitat likely to occur within area
Salix spp. except S.babylonica, S.x calodendron & S.x reichardtiji Willows except Weeping Willow, Pussy Willow and Sterile Pussy Willow [68497]		Species or species habitat likely to occur within area
Ulex europaeus Gorse, Furze [7693]		Species or species habitat likely to occur within area

Nationally Important Wetlands	[Resource Information]
Name	State
Western Port	VIC

Coordinates

-38.39942 145.54171

Caveat

The information presented in this report has been provided by a range of data sources as acknowledged at the end of the report.

APPENDIX 5 Revegetation Species

Revegetation Species

The lifeforms required for shelter belt planting will be selected in consultation with DSE and the local Phillip Island Landcare Group, part of the Port Phillip and Westernport Landcare Network. The Phillip Island Landcare Group will also provide and assist in sourcing tube-stock of local provenance.

The combined 80 years site experience of the previous owners who are experienced nurserymen and market gardeners in addition to being farmers, will be invaluable in the selection and planting of revegetation. As they remain resident on the property, their guidance and volunteer involvement efforts to collect seed from existing native vegetation, to establish a seed-bank and undertake on-site propogation of tube-stock for plantings and revegetation will be of great assistance.

The combination of these resources with on-site experience and planting trials will determine what species are the most suitable and successful.

The following indicative list will be modified accordingly and where required, replacement and supplementary planting will be undertaken to enhance those areas where initial revegetation outcomes have been less than successful.

Lifeform	Scientific Name	Common Name
Trees ~ 30/ha	*Eucalyptus obliqua* *Eucalyptus radiata s.l.* *Eucalyptus ovata*	Messmate Stringybark Narrow-leaf Peppermint Swamp Gum
Medium Shrubs ~200/ha	*Leptospermum continentale* *Bursaria spinosa* *Kunzea ericoides (local)* *Banksia marginata*	Prickly Tea-tree Sweet Bursaria Burgan Silver Banksia
Small Shrubs ~200/ha	*Epacris impressa* *Monotoca scoparia* *Pteridium esculentum* *Amperea xiphoclada*	Common Heath Prickly Broom-heath Austral Bracken Broom Spurge

Livestock will be completely removed from the works area to assist the reclamation and replanting enhancement efforts proposed to the Northern Drainage Tibutary leading to Deep Creek. These works will include the construction of Sediment Ponds, swales and the planting of aquatic/ephemeral vegetation communities and native vegetation species.

APPENDIX 6 Noise Emission Assessment

WATSON MOSS GROWCOTT acoustics pty ltd

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SAND QUARRY PROPOSAL AT 1381-1395 BASS HIGHWAY, GRANTVILLE VIC 3984

Noise Emission Assessment

Prepared for
Dandy Premix
C/- FOCUS Creative Development Solutions
9-10 Garden Court
Narre Warren, Victoria 3805

Ref. 11180-1.1ng.docx
22 May 2012

EXECUTIVE SUMMARY

A noise assessment has been conducted in order to identify potential impacts of noise emission from the proposed sand quarry operations at 1381-1395 Bass Highway Grantville. The assessment has been based on monitoring of the ambient noise environment in the vicinity of the nearest houses to the proposal and detailed modelling of noise emissions from the activities and equipment proposed for the site.

The noise assessment has been conducted in terms of Recommended Maximum Noise Levels determined in accordance with the EPA's recently released document *NOISE FROM INDUSTRY IN REGIONAL VICTORIA Recommended Maximum Noise Levels from Commerce, Industry and Trade Premises in Regional Victoria* (NIRV).

NIRV was introduced in October 2011. This sand quarry proposal has therefore been considered in terms of NIRV, making it one of the first quarry proposals to be assessed under the EPA's new noise framework for regional Victoria.

Derivation of the Recommended Maximum Noise Levels for this site in accordance with NIRV, which is subject to noise from the nearby Bass Highway, takes into account planning scheme zonings and ambient background noise, with a final check related to the traffic noise environment. The recommended maximum noise levels derived in accordance with NIRV for houses nearest to the quarry but set back from the highway and for houses closer to the highway are set out in the table below.

Summary of Derived Recommended Maximum Noise Levels

RESIDENTIAL LOCATION/S	NIRV RECOMMENDED MAXIMUM NOISE LEVELS, dB(A)	
	'Day' 7am-6pm Mon-Fri, 7am-1pm Sat	6am-7am Mon-Fri
Houses nearest to the quarry site, approximately 200m east of the highway.	50	45
Houses in the vicinity of the highway.	55	45

Noise modelling has enabled the determination of noise control measures and strategies to allow the proposed sand quarry to be developed and operated while maintaining noise levels within the recommended maximum noise levels at all relevant residential locations.

The recommended noise control measures and strategies comprise:

- A noise barrier to a total height of 4m relative to the level of the sand screening and stockpile area along the south western, western and north western sides of this area.
- Planning of the sequencing of site development and daily activities in order to avoid having excavators and haul trucks working at the existing ground surface level prior to 7am. In the western half of the pit in particular, machinery would need to be working at a level more than 5m below the edge of the pit in the direction towards any of the houses visible in Appendix Four in order to operate prior to 7am.
- Fitting mobile equipment operating at the site with broadband reverse alarms, which vary their noise output according to the ambient noise level. These reversing alarms should be selected for the lowest noise level consistent with safe operation.

It has been established that with these measures and strategies in place, the proposed sand quarry can be developed and operated in compliance with the recommended maximum noise levels determined in accordance with the EPA's new noise framework for regional Victoria.

TABLE OF CONTENTS

1. INTRODUCTION

This report sets out the findings of a noise emission assessment of the proposal to establish a sand quarry at a site on the eastern side of the Bass Hwy, approximately one kilometre north of the town of Grantville.

The proposed operation is to comprise removal or topsoil and overburden, extraction of sand, on-site processing consisting of dry screening and sales.

The purpose of the assessment has been to identify potential impacts of noise emission from the proposed quarry operations, based on monitoring of the ambient noise environment in the vicinity of the nearest houses to the proposal and detailed modelling of noise emissions from the activities and equipment proposed for the site, and to determine required noise control measures in principle, if necessary, in order to achieve compliance with relevant recommended maximum noise levels at existing residential locations.

This report covers the following aspects:

- Monitoring of background noise levels in the vicinity of residential locations potentially exposed to noise from the proposed operational areas;
- Determination of E.P.A. guideline maximum noise levels for noise emission to residential premises in regional Victoria;
- Prediction of noise levels at potentially affected residential locations resulting from the proposed quarry operations, using a three dimensional noise modelling software package;
- Consideration of appropriate noise mitigation strategies in order to achieve compliance with the guideline maximum noise levels.

In October 2011, the Victorian EPA introduced a new guideline for noise in regional Victoria: *NOISE FROM INDUSTRY IN REGIONAL VICTORIA Recommended Maximum Noise Levels from Commerce, Industry and Trade Premises in Regional Victoria* (NIRV). This sand quarry proposal has therefore been considered in terms of NIRV, making it one of the first quarry proposals to be assessed under this new noise framework

2. NOISE ASSESSMENT TERMINOLOGY

The following terms are used in this report:

dB(A) Decibels recorded on a sound level meter, which has had its frequency response modified electronically to an international standard, to quantify the average human loudness response to sounds of different character.

L_{90} the level exceeded for 90% of the measurement period, which is representative of the typical lower levels in a varying noise environment. It is the noise measure defined by the EPA as the measure of the background noise level to use in determining recommended maximum noise levels.

L_{eq} the equivalent continuous level that would have the same total acoustic energy over the measurement period as the actual varying noise level under consideration. It is the noise measure defined by the EPA as the measure of the quarry noise to use in assessing compliance with recommended maximum noise levels.

In short, L_{90} is the measure of background noise (in the absence of industrial noise) used in determining recommended maximum noise levels, and L_{eq} is the measure of industrial noise used in assessing compliance with recommended maximum noise levels.

3. BACKGROUND NOISE LEVELS IN THE VICINITY OF RESIDENTIAL LOCATIONS POTENTIALLY AFFECTED BY NOISE EMISSION FROM THE SAND QUARRY

For much of Victoria, there is now no need to monitor the existing ambient background noise environment as part of determining Recommended Maximum Noise Levels in accordance with NIRV. However, locations in the vicinity of highways are among the sites where the ambient background level is taken into account in determining Recommended Maximum Noise Levels.

Acoustic Research Laboratories Type EL215 and EL 316 noise loggers were used to measure the ambient noise environment at residential locations nearest to the site, which are also located in the vicinity of the Bass Highway. The noise monitoring was conducted during February 2012.

One logger was located at the southern boundary of 1395 Bass Highway, at a location representative of the ambient noise exposure of 1421 Bass Highway, and the other at the northern boundary of 1393 Bass Highway, at a location representative of the ambient noise exposure of 1381 Bass Highway. These locations are indicated on an aerial plan of the area attached at Appendix One.

1381 Bass Highway has since been purchased by the quarry proponents, and is no longer a relevant noise assessment location, but the noise monitoring data obtained provides useful confirmation of the results obtained at the southern location.

Graphical results of the noise monitoring are included at Appendix Two. The ambient L_{90} and L_{eq} levels have both been included. The derived guideline L_{eq} recommended maximum noise levels set out in section 4 below for the proposed periods of operation have been superimposed over the ambient noise levels in order to put them in context.

The proposed hours are 6am to 6pm Monday to Friday and 6am to 1pm Saturday. The majority of this is withinin the EPA-defined ‘day’ period [7am to 6pm Mon-Fri and 7am to 1pm Sat], but 6am to 7am is within the EPA-defined ‘night’ period [10pm to 7am], for which a lower recommended maximum noise level is applicable.

Ambient L_{90} noise levels averaged over those components of the EPA-defined day and night periods have been tabulated below.

Table One: Summary of Average Monitored Ambient Background Noise Levels

Day and date	Ambient background L_{90} noise levels averaged over the day, evening and 6am-7am in the night periods as defined by the EPA, dB(A)	
	6am-7am in the 'Night' period	'Day' 7am-6pm M-F, 7am-1pm Sat
Southern boundary of 1395 Bass Highway		
Thu 16 February	49	
Fri 17 February	48	47
Sat 18 February	42	44
Mon 20 February	49	48
Tue 21 February	46	45
Wed 22 February	42	42
Northern boundary of 1393 Bass Highway		
Wed 22 February		43
Thu 23 February	49	46
Fri 24 February	41	44

The results for Sundays are not relevant, as operation on Sundays is not proposed.

Conventional EPA practice when a spread of results are obtained during a monitoring period is to use the lowest of the averaged background noise levels obtained during a monitoring period for the purpose of determining recommended maximum noise levels, on the basis that if it can occur during any given period then it is reasonable to expect it to occur again.

On that basis, the background noise levels for the day period to be used in determining the recommended maximum noise levels for these houses are 42dB(A) L_{90} for the period 7am-6pm Mon-Fri and 7am-1pm Sat, and 41dB(A) L_{90} for the period 6am-7am.

In addition to the unattended noise logging, short-term 'hand-held' noise measurements were conducted in the vicinity of the houses on the western side of the Bass Highway. A sample measurement at this location gave a result of 45dB(A) L_{90} during a 15 minute period when the logged noise level approximately 200m from the highway was 40dB(A) L_{90}. This indicates a background level at the houses nearer to the highway approximately 5 dB(A) higher than those locations more distant from the highway. This provides a reasonable basis for the background level at those residential locations relatively close to the highway.

Comparing this result with the longer term average over the day and during the period 6am to 7am indicates background levels for the purpose of determining recommended maximum noise levels under NIRV at these locations of 47dB(A) L_{90} for the period 7am-6pm Mon-Fri and 7am-1pm Sat, and 46dB(A) L_{90} for the period 6am-7am Mon-Sat.

The results obtained at these locations would provide a good indication of the ambient noise environment at other residential locations in the approximate vicinity of the highway.

The application of the measured and assumed background noise levels in determining guideline recommended maximum noise levels is discussed in section 4 below.

4. NOISE LEVEL GUIDELINES

In October 2011, the Victorian EPA introduced a new guideline for noise in regional Victoria: NOISE FROM INDUSTRY IN REGIONAL VICTORIA Recommended Maximum Noise Levels from Commerce, Industry and Trade Premises in Regional Victoria (NIRV). The recommended maximum noise levels under the guideline are just that, guideline recommendations. The recommended levels only gain a higher status than recommendations if adopted as Conditions in a Planning Permit of operating Licence.

Under the noise assessment procedures set out in this document, recommended maximum noise levels are set using State Environment Protection Policy (Control of Noise from Commerce, Industry and Trade) No. N-1 (SEPP N-1) within the Urban Centre Boundaries of major urban centres in Victoria (defined as a population greater than 7000).

In areas outside Urban Centre Boundaries, NIRV sets out specific procedures for determining the Recommended Maximum Noise Levels (RMNLs) for General Commerce Industry and Trade, with a separate procedure for Earth Resources, which is applicable for the sand quarry under consideration.

Derivation of the RMNLs for this site, which is subject to noise from the nearby Bass Highway, takes into account planning scheme zonings and ambient background noise, with a final check related to the traffic noise environment. The recommended maximum noise level derivations for houses nearest to the quarry but set back from the highway and for houses closer to the highway are set out in the attached appendix.

Table Two: Summary of Derived Recommended Maximum Noise Levels

RESIDENTIAL LOCATION/S	NIRV RECOMMENDED MAXIMUM NOISE LEVELS, dB(A)	
	'Day' 7am-6pm Mon-Fri, 7am-1pm Sat	6am-7am Mon-Fri
Houses nearest to the quarry site, approximately 200m east of the highway.	50	45
Houses in the vicinity of the highway.	55	45

Compliance with the RMNLs is not relevant for properties in the ownership of the quarry proponents, which includes the two houses at 1393 and 1395 Bass Highway, and the recently purchased property at 1381 Bass Highway.

Note that the assessment of noise emission from the quarry is made using the L_{eq} noise measure. The ambient L_{eq} due to the Bass Highway traffic noise is at times higher than the derived recommended maximum noise level at some locations, as indicated in the graphical noise monitoring results included in Appendix Two.

This indicates a high level of protection of residential amenity by the NIRV RMNLs, but also indicates that assessment of compliance with the RMNLs would be difficult in the ambient noise environment. This is consistent with the objective of noise criteria, which is to have a new noise being introduced into an area 'blend in with' and not dominate the existing noise environment.

The graphs in Appendix Two were obtained from noise monitoring at locations approximately 200m from the highway. A higher Recommended Maximum Noise Level has been derived for the day period at houses within approximately 50m of the highway, but the ambient levels would also be correspondingly higher therefore providing equivalent protection of amenity.

Compliance with the RMNLs could not be assessed by means of unattended noise measurements, measurements would need to be conducted while in attendance at the site to discriminate sound sources.

During site clearing and preparation and construction of noise control features, which would include construction of the access track, the NIRV document notes that noise from the activity may be exempted from recommended levels during the Day period. However, the document clearly states that overburden removal is included in those activities assessable in terms of the RMNL.

Noise of trucks operating within the boundaries of the site would also be assessable in terms of the NIRV RMNLs.

4.1 Noise Due to Traffic Generated By the Proposal

There are no regulatory recommended maximum noise levels in Victoria for road traffic noise associated with developments that cause a change in traffic volumes on public roads and consequently change traffic noise levels. Conventionally such projects have been assessed in terms of the change to existing traffic noise levels. An increase of up to 3 dB(A) is normally regarded as being of little significance. Broadly, a 3 dB(A) increase in traffic noise level corresponds with an approximate doubling of the traffic volume.

The NSW EPA has guidelines for this situation in a document titled “Environmental Criteria for Road Traffic Noise”. For land use developments with the potential to create additional traffic on arterial roads, the document includes criteria of a noise level outside houses of $L_{Aeq\ (1hr)}$ 60 dB(A) for Day (7am-10pm), and $L_{Aeq\ (1hr)}$ 55 dB(A) for Night (10pm-7am). Also the guidelines indicate that traffic arising from the development should not cause an increase in the existing traffic noise level of more than 2 dB(A).

For this project, observations of traffic and the results of ambient noise monitoring have indicated that the relatively small number of vehicle movements associated with the proposal compared with traffic on the Bass Highway will have a negligible impact.

5. SAND QUARRY NOISE SOURCES

The proposed sand quarry will include both mobile and stationary noise sources. Advice has been received that the following noise sources will be relevant:

- Excavator operating at the quarry face, Hitachi 470LCH or similar.
- Off road haul truck in the order of 40 tonne capacity, either carting overburden to the overburden storage area south east of the proposed pit or sand to the raw sand stockpile at the sand screening and sales area.
- CAT 980H or similar wheeled loader operating at the sand screening and stockpile area.
- Finitec 542 or similar Dry Screen operating at the sand screening area.
- On-road dump trucks accessing the site along the access track for product sales.

Noise source data for equipment typical of that to be used at the quarry were obtained from an existing sand quarry. This was supplemented by data on file from other similar quarries where it was not possible to obtain all relevant information from the quarry visited. Relevant noise data has been included in Appendix Five.

The noise assessment under the EPA procedures is based on the equivalent continuous noise level in a 30 minute period. The number of road trucks accessing the site during a 30 minute period is therefore a relevant factor in the assessment of noise emission. Advice has been received from the quarry proponent that at the anticipated production and sales rate, the number of truck movements along the site access track would commence at 4 movements per 30 minutes in year 1 and rise to 7 movements per 30 minutes in year 4 and beyond.

Noise modelling has allowed for 7 truck movements per 30 minutes in order to represent full operation of the quarry in later years.

6. PREDICTED NOISE LEVELS DUE TO NOISE EMISSION FROM THE SAND QUARRY SITE

6.1 NOISE PREDICTION METHODOLOGY

Modeling of operational noise emissions has been conducted using the Australian developed computer software package known as the Environmental Noise Model (ENM). The ENM package, which runs in a 3 dimensional environment, has been successfully used to model noise emissions from industrial sites at numerous locations within Victoria, including quarries and mines.

The noise modelling has allowed for the effects of light breezes from the noise sources to the residential locations enhancing sound propagation. For the majority of the time, the resultant noise levels would be lower than predicted on this basis.

Apart from the reduction of sound due to distance and atmospheric effects, noise attenuation results from acoustic shielding.

In addition to acoustic shielding resulting from natural topography there is potential for acoustic shielding of in-pit equipment to result from the formation of the excavation. In this event noise levels can progressively reduce as the depth of the pit increases. The worst case for noise emission is often when the working area is at or close to the natural surface.

Noise modelling has focused on critical stages in the development of the sand quarry, being the initial stage when operations are at or close to the surface. Modelling has also been conducted for a later stage when full operation of the quarry has commenced, with all equipment operating.

The noise assessment under the EPA procedures is based on the equivalent continuous noise level in a 30 minute period.

6.2 NOISE PREDICTION RESULTS

Initial noise modeling results indicated noise levels above the RMNLs for the period 6-7am at residential locations east of the highway, due to noise contributions from the screen and loader operating at the sand screening and stockpile area and the excavator and haul truck operating close to the natural surface.

There is flexibility to selectively choose whether to operate the excavator and haul truck prior to 7am at exposed locations, but once production commences, the sand screening and stockpile area will be integral to the operation.

Noise modeling was therefore used to iteratively determine the height of a noise barrier to be located around the curving south western, western and north western side of the sand screening and stockpile area, to reduce noise emission from this area to a level consistent with the RMNLs. A noise barrier height of 4m was established and this has been allowed for in subsequent noise modeling.

Noise modeling has demonstrated compliance with the RMNLs after 7am for all relevant houses, from activities anywhere within the pit once it is established.

Operation of an excavator and haul truck at exposed locations close to the natural surface in the western half of the pit has been predicted to result in noise levels 1-3 dB(A) above the recommended maximum noise level for the period 6-7am at one house,1353 Bass Highway located east of the highway north west of the site and north of Deep Creek.

At the nearest house to the pit, 1421 Bass Highway, compliance with the RMNL from 6-7am has been predicted once the bund has been established, provided that machinery is operating at the base of a nominally 5m high initial bench. The difference between this location and the house to the north west of the pit is due to the topography, whereby the hillside on which the pit is to be established slopes downwards towards the house at 1353 Bass Highway.

6.3 CONSTRUCTION NOISE

Early stage construction works, including the creation of a noise-reducing earth bund approximately 100m east of the house at 1421 Bass Highway, are predicted to result in noise levels around 60dB(A) for a limited duration. Such activities are only to be conducted after 7am, which is consistent with the EPA guidelines for construction noise.

7. NOISE CONTROL MEASURES

The following noise control measures are recommended in order to achieve compliance with guideline RMNLs at all residential locations at all stages of the sand quarry development.

These noise control measures have been developed on the basis of source noise data obtained from existing equipment. As the project proceeds over a number of years, machines capable of achieving the required functions while producing lower noise levels may be developed, and it may then be possible to review these recommendations.

7.1 Sand Screening and Stockpile Area Noise Barrier

A noise barrier to a total height of 4m relative to the level of the sand screening and stockpile area is recommended along the south western, western and north western sides of this area. This barrier can be a combination of earth bunding and solid panels to the required overall height

7.2 Site Activities to be Conducted Prior to 7am

The sequencing of site development and daily activities should be planned in order to avoid having excavators and haul trucks working at the existing ground surface level prior to 7am. In the western half of the pit in particular, machinery would need to be working at a level more than 5m below the edge of the pit in the direction towards any of the houses visible in Appendix Four in order to operate prior to 7am.

7.3 Reversing Beepers

Conventional reversing beepers have the potential to cause annoyance to residents and contribute to exceedance of recommended maximum noise levels at the residential locations around the site, due to the highly distinctive character and on-off nature of the noise.

All mobile equipment operating at the site should be fitted with the ‘new generation’ broadband reverse alarms, which vary their noise output according to the ambient noise level. These reversing alarms should be selected for the lowest noise level consistent with safe operation.

Product stockpiles and travel routes within the site should be configured so as to minimise any need for sales trucks to reverse.

8. OVERVIEW

A noise assessment has been conducted in order to identify potential impacts of noise emission from the proposed sand quarry operations at 1381-1395 Bass Highway Grantville. The assessment has been based on monitoring of the ambient noise environment in the vicinity of the nearest houses to the proposal and detailed modelling of noise emissions from the activities and equipment proposed for the site.

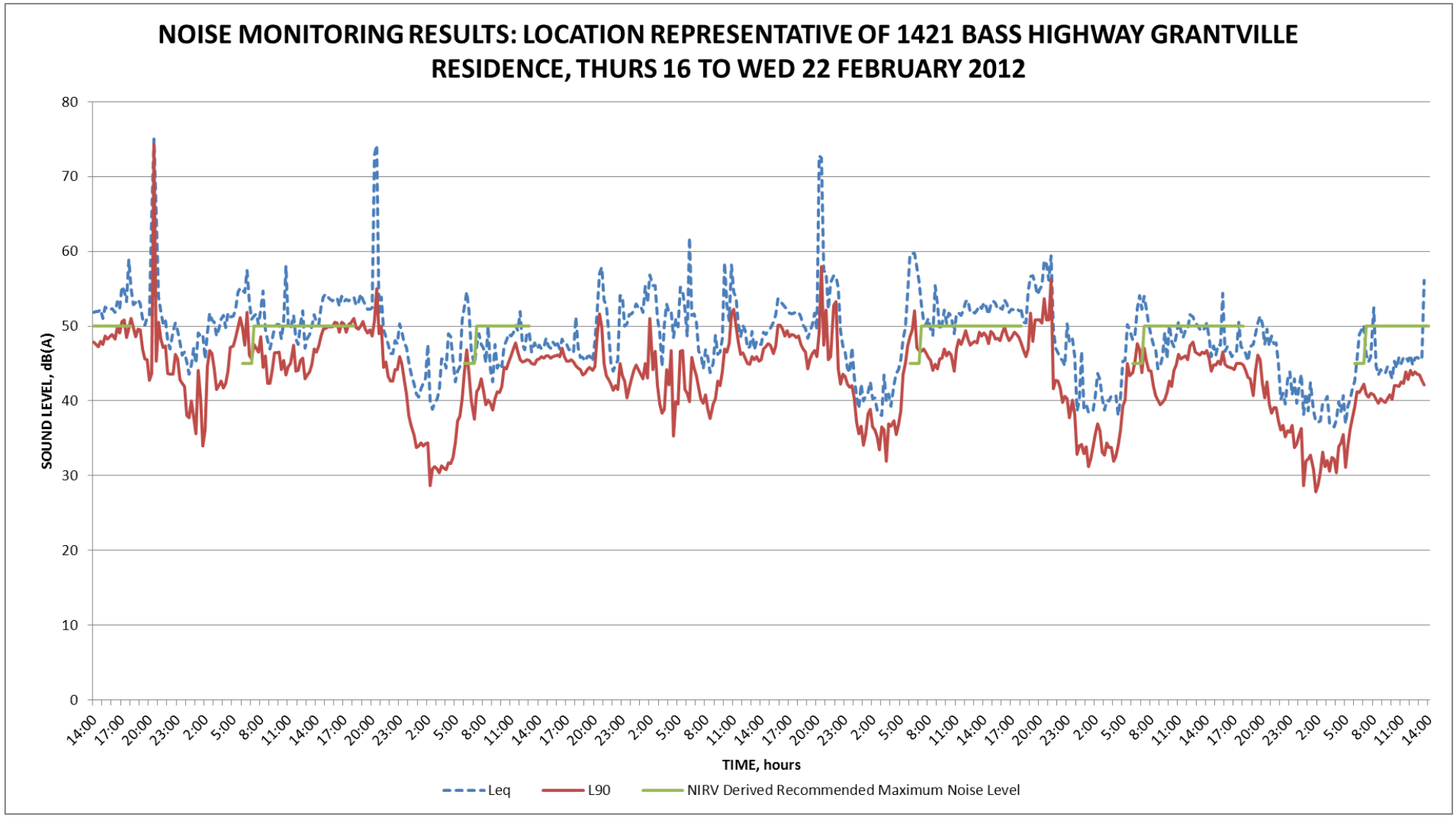
The noise assessment has been conducted in terms of Recommended Maximum Noise Levels determined in accordance with the EPA's recently released document *NOISE FROM INDUSTRY IN REGIONAL VICTORIA Recommended Maximum Noise Levels from Commerce, Industry and Trade Premises in Regional Victoria.*

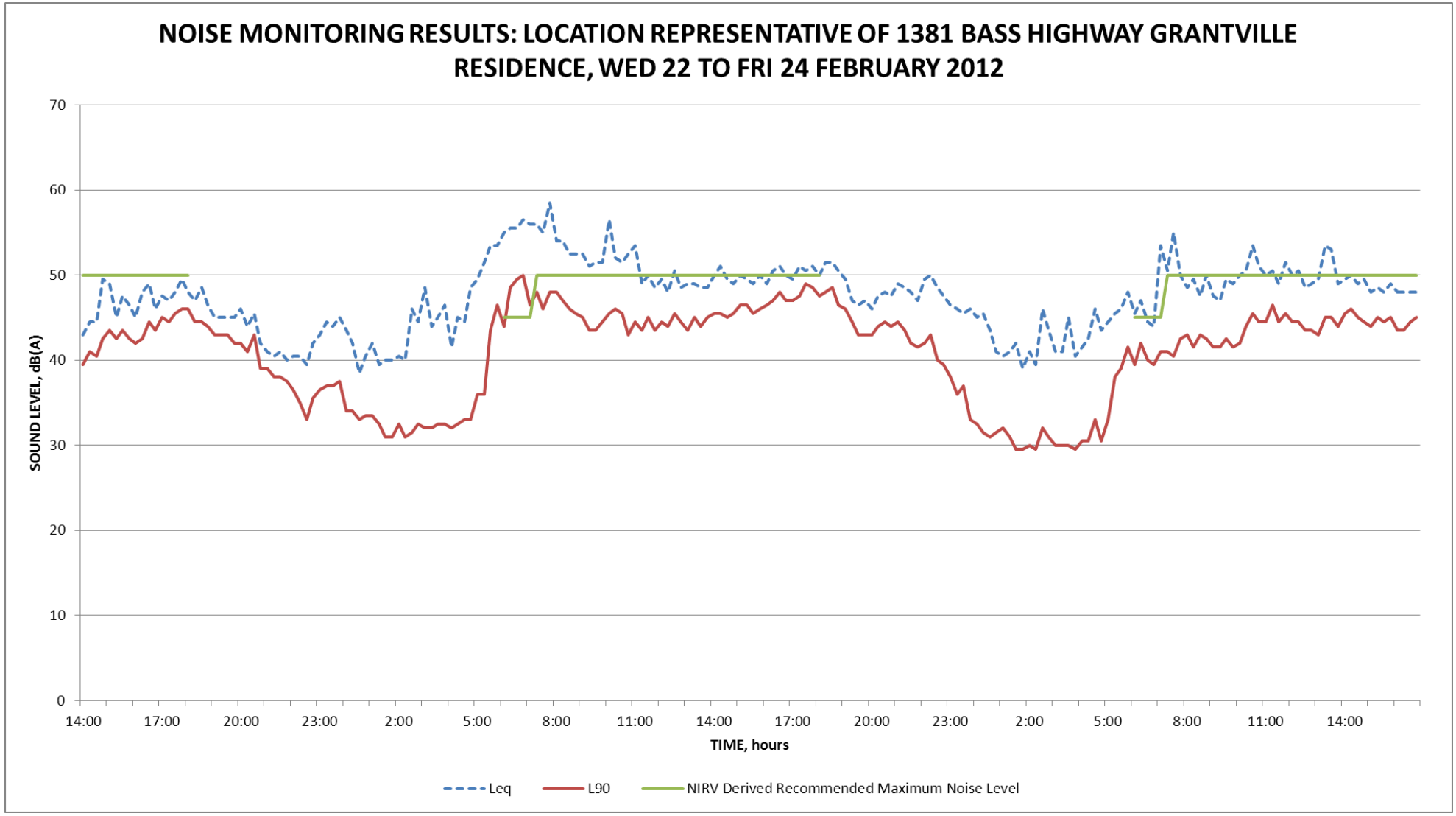
The noise modelling results have enabled the determination of noise control measures and strategies to allow the proposed sand quarry to be developed and operated while maintaining noise levels within the recommended maximum noise levels at all relevant residential locations.

NEVILLE GODDARD
WATSON MOSS GROWCOTT
acoustics pty ltd

APPENDIX ONE: AERIAL PHOTO SHOWING NOISE MONITORING LOCATIONS

APPENDIX TWO: NOISE MONITORING GRAPHICAL RESULTS




NOISE MONITORING RESULTS: LOCATION REPRESENTATIVE OF 1381 BASS HIGHWAY GRANTVILLE RESIDENCE, WED 22 TO FRI 24 FEBRUARY 2012
SOUND LEVEL, dB(A)
70
60
50
40
30
20
10
0
14:00
17:00
20:00
23:00
2:00
5:00
8:00
11:00
14:00
17:00
20:00
23:00
2:00
5:00
8:00
11:00
14:00
TIME, hours
Leq
L90
NIRV Derived Recommended Maximum Noise Level

APPENDIX THREE: DERIVATION OF RECOMMENDED MAXIMUM NOISE LEVELS IN ACCORDANCE WITH *NOISE FROM INDUSTRY IN REGIONAL VICTORIA - RECOMMENDED MAXIMUM NOISE LEVELS FROM COMMERCE, INDUSTRY AND TRADE PREMISES IN REGIONAL VICTORIA* (NIRV).

PROJECT: *Grantville Sand Quarry 1393-1395 Bass Hwy Grantville*

RECEIVER LOCATION: *1421 Bass Hwy Grantville*

EARTH RESOURCES STEP E1 — Earth resources levels

Use the following levels where the noise receiver is in a GWAZ, RCZ or RLZ (consult Table 1 for full zone terms):

Day	Evening	Night
45 dB(A)	38 dB(A)	33 dB(A)

Use the following levels where the noise receiver is in an IN3Z or SUZ (only where accommodation, other than caretaker's house, is prohibited in the SUZ):

Day	Evening	Night
51 dB(A)	46 dB(A)	41 dB(A)

Use the following levels where the noise receiver is in an IN1Z, IN2Z, B3Z or B4Z:

Day	Evening	Night
56 dB(A)	51 dB(A)	46 dB(A)

Use the following levels in all other situations:

Day	Evening	Night
46 dB(A)	41 dB(A)	36 dB(A)

No distance adjustment applies in any of the above situations.

Receiver Zoning: *FZ*

STEP ONE LEVELS: Day - *46* Evening - *41* Night - *36* dB(A).

EARTH RESOURCES STEP E2 — Background levels check and adjustment

Conduct a background level assessment in 'background -relevant areas.' Otherwise, apply the relevant earth resources levels as the recommended levels, considering the variations for mines, quarries and landfilling in Part 4. 'Background -relevant area' means a noise -sensitive area where background levels may be higher than usual for a rural area. This includes areas where freeway or

highway traffic is a significant audible background noise source. It also includes coastal areas, where representative background levels are elevated by surf.

Take the earth resources levels from Step E1 and compare them to the background levels, adopting the following for each period:

Day — the greater of —

- the step E1 noise level, or
- the day background level plus 8

Evening — the greater of —

- the step E1 noise level, or
- the evening background level plus 5

Night — the greater of —

- the step E1 noise level, or
- the night background level plus 5.

For existing earth resources, and new earth resources where Step E3 does not apply, the results of the above comparison become the recommended levels

See NIRV document for detailed rules.

Measured Background Level: Day – *42* Evening - Night – *41 (only 6-7am relevant)* dB(A) L_{90}.

Background Checked Level: Day – *50* Evening - Night - *46* dB(A).

Earth resources Step E3 — High traffic -noise areas

This step applies to background-relevant areas affected by high traffic-noise levels. It applies where the noise-sensitive area is not in an IN1Z, IN2Z, IN3Z, B3Z, B4Z or an SUZ (with accommodation a prohibited use in that SUZ). Compare the Earth resources Step E 2 level(s) against the following reference values.

Day	Evening	Night
55 dB(A)	50 dB(A)	45dB(A)

Consult Table 3 (over) to determine the recommended levels, considering each period separately (with consideration for the Mines, Quarries and Landfilling variations in Part 4).

Table 3: Determining recommended levels for high traffic-noise areas for earth resources sites

Result of comparing Step 4 level to reference value	Figure to apply as recommended level
Step E2 level is lower than the reference value	The Step E2 level
Step E2 level is equal to or greater than the reference value	The reference value
Step E2 level is greater than the reference value, and traffic noise LA_{eq} equals or is greater than the reference value +10	The lower of • The Step E2 level • The traffic noise LA_{eq} level -10

FINAL RECOMMENDED MAXIMUM NOISE LEVELS:

Day - ***50*** **Evening -** **Night -** ***45*** **dB(A).**

PROJECT: *Grantville Sand Quarry 1393-1395 Bass Hwy Grantville*

RECEIVER LOCATION: *In the vicinity of 1388 Bass Hwy Grantville, typical of houses within approx. 50m of the highway.*

EARTH RESOURCES STEP E1 — Earth resources levels

Use the following levels where the noise receiver is in a GWAZ, RCZ or RLZ (consult Table 1 for full zone terms):

Day	Evening	Night
45 dB(A)	38 dB(A)	33 dB(A)

Use the following levels where the noise receiver is in an IN3Z or SUZ (only where accommodation, other than caretaker's house, is prohibited in the SUZ):

Day	Evening	Night
51 dB(A)	46 dB(A)	41 dB(A)

Use the following levels where the noise receiver is in an IN1Z, IN2Z, B3Z or B4Z:

Day	Evening	Night
56 dB(A)	51 dB(A)	46 dB(A)

Use the following levels in all other situations:

Day	Evening	Night
46 dB(A)	41 dB(A)	36 dB(A)

No distance adjustment applies in any of the above situations.

Receiver Zoning: *R1Z*

STEP ONE LEVELS: Day - *46* Evening - *41* Night - *36* dB(A).

EARTH RESOURCES STEP E2 — Background levels check and adjustment

Conduct a background level assessment in 'background -relevant areas.' Otherwise, apply the relevant earth resources levels as the recommended levels, considering the variations for mines, quarries and landfilling in Part 4. 'Background -relevant area' means a noise -sensitive area where background levels may be higher than usual for a rural area. This includes areas where freeway or highway traffic is a significant audible background noise source. It also includes coastal areas, where representative background levels are elevated by surf.

Take the earth resources levels from Step E1 and compare them to the background levels, adopting the following for each period:

Day — the greater of —

- the step E1 noise level, or
- the day background level plus 8

Evening — the greater of —

- the step E1 noise level, or
- the evening background level plus 5

Night — the greater of —

- the step E1 noise level, or
- the night background level plus 5.

For existing earth resources, and new earth resources where Step E3 does not apply, the results of the above comparison become the recommended levels

See NIRV document for detailed rules.

Measured Background Level: Day – *47* Evening - Night – *46 (only 6-7am relevant)* dB(A) L_{90}.

Background Checked Level: Day – *55* Evening - Night - *51* dB(A).

Earth resources Step E3 — High traffic -noise areas

This step applies to background-relevant areas affected by high traffic-noise levels. It applies where the noise-sensitive area is not in an IN1Z, IN2Z, IN3Z, B3Z, B4Z or an SUZ (with accommodation a prohibited use in that SUZ). Compare the Earth resources Step E 2 level(s) against the following reference values.

Day	Evening	Night
55 dB(A)	50 dB(A)	45dB(A)

Consult Table 3 (over) to determine the recommended levels, considering each period separately (with consideration for the Mines, Quarries and Landfilling variations in Part 4).

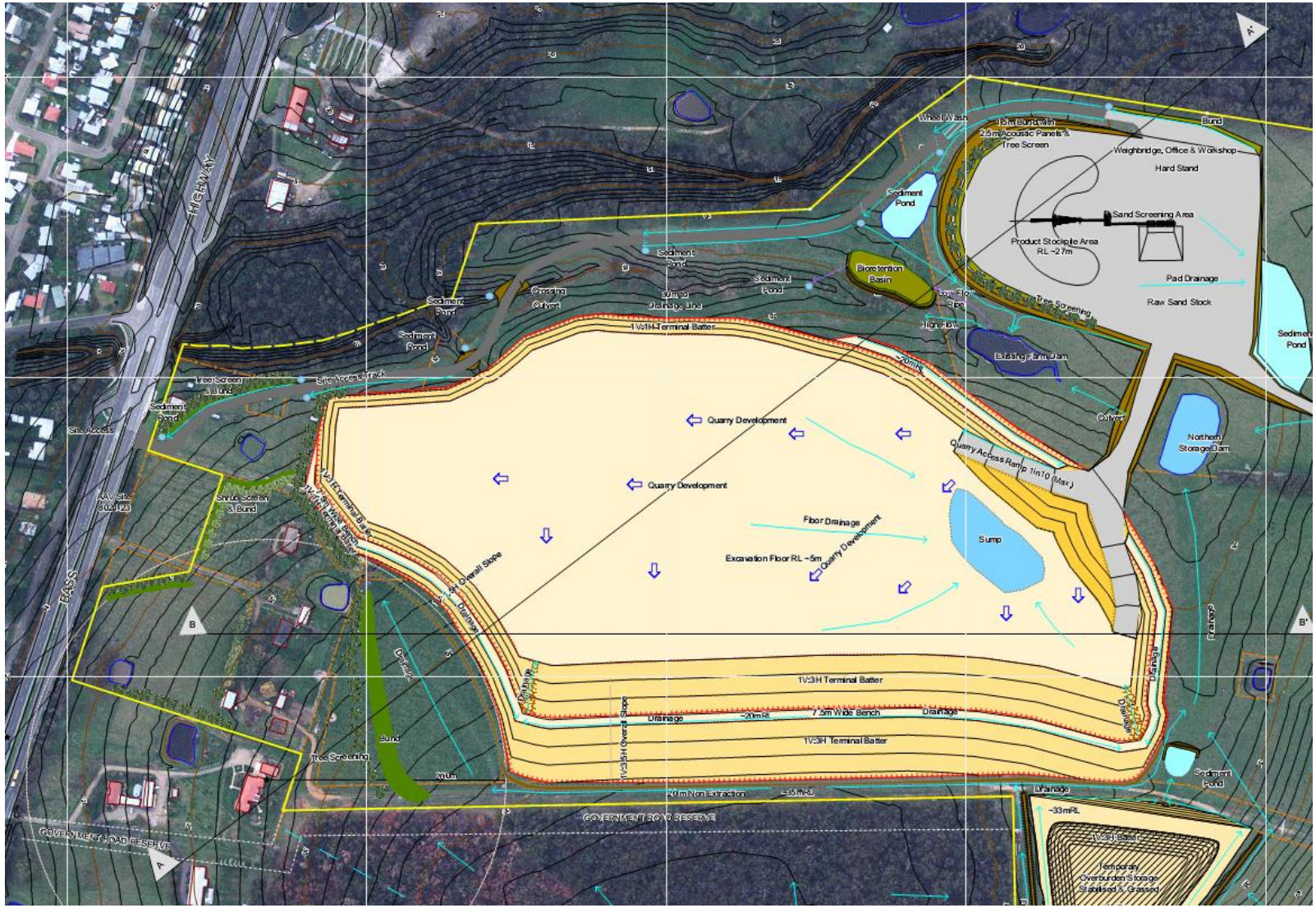
Table 3: Determining recommended levels for high traffic-noise areas for earth resources sites

Result of comparing Step 4 level to reference value	Figure to apply as recommended level
Step E2 level is lower than the reference value	The Step E2 level
Step E2 level is equal to or greater than the reference value	The reference value
Step E2 level is greater than the reference value, and traffic noise LA_{eq} equals or is greater than the reference value +10	The lower of • The Step E2 level • The traffic noise LA_{eq} level -10

FINAL RECOMMENDED MAXIMUM NOISE LEVELS:

Day - ***55*** **Evening -** **Night -** ***45*** **dB(A).**

APPENDIX FOUR: PLAN SHOWING PROPOSED QUARRY SITE IN RELATION TO NEARBY HOUSES



APPENDIX FIVE: SOURCE NOISE DATA

NOISE SOURCE	SOUND POWER LEVEL (dB re. 1pW) IN OCTAVE FREQUENCY BANDS (Hz)								CORRESPONDING SOUND PRESSURE LEVEL AT 20m, dB(A)
	63	125	250	500	1000	2000	4000	dB(A)	
HAUL TRUCK	113	104	103	103	103	100	90	107	73
EXCAVATOR	112	116	106	101	100	101	92	111	77
CAT WHEELED LOADER	119	113	103	100	101	95	90	105	71
DRY SCREEN	111	106	105	101	98	97	93	105	71
ROAD TRUCK	113	107	102	100	99	98	91	104	70

APPENDIX 7 Air Quality – Dust Assessment

Dandy Premix Quarries Pty Ltd

PROPOSED SAND EXTRACTION
1381-1395 BASS HIGHWAY
GRANTVILLE

DUST ASSESSMENT

Revision 01

22 May 2012

Environmental Science Associates
135 Butlers Lane, Glenlyon 3461

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1. INTRODUCTION

Environmental Science Associates (ESA) was retained by Dandy Premix Quarries Pty Ltd (DPQ) to undertake an assessment of dust control measures to be implemented at DPQ's proposed sand extraction project at Grantville. The project is the subject of a Work Authority Application for Extractive Industry Work Authority No 1488.

1.1 Background

DPQ lodged a Draft Work Plan for the project with the Department of Primary Industries (DPI) in May 2012. This followed a Stakeholder Consultative Meeting including a site visit on 8 March 2012. All relevant DPI referral agencies and the Bass Coast Shire Council were in attendance. PQ has also consulted with a number of the neighbouring property owners and the local Bass Coast Shire Council's Leadbeater Ward councillor regarding the development proposal.

In addition to the above, DPQ will be conducting broader community consultation as part of the Planning Permit application process following DPI Work Plan endorsement. This consultation will include an advertised public meeting and may extend to individual meetings with local residents, environmental and special interest groups.

Under the Mineral Resources (Sustainable Development) Act 1990, DPI requires Work Authority holders to implement an ongoing Community Engagement Plan which includes the management of any community complaints and their resolution. This process includes the recording of any off-site dust complaints from the community and the timing and manner of their resolution.

1.2 The Site

The project will be undertaken on DPQ's land at 1381-1395 Bass Highway, Grantville. Relevant site boundaries are shown on the Draft Development Plan which is reproduced as Attachment 1. All extraction, processing and stockpiling operations will be conducted on what is currently cleared grazing land, which rises from the Deep Creek riparian zone in the north to a maximum elevation of approximately 37 m at the southern edge of the extraction zone.

1.3 Zoning and Nearby Land Uses

The site (including the WA 1488WA area) is within an extensive Farming Zone (FZ) which extends to the east from the Bass Highway. The Grantville Residential 1 Zone is located on the western side of the highway (approximately 200 m from proposed extraction area. The two nearest off-site dwellings are situated in the FZ: approximately 200 m to the southwest (at 1421 Bass Highway); and about 230 m to the northwest (at 1353 Bass Highway). A small Low Density Residential Zone, supporting a few dwellings accessed from the highway via Shackleford Rise, is located about 330 m to the southwest. A bushland reserve (zoned PCRZ) is situated between the southern boundary of the proposed extraction area and a Special Use 2 Zone (further to the south) which supports a major sand extraction operation.

2. OUTLINE OF PROPOSAL

The Draft Development Plan (dated 17 May 2012) has been prepared by Bell Cochrane & Associates. The proposed operation will involve the (dry) extraction of sand, dry blending of in-situ and imported sands, and the stockpiling and export of various grades of sand for use in concrete production and by the construction industry (there will be no retail sales from the site). The main development works (with the exception of the site access track) will commence towards the eastern end of the operations area (refer to Attachment 1).

Relevant aspects of the proposal are outlined below:

- progressive removal of overburden, which will initially be used as base material in the construction of the site access track and processing area, and for screening bunds;
- overburden will subsequently be used to create the final terminal pit faces after extraction;
- establishment of a temporary overburden stockpile (approximately 2 ha in size) adjacent to the southeast corner of the extraction area;
- sealing of the site access track between the Bass Highway and the processing and stockpile area;
- dry extraction of sand to a base level of about 5 m AHD with a maximum pit extent of approximately 20 ha (the extraction rate is projected to initially be about 200,000 tonnes per year (t/y) and could increase to approximately 500,000 t/y by year 3);

- construction of gravel haul roads between the pit, processing area and temporary overburden stockpile;
- installation and operation of feed bins, a trommel, screens and radial stacker for blending and stockpiling specific grades of sand (all potentially dusty equipment will be equipped with water sprays for dust control);
- establishment of vegetated screening bunds to the west of the pit;
- development of surface water management facilities; and
- construction of an office, shed and weighbridge.

3. POTENTIAL DUST SOURCES

Experience with dust management at a range of extractive industry and mining operations indicates that the main potential dust sources at DPQ's Grantville operation (if uncontrolled) will be: (1) overburden removal and placement (during periods when soil moisture is low); (2) movement of trucks and loaders on haul roads and in the processing area; (3) blending, screening and stockpiling sand; and (4) suspension of dust from any bare, exposed and erodible surfaces by strong winds. There will also be a potential for some short-term dust emissions associated with the establishment of screening bunds if this work is carried out during dry weather conditions.

Samples of the DPQ Grantville sand resource have undergone particle sieve and clay fine silts analysis to determine processing, blending and finished product use. The majority of the sand to be mined is a very clean, free running resource with a low to negligible clay silt content. Particle sizes mainly vary from fine through to medium with a reasonable percentage of medium/coarse and a low percentage retention of coarse particles. The sand resource to be extracted does not contain a significant level of very fine, talc like material.

These results confirm there is no requirement to wash the sand for use in concrete and numerous other construction applications. The absence of a wash plant (which would otherwise result in the generation of dust from dried clay tailings) reduces the potential for dust emissions. This analysis also confirmed the suitability of a dry blend processing operation.

As discussed below, DPQ's dust control management plan has been designed to provide a high degree of dust control through a range of measures, including proactive initiatives triggered by predicted adverse weather conditions.

4. EPA BUFFER DISTANCES GUIDELINES

EPA Publication AQ 2/86 lists buffer distance guidelines for a wide range of operations which have the potential to impact on local amenity through emissions to atmosphere (including odours)[1]. The publication recommends a buffer distance of 200 m for quarrying of "any material without blasting", and notes that this distance is to be measured between the [main] potential emission source(s) and sensitive land

[1] EPA (July 1990). "Recommended buffer distances for industrial residual air emissions" Publication No. AQ 2/86.

uses (such as residentially-zoned land or an isolated dwelling in a non-residential zone).

These guidelines are not mandatory and Publication AQ 2/86 provides for them to be varied, where appropriate, to account for factors such as the nature and scale of the operation, the standard of environmental management, local topography, meteorology and vegetation, and complaint history (in the case of existing operations). It is also relevant to consider the zoning and land use associated with potential receptors.

5. LOCAL WINDS

The closest Bureau of Meteorology (BOM) wind recording station is at Wonthaggi, which is about 23 km to the SSE. Figure 1 is a windrose prepared by the BOM, based on 42 year's observations at 3 pm at Wonthaggi (the 3 pm data provide the most relevant information on winds during periods of the day when the site will be operational).

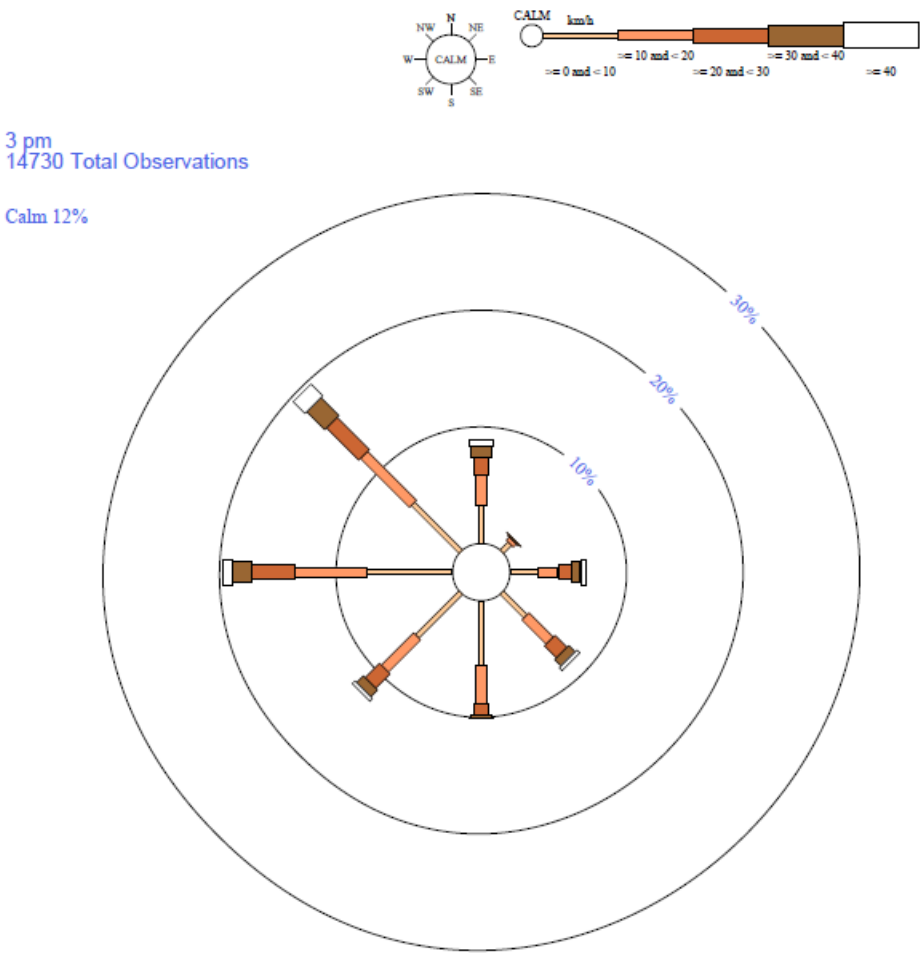


Figure 1. BOM Windrose for 3 pm Winds at Wonthaggi

The frequency of occurrence of calms is 12%, while the predominant winds are from the northwest and west sectors (each with a frequency of occurrence of about 20%. In contrast, winds from the northeast (which would place DPQ's proposed operations upwind from the nearest dwelling) occur for only about 2.5% of the time. Similarly, the frequency of winds from the east and southeast (which would place DPQ's proposed operations upwind from the nearest parts of the Grantville township) are relatively infrequent.

It is also relevant that weather conditions which have the greatest potential to generate elevated dust emissions during the summer and autumn months are strong, hot winds from the north to northwest sector.

6. RELEVANT AIR QUALITY REQUIREMENTS

This section reviews air quality requirements which are directly applicable to DPQ's proposed Grantville sand extraction operation.

Schedule A of [SEPP (AQM)] defines design ground level criteria for particulate (dust) emissions from point sources; however, these criteria are not applicable to emissions from area or diffuse sources at quarries.

The Protocol for Environmental Management for Mining and Extractive Industry[2] (the PEM) is an incorporated document of EPA's State Environment Protection Policy (Air Quality Management). The PEM sets out the requirements for assessment and management of emissions from the mining and extractive industries. Relevant provisions of the PEM are summarised below:

Section 1.1 of the PEM notes that:

> *"An air quality assessment in accordance with this PEM is required only for proposals requiring an Environment Effects Statement or an EPA Works Approval and Licence or where specifically required by DPI. DPI are likely to request an air quality assessment only when activities that are likely to generate increased emissions of the indicators specified in this PEM or will have significantly increased emissions at sensitive locations".*

The PEM does not require monitoring for suspended particulates at sites where air quality assessments are not required (Section 6.2). However, Section 4 notes that:

> *"Deposited dust is an indicator of the effectiveness of site management practices and the potential for off-site nuisance - - Results of monitoring* [at upwind and downwind locations] *should not exceed 4 g/m^2/month (no more than that 2 g/m^2/month above background) as a monthly average".*

DPQ's proposed dust management plan (reproduced in Attachment 2 and discussed below) includes monitoring of dust deposition rates at two locations on the site boundary to be selected in consultation with DPI.

2 EPA (December 2007). "Protocol for Environmental Management for Mining and Extractive Industry". EPA Publication 1191.

7. EXPERIENCE WITH SIMILAR OPERATIONS

My experience in environmental investigations at numerous quarries and mines over the past 25 years indicates that, while there is a widely-held community perception that such sites are major dust sources, this is not the case for well-managed operations.

One of the most important factors which determines the extent of off-site dust emissions from a particular operation is the calibre of the site management, and their level of commitment to conduct an environmentally sound operation and protect the amenity of nearby landowners. A good site manager will make use of weather forecasts (10-day climate models are readily available on-line in the form of "meteorograms", which present 6-hourly predictions (for the next 10 days) of a range of parameters, including temperature, relative humidity, rainfall, and wind speed and direction). Reference to the meteorograms enables pro-active control measures to be implemented in advance of potentially adverse weather situations.

Such measures can include increasing water application rates in advance of hot windy conditions, and deferring or curtailing some site operations during adverse weather conditions. Good managers are also pro-active in seeking to establish good relations with neighbours and have effective systems in place to record and respond to any complaints (including modifying operations where appropriate to minimise dust emissions).

This approach invariably results in substantially lower off-site dust levels as compared with operations where a low priority has been placed on protecting local amenity during design, development or operational stages.

My contact with DPQ personnel indicates that they are well aware of the need to minimise off-site dust emissions, and have demonstrated a commitment to implement proactive measures as required to protect local amenity at a major hard rock quarry.

8. DPQ's DUST CONTROL MANAGEMENT PLAN

DPQ's draft dust control management plan is provided as Attachment 2. The provisions of the plan are summarised below.

1. **Air Quality (Dust Control) Objectives and Performance Indicators**
   - The applicable objectives are: (1) to ensure that no visible dust emissions are detected beyond the site boundaries; and (2) to ensure that dust emissions comply with relevant guidelines in EPA's Mining and Extractive Industries PEM.
   - Corresponding performance indicators are: (1) visual observations of dust beyond; and (2) measured dust deposition rates at the site boundary.

2. Dust Control Program

- Trafficable Areas:
  - Water will be applied to trafficable areas through the use of a water tanker truck fitted with spray bars and a cannon, fixed sprays and sprinkler systems;
  - Water will be applied proactively as a dust control measure before the onset of potentially dusty weather conditions (based on Bureau of Meteorology weather predictions);
  - Approved chemical dust suppressants may also be applied where appropriate to enhance dust control and to reduce the volume of water required for effective dust control;
  - All Haul Truck movements will be kept to designated haul routes to minimise the extent of trafficked areas; and
  - Ancillary and administrative vehicle speeds on-site will be limited to 25 kilometres per hour (kph).

- Truck Movements – Entry & Exit to Site:
  - The site entry and exit to the Bass Highway will be sealed and swept as required to control the accumulation of dust;
  - Loads will be covered or be wet-down as required to prevent dust emissions;
  - The tailgates of all trucks leaving the site will be securely closed; and
  - Where sediment or mud is deposited on a public road, this will be cleaned-up immediately by DPQ.

- Plant and Processing Hard Stand Area:
  - Surfaces on which front-end wheel loaders operate will be treated with water (including dust suppressants where appropriate);
  - Loader operations will be conducted in a manner designed to minimise dust generation;
  - Periodic watering of the remainder of the Plant and Processing Hard Stand Area will be undertaken as required;
  - Water sprays will be installed, fully maintained and used whenever the screening and blending plant is operating; and
  - All sections of the Hard Stand Area shall be kept in a clean and tidy condition at all times.

- Stockpiles:
  - Sprinklers will used to apply water to the raw sand and finished product stockpiles as required to minimise dust generation;
  - Approved dust suppressants may be used to seal surfaces and minimise dust emissions
  - Sprinklers shall have the ability to operate out of working hours; and
  - The DPQ Grantville Site Quarry Manager/Supervisor will monitor the condition of the stockpiles.

- Site Supervision:
  - The Manager/Supervisor will monitor those areas and operations of the site that have the potential to generate dust - all staff will be required to immediately advise the Quarry Manager/Supervisor if they observe significant dust generation.

- Contingencies:
  - During those times of the year with higher evaporation rates (September – April) 10-day Bureau of Meteorology climate model of meteorograms will be downloaded to provide advance warning of strong winds and very hot weather conditions - this will assist with the daily and proactive management of dust suppressant measures, which may include the suspension of extraction and screening and blending operations for the duration of the adverse weather conditions;
  - Where strong winds are forecast which will place operations upwind from nearby sensitive uses, proactive dust suppression measures will be implemented; and
  - If off-site dust emissions are observed, or indicated by elevated dust deposition monitoring data, additional/proactive dust suppression measures will be implemented until such time as effective dust control is achieved or conditions abate.

- Scheduling Potentially Dusty Operations:
  - Potentially dusty operations, such as overburden removal and placement, and installation of screening bunds will, whenever practicable, be conducted between the Autumn break and the end of November (this may not be possible in the case of the initial development works in Year 1, which will be predominately towards the eastern end of the development).

- Dust Monitoring
  - The dust monitoring program is designed to facilitate an adaptive management approach to the control of dust;
  - The Quarry Manager/Supervisor will undertake daily visual site inspections for dust generation including an assessment of the dust suppression measures;
  - Two dust deposition gauges will be located on the DPQ Grantville Sand Quarry site boundaries at locations to be determined in consultation with DPI. The results of monthly sampling will be used to assess compliance with the PEM dust deposition guidelines. This monitoring may be discontinued after a period of 24 months, subject to compliance with the PEM guidelines.

9. POTENTIAL EFFECTS ON LOCAL AMENITY

My assessment of DPQ's proposed Grantville project is that, providing the dust control management plan (Attachment 1) is implemented, dust emissions should not have any significant adverse impacts on local amenity. Key factors which led me to this conclusion include:

- the nearest sensitive land uses are located beyond EPA's recommended 200 m buffer distance from operations;
- local winds are predominantly from the west and northwest sectors, which will place the operation downwind of the nearest sensitive uses – in particular, weather conditions which have the greatest potential to generate elevated dust emissions during the summer and autumn months are strong, hot winds from the north to northwest sector;
- the measures and safeguards set out in DPQ's dust control management plan are comprehensive, achievable and more stringent than those described in EPA's Best Practice Management Guidelines for Major construction Sites[3];
- the assessment of hydrological assessment prepared by Neil M Craigie Pty Ltd[4] estimated that the peak annual water demand for dust control will be 35 ML, which represents only about 16% of the mean annual runoff from the tributary catchment which drains through DPQ's site;
- importantly, the dust control management plan provides for operations to be suspended during extreme weather conditions which could result in significant off-site dust emissions upwind from nearby sensitive uses; and
- dustfall monitoring will provide an indication of the contribution of the operation to dust deposition rates at the site boundary.

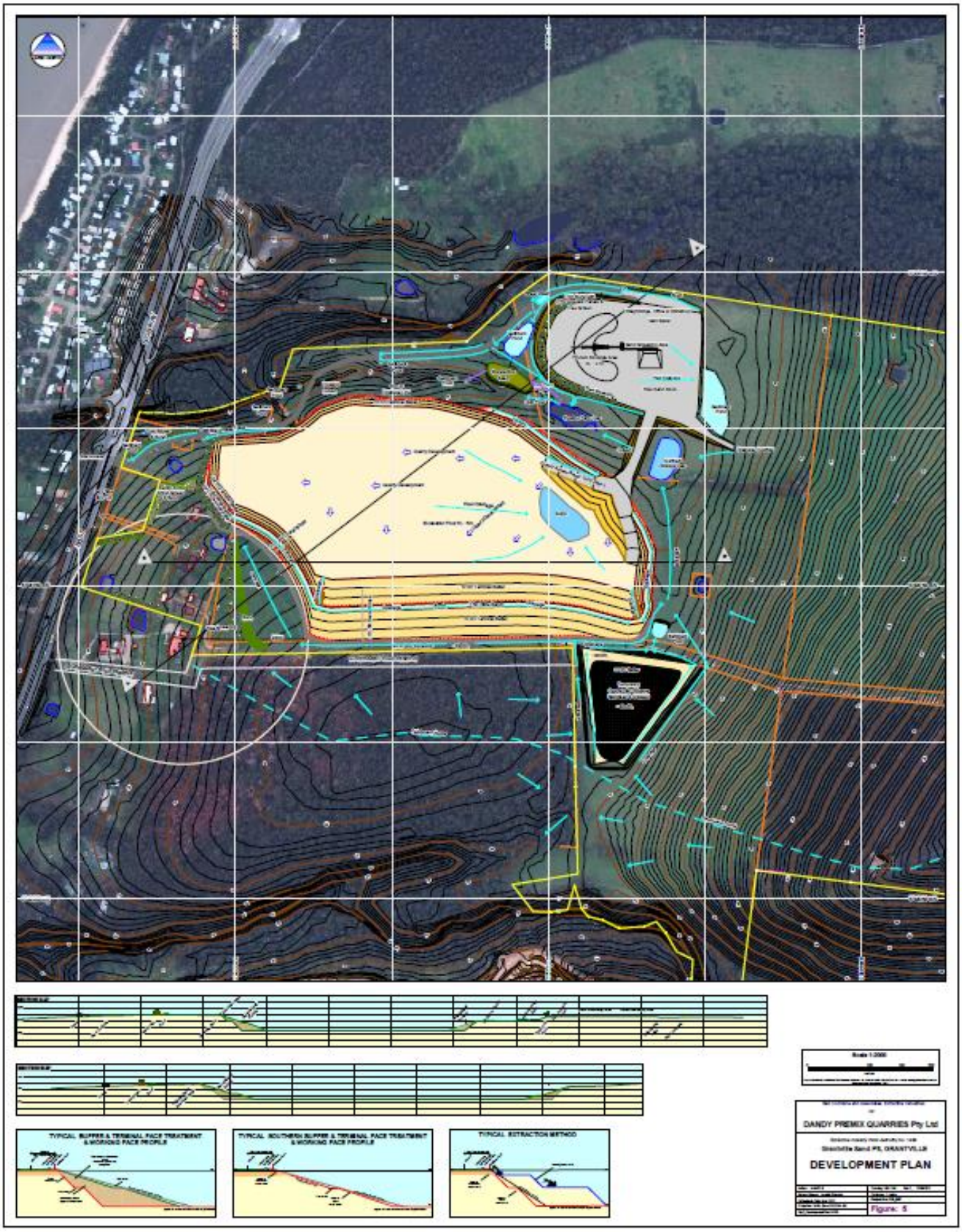
(Dr) Terry Bellair FVEPLA, FEIANZ

22 May 2012

[3] EPA (December 1995). "Environmental Guidelines for Major construction Sites". Best Practice Management Guidelines Series, Publication 480.

[4] Neil M Craigie Pty Ltd (May 2012). "WA No 1488, Sand Extraction Project Proposal, 1393-1395 Bass Highway, Grantville - Drainage and water quality management". Prepared for DPQ.

ATTACHMENT 1. DRAFT DEVELOPMENT PLAN



ATTACHMENT 2. DPQ's DRAFT DUST CONTROL MANAGEMENT PLAN

DPQ GRANTVILLE SAND QUARRY
DRAFT DUST CONTROL MANAGEMENT PLAN 21 May 2012

1. Air Quality (Dust Control) Objectives and Performance Indicators

The Dandy Premix Quarries Grantville Sand Quarry site objectives applicable to air quality and dust control are:

- ***To ensure that no visible dust emissions generated by the quarry operations are detected beyond the site boundaries; and***

- ***To ensure that dust emissions comply with relevant guidelines in the Mining and Extractive Industries PEM.***

Corresponding performance indicators to be used to monitor the achievement of these objectives are:

- Visual observations of dust beyond the quarry site boundary; and
- Measured dust deposition rates as recorded through the site monitoring program in accordance with the operational control requirements of the PEM.

2. Dust Control Program

Dust will be controlled by implementation of the actions below:

Trafficable Areas:

- Water will be applied to trafficable areas around the processing plant, raw sand and finished product stockpiles on the Hard Stand Area through the use of a water tanker truck fitted with spray bars and a cannon, fixed sprays and sprinkler systems;

- Water will be applied to designated Haul Roads by fixed sprinklers where road moisture content is low and dust would otherwise be generated from Haul Truck passage;

- Water will be applied proactively as a dust control measure before the onset of potentially dusty weather conditions (based on Bureau of Meteorology weather predictions);

- Approved chemical dust suppressants may also be applied where appropriate to enhance dust control and to reduce the volume of water required for effective dust control;

- All Haul Truck movements will be kept to designated Haul Roads to minimise the extent of trafficked areas; and

- Ancillary and administrative vehicle speeds on-site will be limited to 25 kilometres per hour (kph).

Truck Movements – Entry & Exit to Site:

- The DPQ Grantville site entry and exit to the Bass Highway will be sealed (paved) and swept as required to control the accumulation of dust;

- Loads will be covered or be wet-down when required to prevent the emission of dust from materials being transported;

- The tailgates of all trucks leaving the site will be securely closed to prevent any loss of materials; and

- Where sediment or mud is deposited on a public road, this will be cleaned-up immediately by DPQ.

Plant and Processing Hard Stand Area:

- Surfaces on which front-end wheel loaders operate will be treated with water (inclusive of approved chemical dust suppressants where appropriate) to ensure minimal dust generation;

- Loader operators are trained and will operate in accordance with their training to fill bins, hoppers, stockpiles and delivery trucks in a manner that minimises dust generation;

- Approved chemical dust suppressants may be applied to the most trafficked sections of the sales (loading) and sand processing Hard Stand Area;

- Periodic watering of the remainder of the Plant and Processing Hard Stand Area is to be undertaken with a water tanker truck as required;

- Water sprays will be installed, fully maintained and used whenever the screening and blending plant , including the raw feed bins and the radial conveyor (transfer) stacker are operating; and

- All sections of the Hard Stand Area including the sales loading, weighbridge and the screening and blending plant shall be kept in a clean and tidy condition at all times.

Stockpiles:

- Sprinklers will be maintained and operated to apply water to the surfaces of the raw sand and finished product stockpiles as required to minimise dust generation;

- Approved chemical dust suppressants may be used to seal surfaces and minimise dust emissions where appropriate;

- Sprinklers shall have the ability to operate out of working hours if required; and

- The DPQ Grantville Site Quarry Manager/Supervisor will monitor the condition of the stockpiles.

Site Supervision:

- The DPQ Grantville Quarry Manager/Supervisor will monitor those areas and operations of the site that have the potential to generate dust to ensure dust control actions are being satisfactorily undertaken as required to mitigate and/or minimise dust generation. All staff will be required to immediately advise the Quarry Manager/Supervisor if they observe significant dust generation.

Contingencies:

- During those times of the year with higher evaporation rates (September – April) the DPQ Grantville Quarry Manager/Supervisor will download 10-day Bureau of Meteorology climate model predictions (available in the form of meteorograms to “Weatherzone” subscribers) which provide advance warning of likely strong winds and very hot weather conditions. This will assist with the daily and proactive management of dust suppressant measures. These

measures may include the suspension of extraction and screening and blending operations for the duration of the adverse weather conditions.

- Where strong winds are forecast which will place operations upwind from nearby sensitive uses, the DPQ Grantville Quarry Manager/Supervisor shall implement proactive dust suppression measures such as undertaking additional dust suppression of stockpiles and haul routes; and

- If off-site dust emissions are observed or indicated by elevated dust deposition monitoring data, additional/proactive dust suppression measures will be implemented. These may include:

    - Increased use of water and approved chemical dust suppressants;
    - A reduction of all vehicle speeds on site; and
    - The suspension of works in the area generating the dust;

  Until such time as effective dust control is achieved or conditions abate.

Scheduling Potentially Dusty Operations:

- Potentially dusty operations, such as overburden removal and placement, and installation of screening bunds will, whenever practicable, be conducted between the Autumn break and the end of November (this may not be possible in the case of the initial development works in Year 1, which will be predominately towards the eastern end of the development).

3. Dust Monitoring Actions

The DPQ Grantville Sand Quarry dust monitoring program is designed to facilitate an adaptive management approach to the control of dust. The monitoring of dust generation and dust emissions will be undertaken as follows:

- The DPQ Grantville Quarry Manager/Supervisor will undertake daily visual site inspections for dust generation including an assessment of the dust suppression measures in operation at the time of inspection;

- Two dust deposition gauges will be located on the DPQ Grantville Sand Quarry site boundaries at locations to be determined in consultation with DPI. The results of monthly sampling will be used to assess compliance with the PEM dust deposition guidelines. This monitoring may be discontinued after a period of 24 months, subject to compliance with the PEM guidelines.

APPENDIX 8 Landscape and Visual Impact Assessment

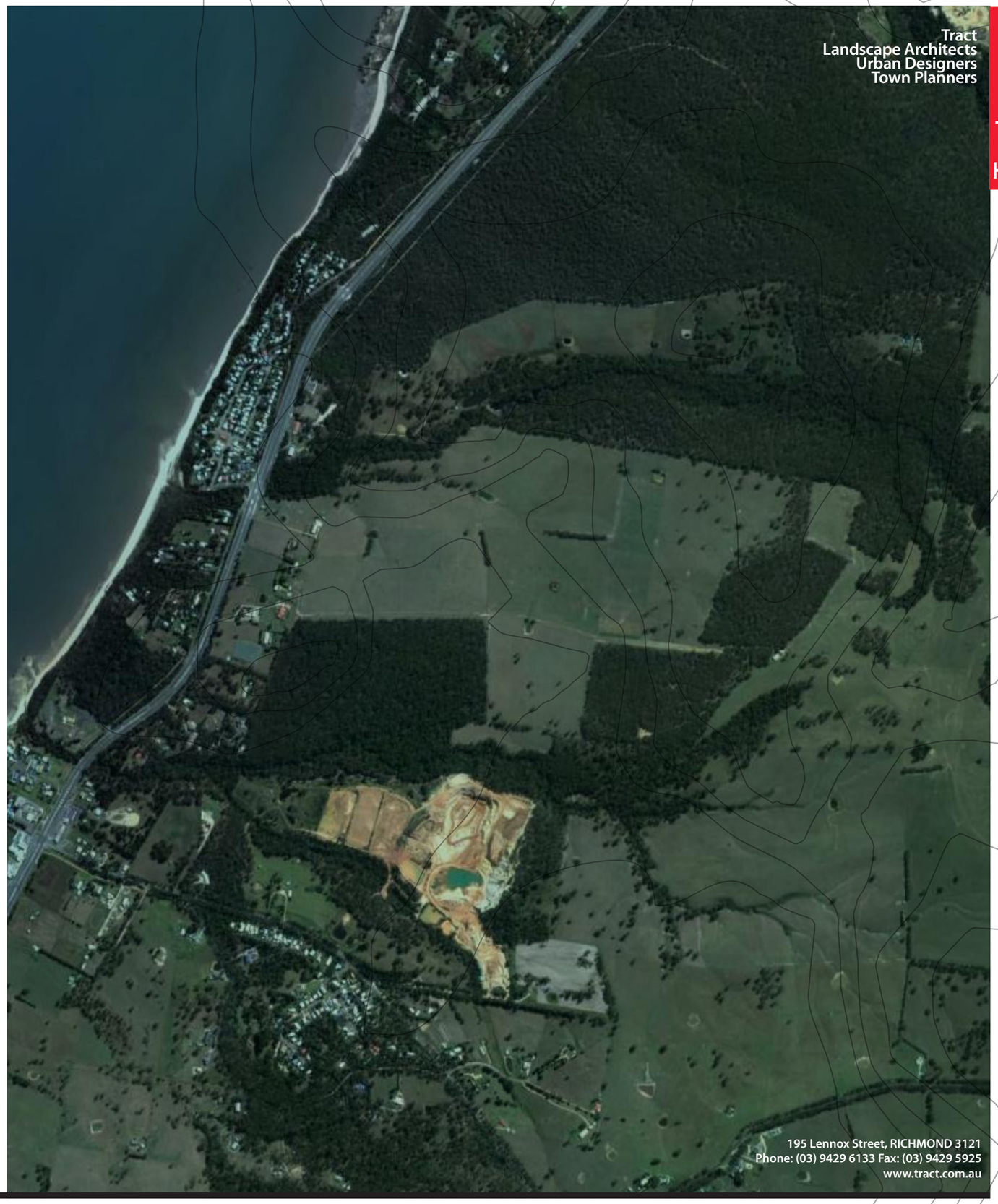
Grantville Sand Pit

Preliminary Landscape and Visual Impact Investigation

For Dandy Premix

Prepared by Tract Consultants

0311-0551 PR01_00 MAY 2012



Tract
Landscape Architects
Urban Designers
Town Planners

Tract

195 Lennox Street, RICHMOND 3121
Phone: (03) 9429 6133 Fax: (03) 9429 5925
www.tract.com.au

Overview

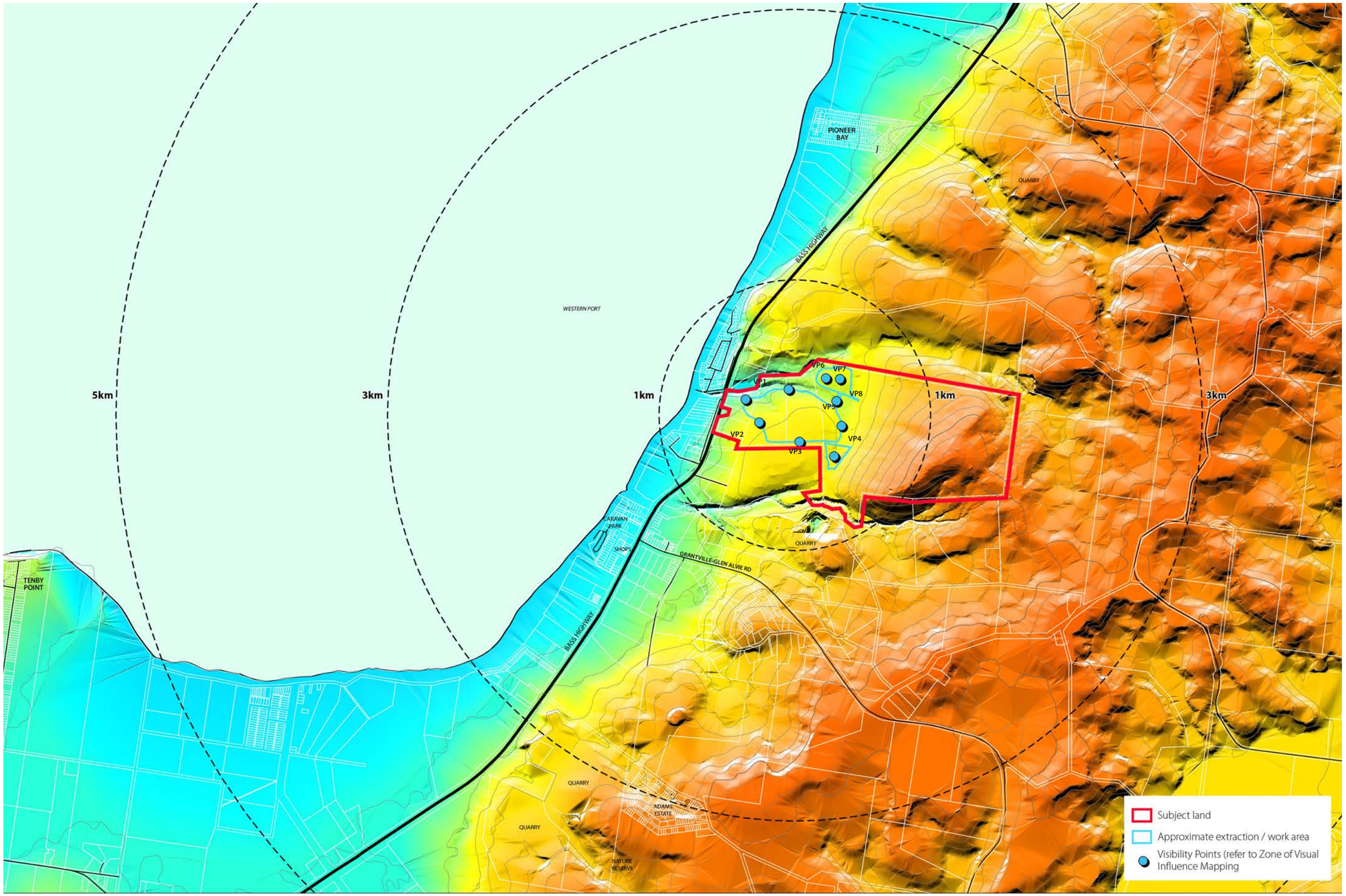
Tract Consultants were engaged by Dandy Premix to undertake a landscape and visual impact assessment of the proposed sand quarry at Grantville. This report provides a preliminary investigation of the potential landscape and visual impact of the quarry on surrounding areas.

Zone of Visual Influence mapping has been undertaken as part of the investigation to determine locations (receptor points) where the quarry could potentially be visible. This modelling was undertaken with and without trees to establish a worst case scenario. This mapping identified four potential areas where the quarry may be visible.

These locations were investigated further through a site visit to determine whether or not the quarry would be visible. From the site visits only one location was identified as having potential visibility of the quarry. This was the view from the Shuntoff (Camera Point 4) where the proposed stockpile area may have negligible level of visibility however this would need to be confirmed through further modelling.

Visibility of the quarry from other locations is screened by vegetation within the road reserve, vegetation within the broader landscape or landform.

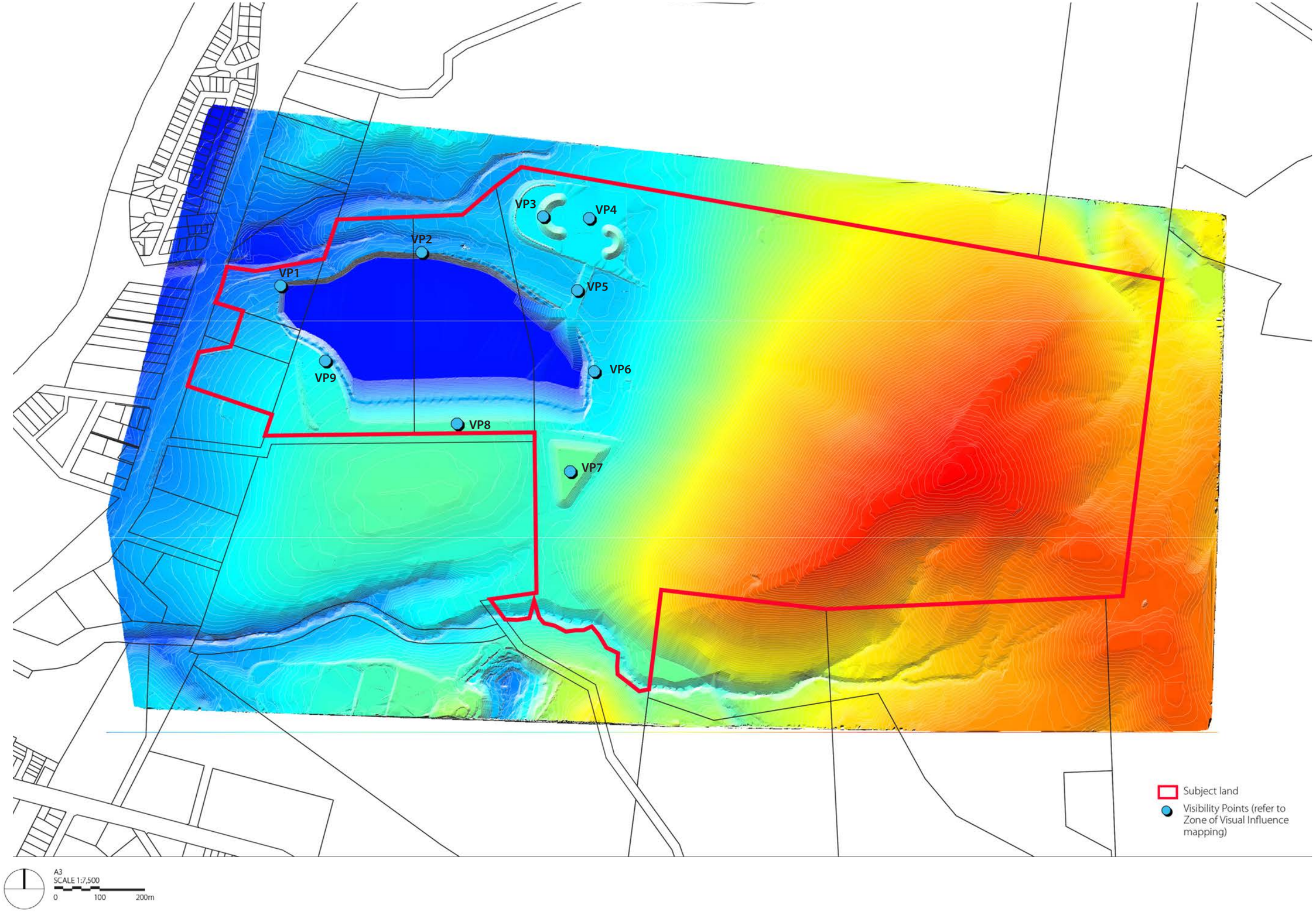
At this stage we believe that the proposed quarry development will have negligible or no landscape and visual impact on the surrounding areas.



SUB-REGIONAL TOPOGRAPHIC ANALYSIS

GRANTVILLE SAND QUARRY LANDSCAPE AND VISUAL ASSESSMENT PROJ / DRG NO. 0311-0551 SA-01 DATE 22.05.2012

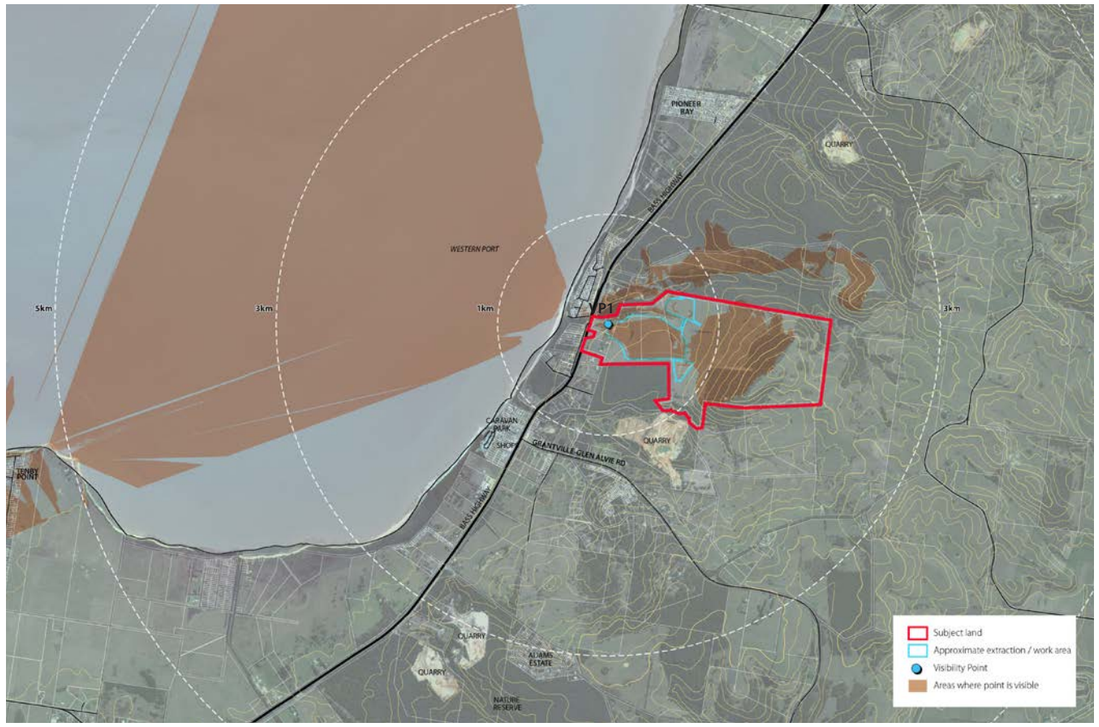
Tract



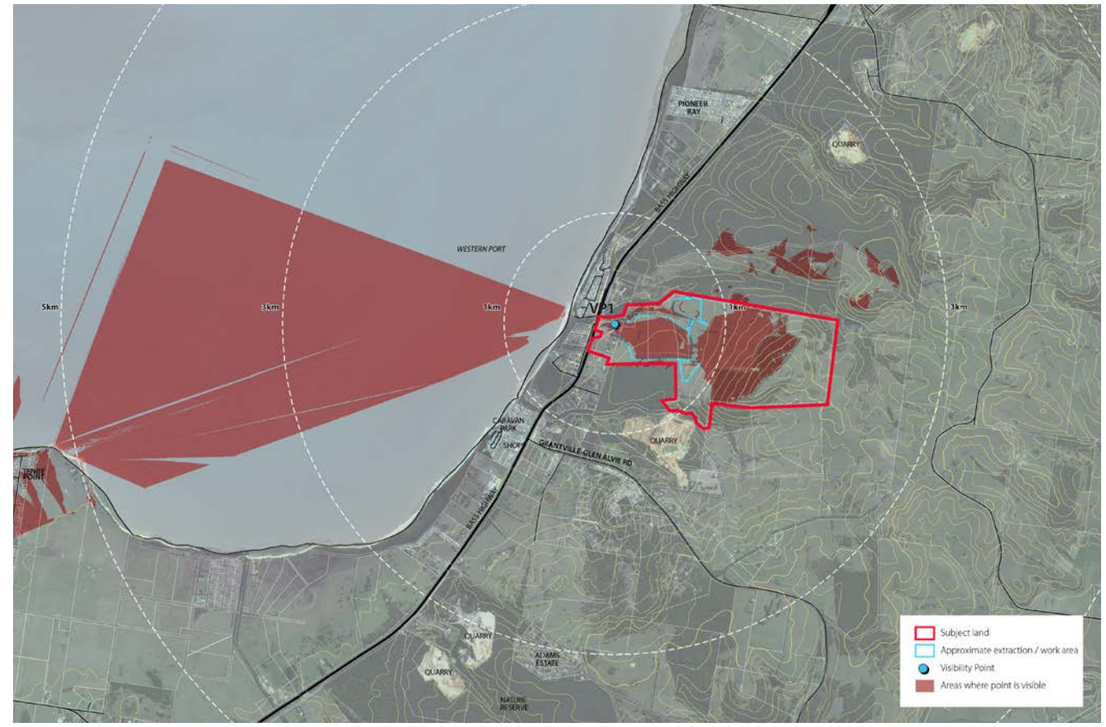
SITE TOPOGRAPHY - WITH PROPOSED QUARRY

GRANTVILLE SAND QUARRY LANDSCAPE AND VISUAL ASSESSMENT PROJ / DRG NO. 0311-0551 SA-03 DATE 22.05.2012

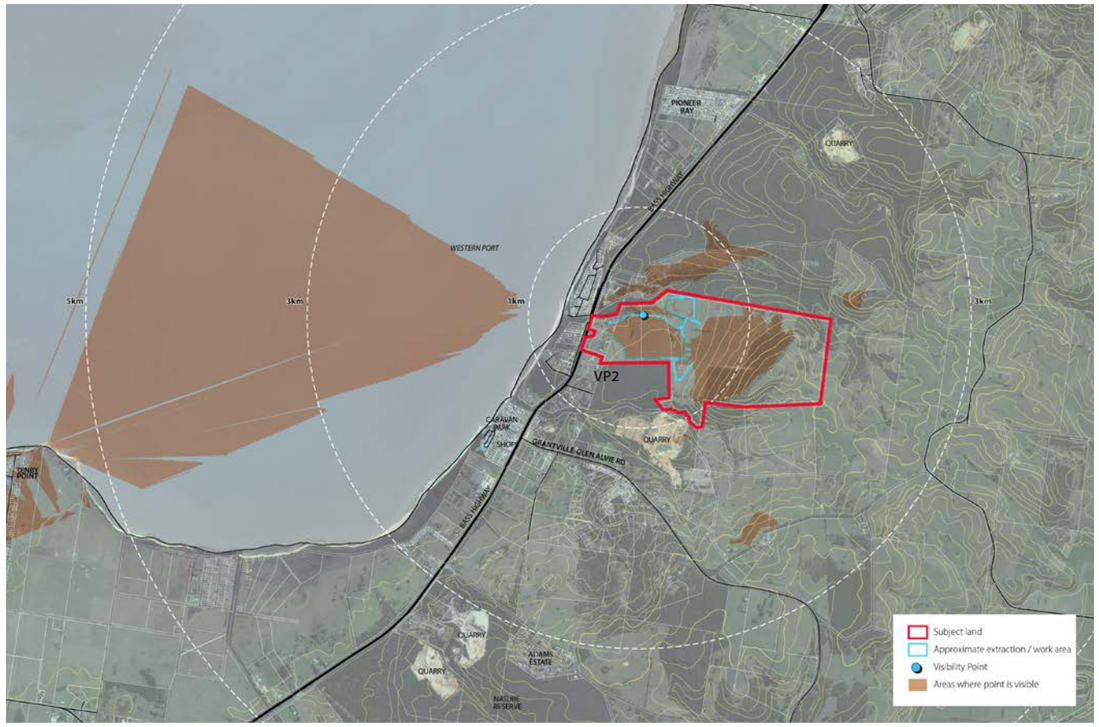
Tract



Visibility Point 1 - No Vegetation



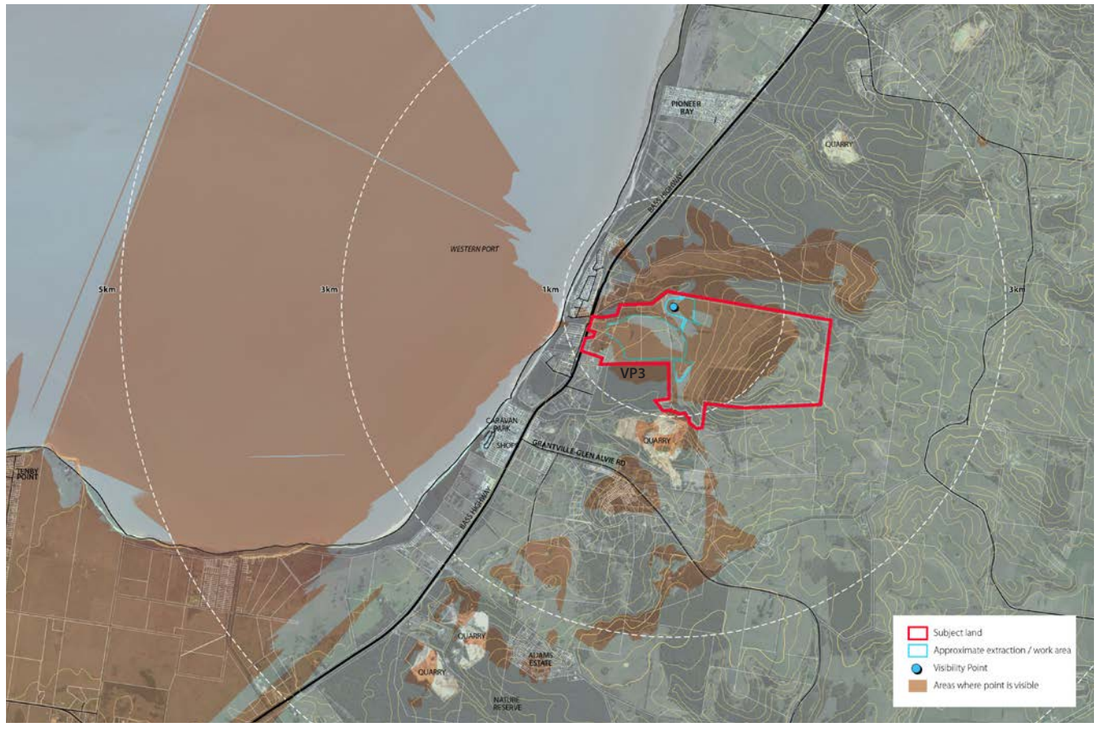
Visibility Point 1 - With Vegetation



Visibility Point 2 - No Vegetation

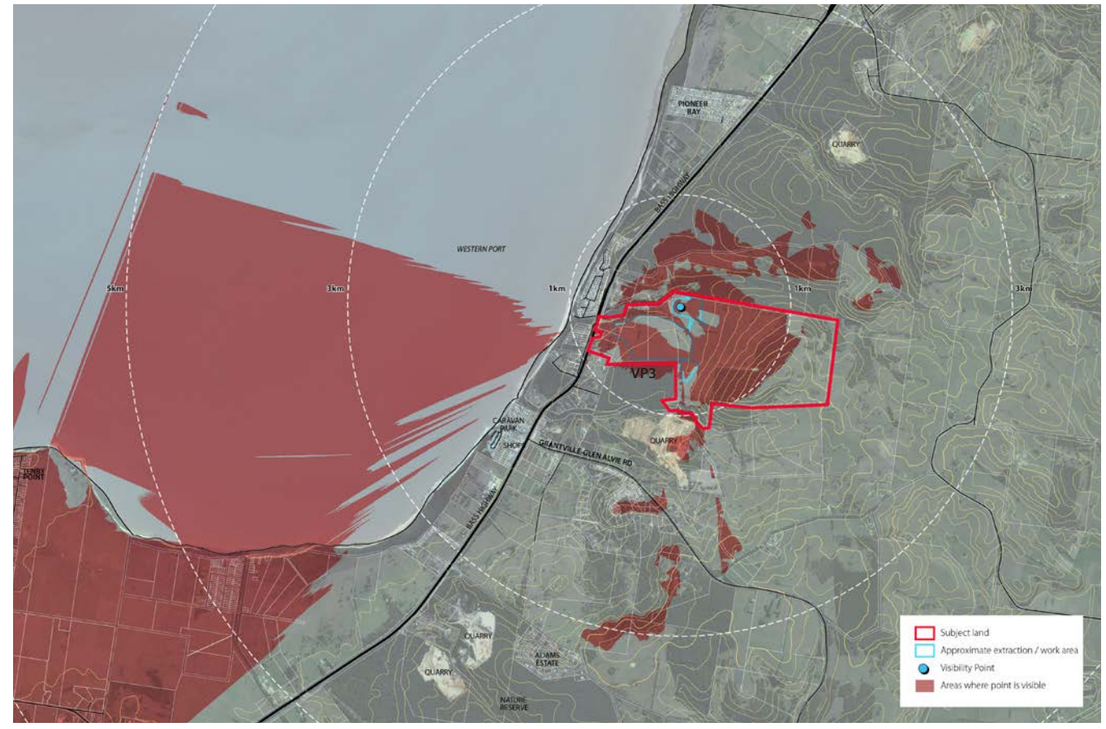
Visibility Point 2 - With Vegetation

ZONE OF VISUAL INFLUENCE - INDIVIDUAL VISIBILITY POINTS



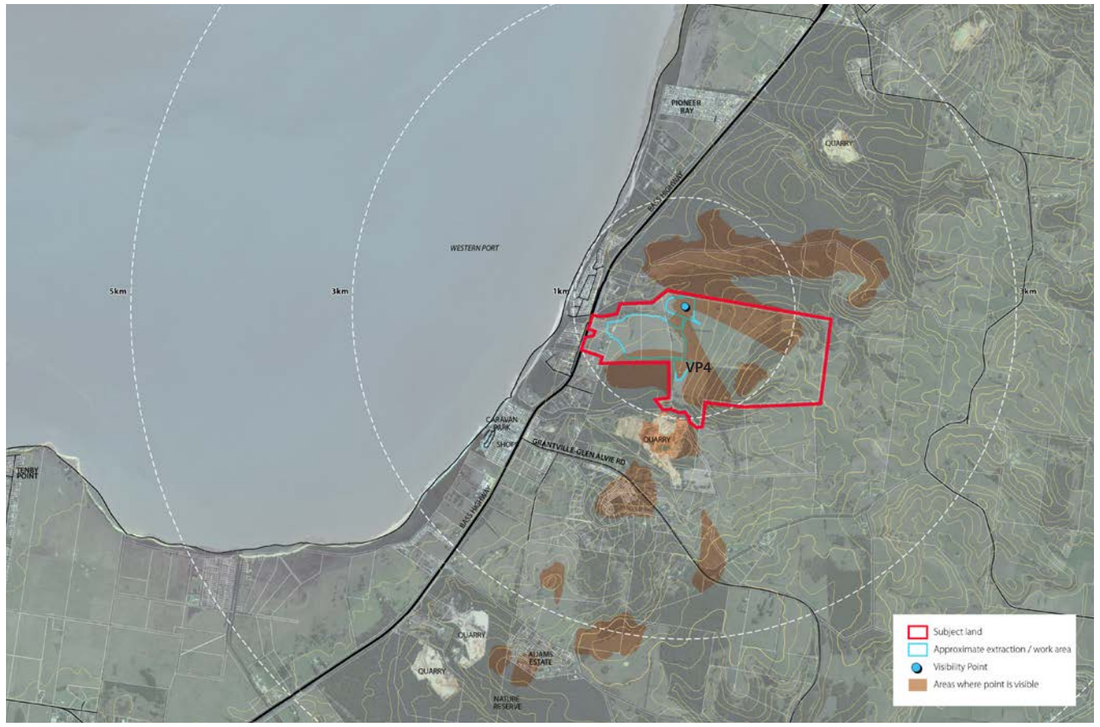
N.B The visibility of the stacker has been factored into this ZVI and is estimated at 11m above the proposed pad level

Visibility Point 3 - No Vegetation



N.B The visibility of the stacker has been factored into this ZVI and is estimated at 11m above the proposed pad level

Visibility Point 3 - With Vegetation



N.B The visibility of the conveyor has been factored into this ZVI and is estimated at 6m above the proposed pad level

Visibility Point 4 - No Vegetation

N.B The visibility of the conveyor has been factored into this ZVI and is estimated at 6m above the proposed pad level

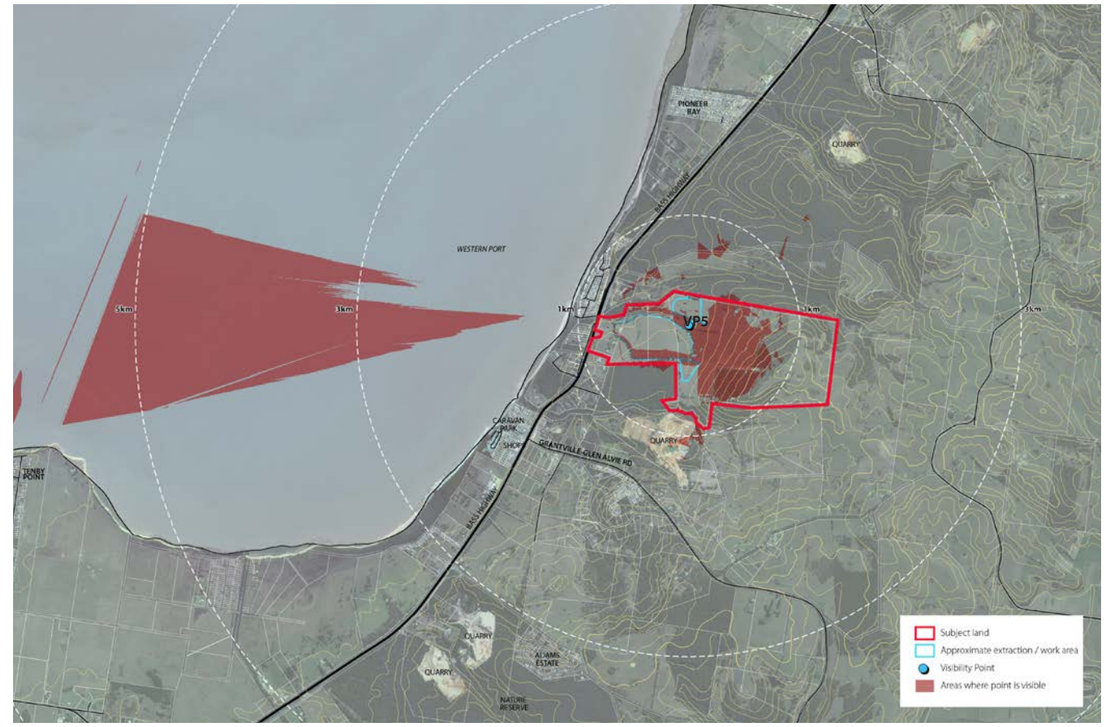
Visibility Point 4 - With Vegetation

ZONE OF VISUAL INFLUENCE - INDIVIDUAL VISIBILITY POINTS

GRANTVILLE SAND QUARRY LANDSCAPE AND VISUAL ASSESSMENT **PROJ / DRG NO.** 0311-0551 ZV 02 **DATE** 22.05.2012

Tract

Visibility Point 5 - No Vegetation

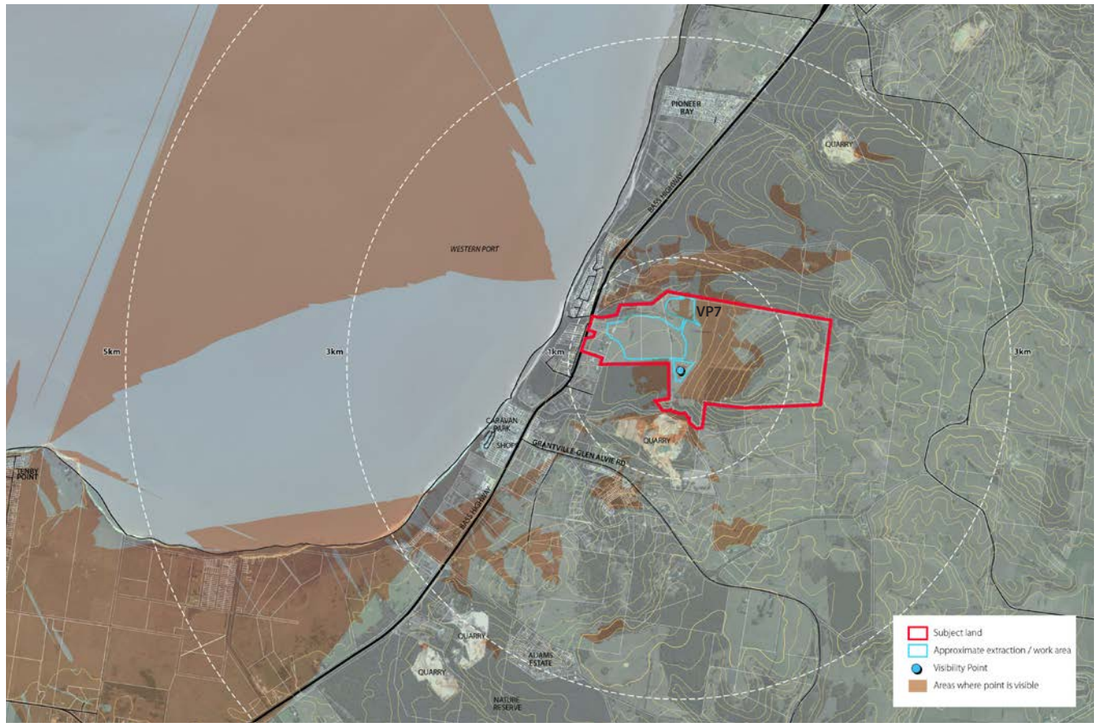


Visibility Point 5 - With Vegetation

Visibility Point 6 - No Vegetation

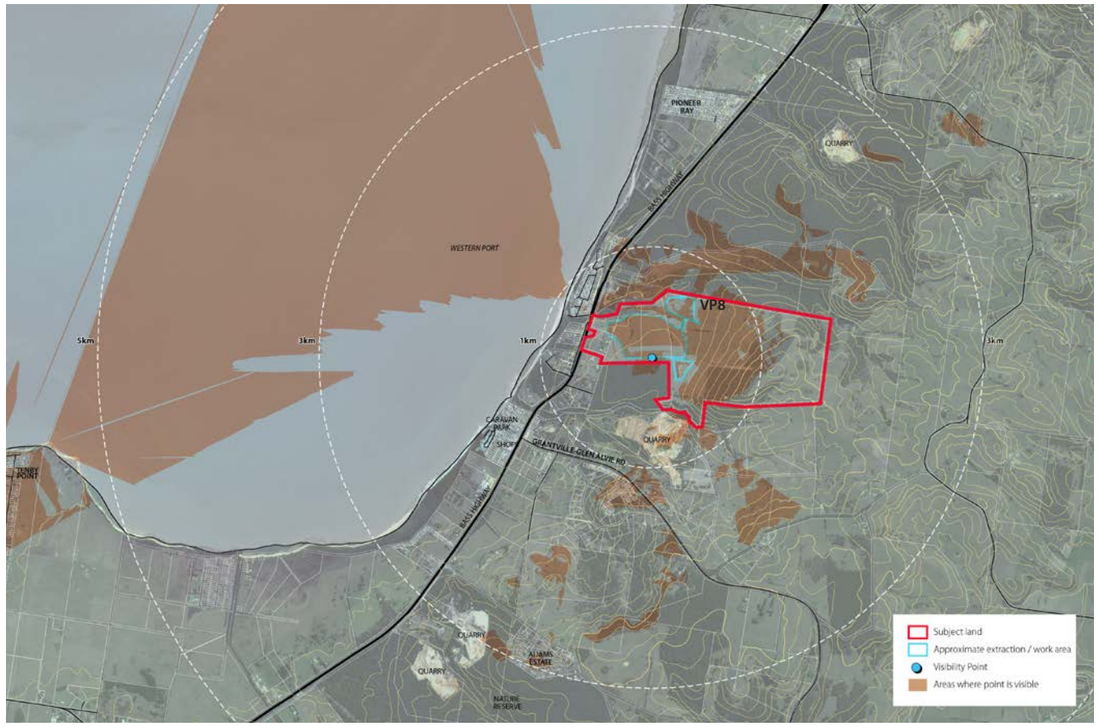
Visibility Point 6 - With Vegetation

ZONE OF VISUAL INFLUENCE - INDIVIDUAL VISIBILITY POINTS

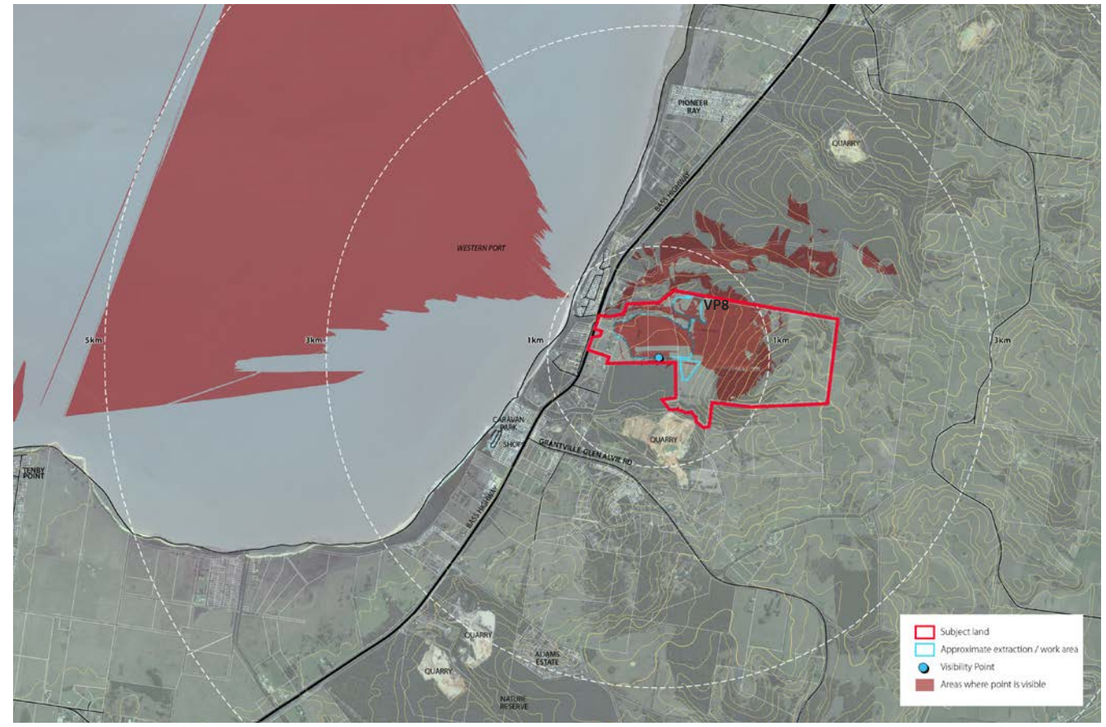


Visibility Point 7 - No Vegetation

Visibility Point 7 - With Vegetation

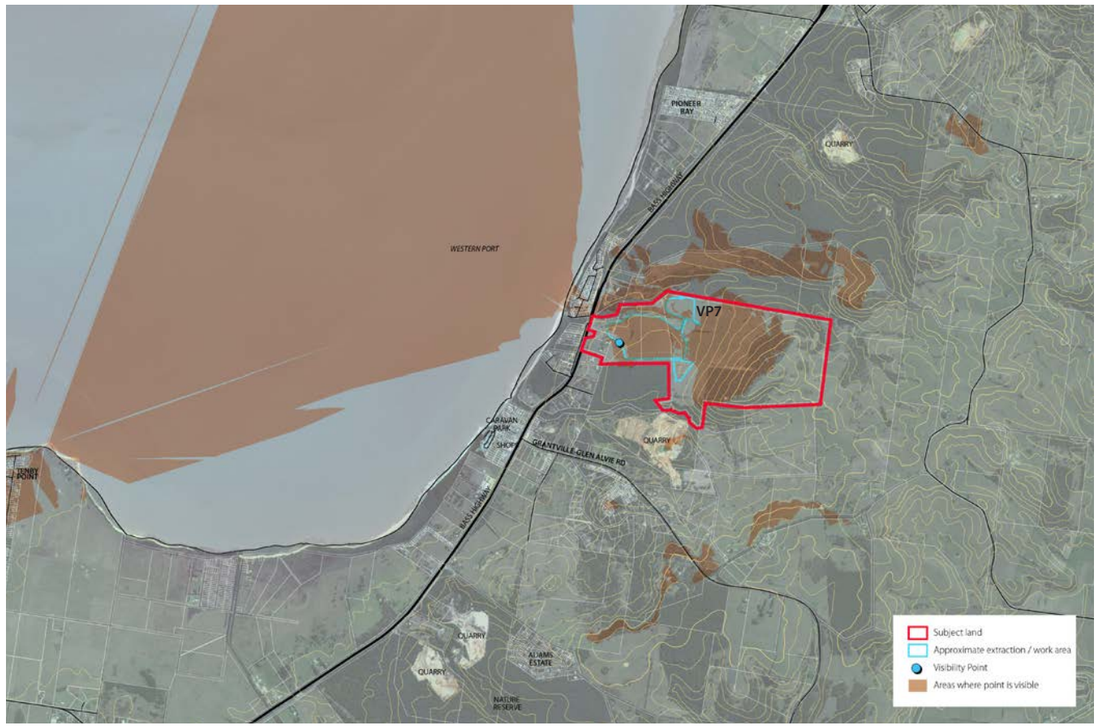


Visibility Point 8 - No Vegetation

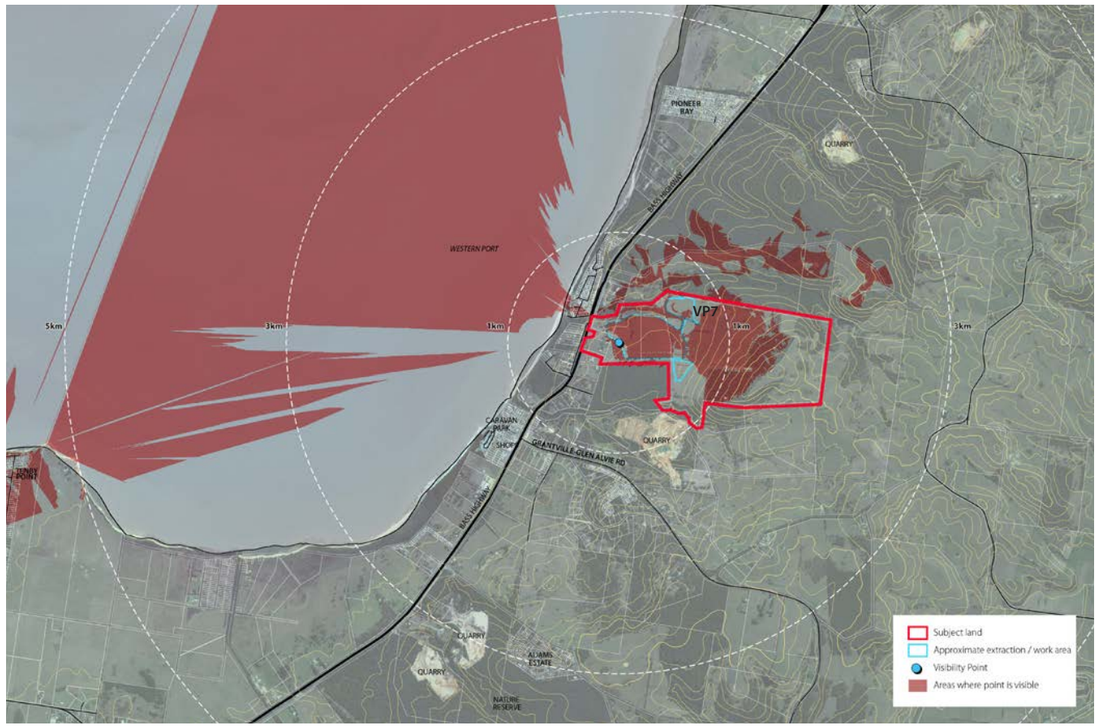


Visibility Point 8 - With Vegetation

ZONE OF VISUAL INFLUENCE - INDIVIDUAL VISIBILITY POINTS

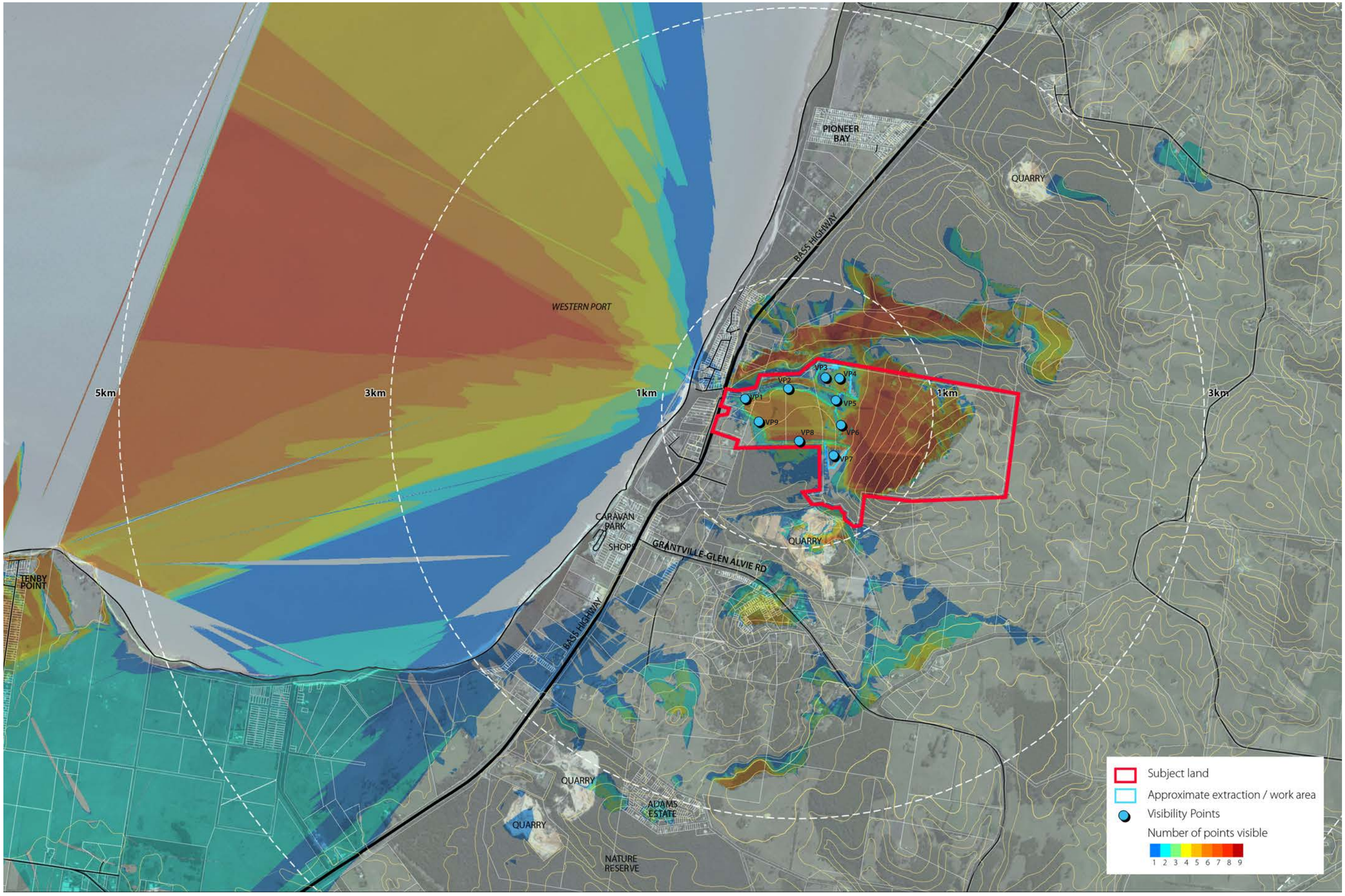


Visibility Point 9 - No Vegetation



Visibility Point 9 - With Vegetation

ZONE OF VISUAL INFLUENCE - INDIVIDUAL VISIBILITY POINTS

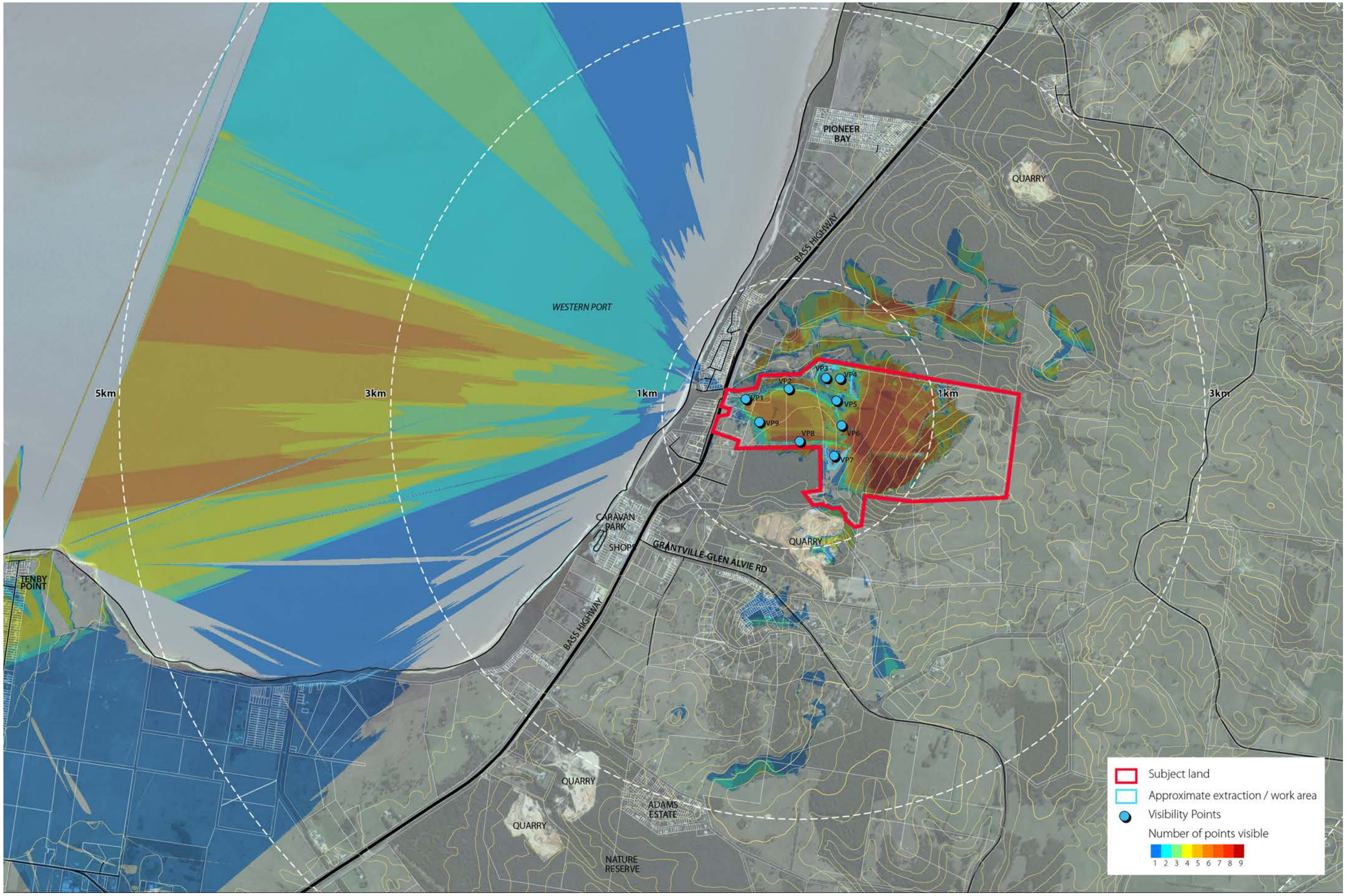


N.B The combined ZVI does not factor in the visibility of the stacker or conveyor which will be located in proximity of VP3 and VP4

ZONE OF VISUAL INFLUENCE (NO VEGETATION) - ALL VISIBILITY POINTS

GRANTVILLE SAND QUARRY LANDSCAPE AND VISUAL ASSESSMENT **PROJ / DRG NO.** 0311-0551 ZV 02 **DATE** 22.05.2012

Tract



N.B The combined ZVI does not factor in the visibility of the stacker or conveyor which will be located in proximity of VP3 and VP4

ZONE OF VISUAL INFLUENCE (WITH VEGETATION) - ALL VISIBILITY POINTS

SITE PHOTOGRAPHS - CAMERA POINT LOCATION PLAN

GRANTVILLE SAND QUARRY LANDSCAPE AND VISUAL ASSESSMENT PROJ / DRG NO. 0311-0551 VS 02 DATE 22.05.2012

Tract

SAND SCREENING AREA NOT VISIBLE -
LOCATED BEHIND VEGETATION

QUARRY NOT VISIBLE -
LOCATED BELOW RIDGE

PHOTO FROM CAMERA POINT 1 - BASS HIGHWAY

GENERAL QUARRY LOCATION NOT VISIBLE
BEHIND TREES AND LANDFORM

PHOTO FROM CAMERA POINT 2- BASS HIGHWAY

SITE PHOTOGRAPHS - CAMERA POINTS 1 & 2

QUARRY NOT VISIBLE - SCREENED BY
LANDFORM AND VEGETATION

PHOTO FROM CAMERA POINT 3 - GRANTVILLE-GLEN ALVIE RD

POTENTIAL VERY LOW LEVEL VISIBILITY OF
OVERBURDEN STORAGE (TO BE CONFIRMED)

PHOTO FROM CAMERA POINT 4- THE SHUNTOFF

SITE PHOTOGRAPHS - CAMERA POINTS 3 & 4

APPENDIX 9 Cultural Heritage Advice

Department of Planning and Community Development

Process List

Project Name: DPQ Grantville

Project Location: 1381-1395 Bass Highway Grantville

Date: 24-May-2012

	QUESTION	ANSWER
Question 1	Is the proposed activity , or all the proposed activities, exempt?	No
Question 2	Are you undertaking a High Impact Activity as listed in the Aboriginal Heritage Regulations?	Yes
Question 3	Does your activity include significant ground disturbance?	Yes
Question 4	Does your activity area include areas of cultural heritage sensitivity that have not previously been subject to significant ground disturbance?	No
Answer:	ON THE BASIS OF THE ANSWERS YOU HAVE ENTERED YOU ARE NOT REQUIRED BY THE REGULATIONS TO PREPARE A CULTURAL HERITAGE MANAGEMENT PLAN FOR THIS PROJECT	

CLARKEOLOGY
30 Steddy Road Lethbridge VIC 3332
Ph/Fax (03) 5281-7427; Mobile (0418) 548-559

A.B.N. 42 149 493 608

22nd May 2012

Mr Gary Cranny
Dandy Premix Quarries Pty Ltd
PO Box 4112
Dandenong South VIC 3164
Telephone 03 9703 8260
Mob: 0419 587 440
email: *gcranny@dandypremix.com*

Dear Sir

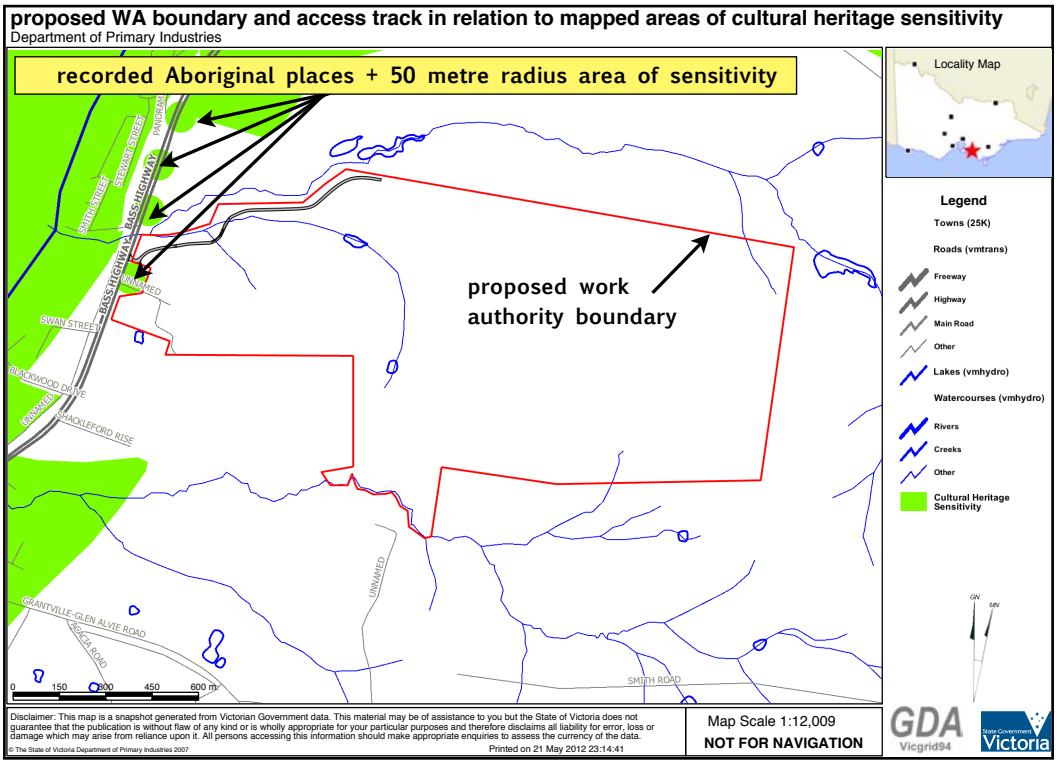
PROPOSED WA 1488 (GRANTVILLE) ABORIGINAL HERITAGE ADVICE

You have sought my advice on Aboriginal heritage matters in relation to the proposed Work Authority 1488 at Grantville, with regard to the possible implications of the *Aboriginal Heritage Regulations 2007*.
In summary, there are no impediments from Aboriginal heritage legislation to the granting of various statutory approvals for this project. There is no requirement for a cultural heritage management plan, nor is there requirement for any other Aboriginal heritage permits.

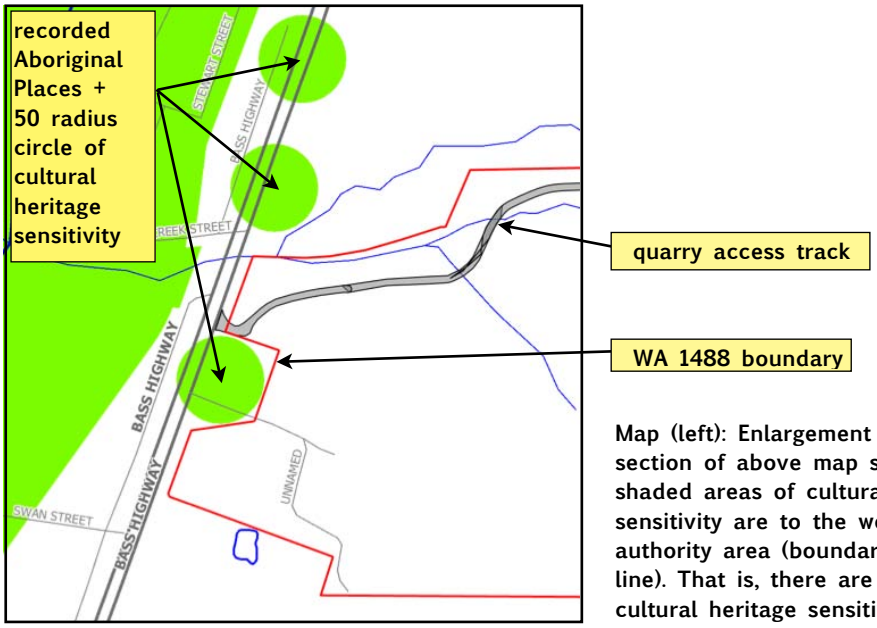
Qualification to provide expert advice
I am a qualified Aboriginal heritage advisor, and am recognised as such by Aboriginal Affairs Victoria, the State Government agency overseeing Aboriginal heritage matters in this State. I hold a Bachelors degree (Botany and Geology), Graduate Diploma in Maritime Archaeology and a Graduate Diploma in Humanities (Aboriginal Archaeology). Formerly a staff archaeologist and Site Registrar with the State Government agency Victoria Archaeological Survey in (1984-1989), I have been working as a consultant archaeologist/ heritage advisor in Victoria for the past 21 years.

Previously recorded Aboriginal sites/places near the proposed WA area
On your behalf, I have examined the Victorian Aboriginal Heritage Register and the relevant reports from previous archaeological investigations in the area. In the general vicinity, there are a number of recorded Aboriginal sites (now called 'Aboriginal Places') along the Bass Highway that were recorded during surveys prior to the highway upgrade in the late 1990s. Given the extent of highway widening that occurred, it is highly probable that these sites were destroyed (in accordance with permits issued by the relevant

Aboriginal Community organsation at the time). Even though there is unlikely to be any part of these Aborigial places surviving, the proposed work authority area avoids the locations where they are are plotted on the Victorian Aboriginal Heritage Register. There will be no impact from this project on any of the recorded Aboriginal places in the area.



Map showing proposed WA 1488 in relation to mapped areas of cultural heritage sensitivity (green shaded areas) and recorded Aboriginal places. The recorded Aboriginal places lie in the centre of the 50 metre radius green circles (arrowed). Neither the recorded Aboriginal places nor any part of the areas of cultural heritage sensitivity are within the proposed work authority area.



Map (left): Enlargement of western section of above map showing the green shaded areas of cultural heritage sensitivity are to the west of the work authority area (boundary marked by red line). That is, there are no areas of cultural heritage sensitivity within the proposed work authority area.

Specific requirements of the Aboriginal Heritage Act 2006 and the Aboriginal Heritage Regulations 2007

Two key elements of the *Aboriginal Heritage Act 2006* and the *Aboriginal Heritage Regulations 2007* relevant to the proposed work authority are:

- that works need to avoid impact on recorded Aboriginal heritage places and objects (sites and artefacts)
- consideration must be given to whether or not a cultural heritage management plan is required for this project.

Recorded Aboriginal places or objects – The entire Work Authority area avoids impacts on the recorded locations of Aboriginal Places in the area. As a result, no modification to the Work Authority boundary (or permit to allow Aboriginal places/objects to be harmed) is required.

Cultural heritage management plan – Certain types of works trigger the requirement for a cultural heritage management plan to be prepared and approved prior to statutory approvals being issued. This occurs if the project activates **both** of the following triggers:

a) That the proposed 'activity' is classified as a high impact activity under the *Aboriginal Heritage Regulations 2007* and
b) That the the proposed 'activity' is in an area of cultural heritage sensitivity (in this case, the areas within 50 metres of a recorded Aboriginal place) which has not previously been subject to significant ground disturbance.

High impact activity? Under Regulation 48(a), quarrying is defined as a high impact activity.

The first trigger **is** activated

Areas of cultural heritage sensitivity? As shown on the maps on page 2, the proposed Work Authority area does not include any areas of cultural heritage sensitivity.

The second trigger **is not** activated.

Consequently, there can be no requirement for a cultural heritage management plan.

Particular note in relation to quarry access track

You have also asked me to consider whether the quarry access track would be considered a 'high impact activity'. Whether it is or not, the construction of the access track would not trigger the requirement for a cultural heritage management plan, because (as shown on the maps on page 2) it is not on an area of cultural heritage sensitivity.

Under Regulation 44(1)(e) of the *Aboriginal Heritage Regulations 2007*, a road with a length exceeding 100 metres is a high impact activity. However, the quarry access track does not meet the definition of 'road' in the Regulations.

According to the Definitions (Regulation 4) in the *Aboriginal Heritage Regulations 2007*, "road" has " ..... the same meaning as in the *Road Management Act 2004."*
In the *Road Management Act 2004*, "road" is defined as:

(a) any public highway;
(b) any ancillary area;
(c) any land declared to be a road under Section 11 or forming part of a public highway or ancillary area.

The quarry access track is clearly not a road as defined in the *Road Management Act 2004,* so work to construct the access track cannot be a high impact activity.

Conclusion: The quarry access track is not a high impact activity. Even if it were, it would not trigger a CHMP, as it is not in an area of cultural heritage sensitivity.

Aboriginal heritage notes/recommendations

1. There is no impediment from Aboriginal heritage legislation to the works proceeding.
2. There will be no requirement for Aboriginal heritage permits ('permit to harm') as works will not impact on recorded Aboriginal places.
3. There is no requirement for a cultural heritage management plan in relation to the proposed Work Authority application or in relation to subsequent statutory approvals: although quarrying is a 'high impact activity', there are no areas of cultural heritage sensitivity within the proposed work authority area.
4. There is no statutory requirement for involvement of the local Aboriginal Communities, as there is no requirement for a cultural heritage management plan.

If you require further information in relation to this or other matters, please contact me any time by email (*clarkeology@bigpond.com*) or mobile 0418-548-559. Please pass on my contact details to the various statutory authorities from whom you may be seeking permits, if there are any matters raised that they wish to discuss with me directly.

Yours faithfully

Nicholas Clark

Field	Value
OBJECTID_1	5450
FID_1	5449
OBJECTID	106391
SDE_DATA_M	7813.93282
PERIMETER	313.755902
AAV_IDENT_	106392
AAV_IDENT1	106391
CULTURAL	yes
FEATURE_TY	mainland
STATE	VIC
ANCIENT_LA	0
COAST_CROW	0
DUNE1	0
DUNE2	0
DUNE_EVC	0
DUNE4	0
GREENSTONE	0
HIGH_PLAIN	0
LUNETTES	0
COAST_NONC	0
PLM_CAVE	0
PARKS_RES	0
PRIOR_WATE	0
RAMSAR	0
SANDSHEET	0
STONY_RISE	0
CLIFF	0
CAVE_VM	0
VOLCANIC_C	0
WATERBODY	0
REGISTERED	1
WATERCOURS	0
KOOWEE_PLA	0
SHAPE_LENG	313.755902
Shape	Polygon ZM
Shape.area	7807.492353
Shape.len	313.630152

Aboriginal Cultural Heritage

1393 - 1395 Bass Hwy Grantville

N

Meters

0 20 40 80 120 160

BASS HIGHWAY 2 — SITE NAME

1:100000 — MAP SCALE | 8021 — MAP SHEET NO. | WARRAGUL — MAP NAME

41 / 42 — MAP QUADRANT | E 372212 (1:100,000) | N 574887 (1:100,000) — GRID COORDINATES | ■ LOCATION APPROXIMATE

(1:25) GRANTVILLE 8021-3-3 — OTHER MAPS | AIR PHOTOS

MORNINGTON — COUNTY | BASS — SHIRE

CORINELLA — PARISH | ALLOTMENT | SECTION

ROAD RESERVE — PRIVATE OWNER OR ■ CROWN

BASS HIGHWAY - GRANTVILLE — OWNER'S ADDRESS

OWNER'S PHONE

LORI SCIUSCO FOR

du CROS & ASSOC. — RECORDED BY | 230497 — DATE RECORDED

322 BAY STREET, PORT MELBOURNE 3207 — RECORDER'S ADDRESS

(03) 9646 8855 — RECORDER'S PHONE

■ DEVELOPMENT IMMEDIATE ☐ DEVELOPMENT PLANNED ☐ DEVELOPMENT UNLIKELY

OFFICE USE ONLY

8021-23 — SITE NUMBER | DATE DECLARED | RADIOCARBON AGE

NOTES AND RECOMMENDATIONS

SITE OWNERSHIP

PRIVATE
- ☐ OWNER OCCUPIED
- ☐ LEASED
- ☐ PRIVATE COMPANY
- ☐ OTHER (SPECIFY)

PUBLIC AUTHORITY
- ☐ DEPT. OF CONSERVATION & NATURAL RESOURCES
- ■ MUNICIPALITY/SHIRE
- ☐ OTHER (SPECIFY) (VICROADS)

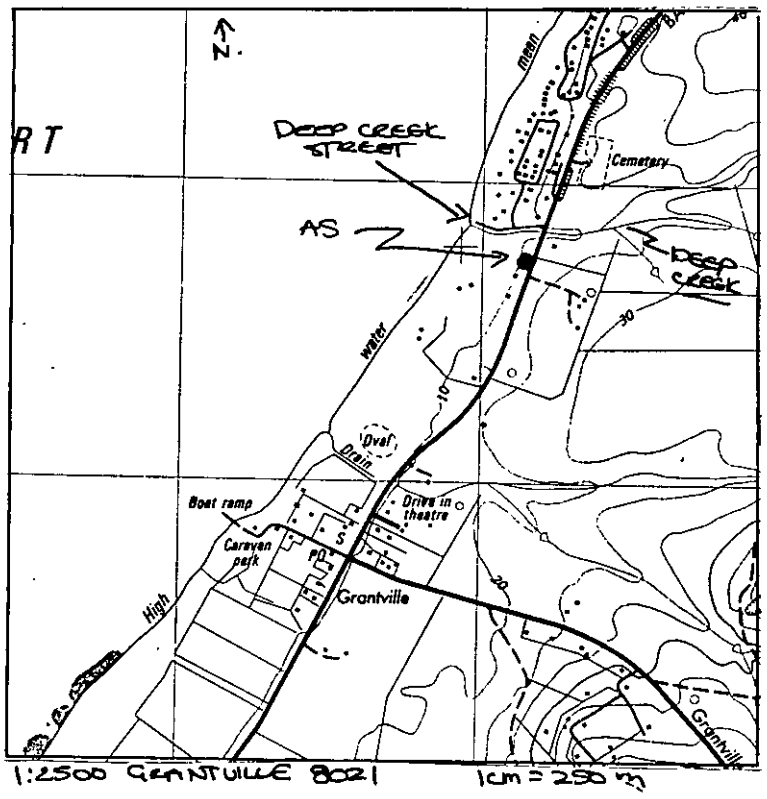
ADMINISTRATIVE TYPE
- ☐ LEASED PRIVATELY
- ■ ROAD RESERVE
- ☐ SPECIAL RESERVE
- ☐ RECREATION RESERVE
- ☐ NATIONAL PARK
- ☐ STATE FOREST
- ☐ ARCHAEOLOGICAL AREA
- ☐ OTHER (SPECIFY)

PRESERVATION
- ☐ EXCELLENT (UNDISTURBED, MATERIALS WELL PRESERVED)
- ☐ GOOD (PARTIALLY DISTURBED, MATERIALS WELL PRESERVED)
- FAIR (INDEFINITE AMOUNT OF DISTURBANCE AND PRESERVATION OF MATERIALS)
- ■ POOR (MATERIALS WEATHERED, HEAVY EROSION)
- ☐ VERY POOR (BUT SOME MATERIALS LEFT)
- ☐ TOTALLY DESTROYED OR REMOVED

OFFICE USE ONLY
- ☐ NEGATIVES ☐ SLIDES
- ☐ SITE REGISTRY FILES OR ARCHIVES
- ☐ OTHER RECORDS (SPECIFY)
- ■ REFERENCE IN LITERATURE OR REPORT (SPECIFY) # 1087
- ☐ SURFACE COLLECTION ☐ EXCAVATION

COLLECTED/EXCAVATED MATERIAL HELD AT:
- ☐ MUSEUM OF VICTORIA ☐ AAV
- ☐ ABORIGINAL COMMUNITY (SPECIFY)
- ☐ PRIVATE COLLECTION (SPECIFY)
- ☐ OTHER (SPECIFY)

SITE LOCATION SKETCH GIVE SCALE AND NORTH ARROW – LABEL FULLY



THE SCALE OF THIS DRAWING IS LIKELY TO BE 1 CM = 250M OR 1 CM = 1KM.
SHOW RELATIONSHIPS OF ALL OTHER KNOWN SITES IN THIS SKETCH
INDICATE OR SHOW DISTANCE AND DIRECTION TO NEAREST TOWN AND OTHER LANDMARKS.

☐ GREATER THAN HALF HOUR WALK FROM VEHICLE ☐ SITE LIABLE TO FLOODING
☐ FOUR WHEEL DRIVE REQUIRED ☐ GUIDE REQUIRED ☐ SEE OWNER OR MANAGER

DIRECTIONS FOR RELOCATION:

SITE TYPES

ROCK SHELTERS, CAVES AND ART
- ☐ ROCK SHELTER/CAVE SITE, BARE ROCK FLOOR
- ☐ ROCK SHELTER/CAVE SITE, SOIL FLOOR, NO DEBRIS
- ☐ ROCK SHELTER/CAVE SITE, SOIL FLOOR, CULTURAL DEBRIS
- ☐ PAINTINGS (MAY NOT BE IN A SHELTER)
- ☐ ROCK ENGRAVINGS, CARVINGS (MAY OR MAY NOT BE IN A SHELTER)
- ☐ OTHER (SPECIFY)

GENERAL OPEN SITES
- ☐ SHELL MIDDEN, COASTAL/MARINE
- ☐ SHELL MIDDEN: FRESHWATER
- ■ SURFACE SCATTER OF CULTURAL MATERIAL (NOT IN CAVE OR SHELTER)
- ☐ EXPOSURE OF CULTURAL MATERIAL IN BANK
- ☐ FIREPLACE, HEARTH, OVENSTONES ETC.
- ☐ EARTH MOUND, ABORIGINAL OVEN, MYRN-YONG ETC
- ☐ OTHER (SPECIFY)

BURIALS
- ☐ ISOLATED FRAGMENTS OF BONE, BELIEVED TO BE HUMAN
- ☐ DEFINITE HUMAN REMAINS, BURIAL, CEMETERY
- ☐ OTHER (SPECIFY)

NATURAL FEATURES
- ☐ SACRED ROCK OUTCROP
- ☐ SACRED TREE
- ☐ SACRED WATERHOLE
- ☐ ROCKWELL
- ☐ OTHER (SPECIFY)

STRUCTURES
- ☐ CAIRN, HUNTING HIDE, ABORIGINAL ROCK PILE
- ☐ ROCK ARRANGEMENT, FUNCTION UNCERTAIN
- ☐ ROCK ARRANGEMENT, CEREMONIAL
- ☐ ROCK ARRANGEMENT, DOMESTIC
- ☐ STONE FISHTRAP, WEIR, DAM
- ☐ ABORIGINAL CANAL, DITCH, "FISHTRAP"
- ☐ ABORIGINAL EARTH DEPOSIT OR MOUND OTHER THAN MYRN-YONG
- ☐ OTHER (SPECIFY)

QUARRIES, WORKSHOPS AND MANUFACTURING AREAS
- ☐ DUGOUT QUARRY, DIGGINGS
- ☐ STONE SOURCE AREA, OUTCROP
- ☐ SPECIALISED WORKSHOP FLOOR
- ☐ AXE GRINDING GROOVES
- ☐ OTHER (SPECIFY)

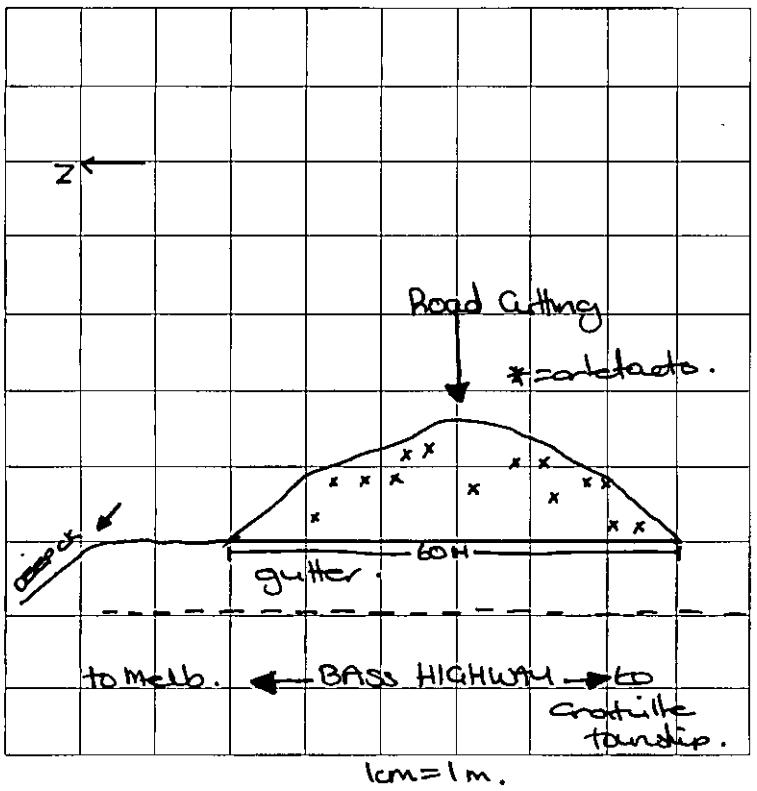
RETURN TO: SITE REGISTRAR
HERITAGE SERVICES BRANCH
ABORIGINAL AFFAIRS VICTORIA

APRIL 1994

SITE NUMBER 8021-23

VICTORIA SITE REGISTER

SITE PLAN GIVE SCALE AND NORTH ARROW – LABEL FULLY



SHOW BOUNDARIES OF THE SITE AND ANY INTERNAL PATTERNING OF ARCHAEOLOGICAL MATERIALS
THE SCALE OF THIS DRAWING IS LIKELY TO RANGE FROM 1CM = 1M TO 1CM = 10M

OPEN SITES – GIVE CRITERIA FOR THE SITE BOUNDARIES, SHOW LOCATION OF HEARTHS, CHIPPED STONE ETC WITHIN THE SITE. GIVE VERTICAL CROSS SECTION WHERE APPROPRIATE
CAVE SITES – SHOW FLOOR PLAN AND A VERTICAL CROSS SECTION OF THE CAVE
EXPOSURE, BANKS – INCLUDE VERTICAL CROSS SECTION AND STRATIGRAPHY.
STRUCTURES – BE SURE PLAN OF STRUCTURES IS ACCURATE AND TO SCALE

SITE DIMENSIONS 60M x 1.5m METRES x n/a METRES DEPTH

SITE CONDITION

SOIL, SEDIMENT
- [x] FINE SOIL, CLAY, LOAM ETC
- [ ] SANDY
- [ ] ROCKY, SHINGLE, TALUS
- [ ] LOOSE OR UNCONSOLIDATED SOIL ON BASE OF FIRM SOIL
- [ ] OTHER (SPECIFY)

SOIL COLOUR (SPECIFY)

ARCHAEOLOGICAL DEPOSIT
- [ ] IN SITU
- [ ] PROBABLY/APPARENTLY IN SITU
- [x] NOT IN SITU
- [ ] STRATIFIED
- [ ] PROBABLY/APPARENTLY STRATIFIED
- [ ] NOT STRATIFIED
- [x] OTHER (SPECIFY) ERODED OUT OF ROAD CUTTING

DAMAGE
- [ ] DAMAGED BY VANDALS
- [ ] HAS BEEN PLOUGHED
- [ ] DAMAGED BY RABBITS
- [x] DAMAGED BY ROAD/TRACK
- [ ] SITE RIPPED
- [x] SITE SEVERELY ERODED
- [ ] OTHER (SPECIFY)

EXPOSURE/EROSION/VISIBILITY
- [x] ERODED BY WIND
- [x] ERODED BY WATER
- [ ] HEAVY SCRUB OR TREE COVER
- [ ] HEAVY GRASS COVER LEAF LITTER
- [ ] THIN VEGETATION, ERODED PASTURES
- [x] VERY LITTLE GROUND COVER (LESS THAN 50%)
- [ ] BARE LAND, PLOUGHED FIELD
- [ ] OTHER (SPECIFY)

SITE SITUATION – PHYSICAL FEATURES ON WHICH SITE, OR BOUNDARIES OF SITE ARE LOCATED

TOPOGRAPHY
- [x] TOP OR EDGE OF HILL, RISE, DUNE
- [ ] SIDE OR BASE OF HILL, RISE, DUNE
- [ ] CLIFF, BLUFF, BANK, (VERTICAL)
- [ ] VALLEY BOTTOM
- [ ] FLAT, LEVEL LAND
- [ ] SLOPING, IRREGULAR LAND
- [ ] DEPRESSION, SWALE, HOLLOW
- [ ] CAVE
- [ ] OTHER (SPECIFY)

LANDFORM – WATER FORMED, FLUVIAL
- [ ] FLOODPLAIN
- [x] TERRACE
- [ ] LEVEE, BANK
- [ ] GULLY, RAVINE
- [ ] RIVERBANK
- [ ] OTHER (SPECIFY)

LANDFORM – WIND FORMED, AEOLIAN
- [ ] DUNE RIDGE
- [ ] SANDSHEET, DRIFT
- [ ] LUNETTE
- [ ] BLOWOUT
- [ ] OTHER (SPECIFY)

VOLCANIC LANDFORMS
- [ ] VOLCANIC CRATER
- [ ] STONY RISE
- [ ] LAVA FLOW
- [ ] VOLCANIC CONE, VENT, NECK
- [ ] OTHER (SPECIFY)

SITE ENVIRONMENT

WATER
- [x] TEMPORARY [ ] PERMANENT
- [ ] RIVERS
- [x] CREEKS
- [ ] DRAINS
- [ ] LAND SUBJECT TO FLOODING
- [ ] FRESHWATER LAKES
- [ ] FRESHWATER SWAMPS
- [ ] SALINE LAKES
- [ ] BRACKISH
- [ ] BILLABONGS, OXBOWS
- [ ] SPRINGS/SOAKS
- [ ] NONE OF THESE *

LAND SYSTEMS – INLAND
- [ ] MOUNTAINS AND VALLEYS (> 300M RELIEF)
- [ ] HILLS AND RIDGES (30-300M RELIEF)
- [ ] UNDULATING LAND
- [ ] HIGHLAND PLAIN
- [x] LOWLAND PLAIN
- [ ] OTHER (SPECIFY)

COASTAL LANDFORMS
- [ ] MUD FLATS
- [ ] SANDY BEACHES
- [ ] NO BEACH, SHINGLE BEACH
- [ ] ROCK PLATFORM, BOULDER BEACH
- [ ] DUNES
- [ ] CLIFFS
- [ ] LAGOON, INLET ETC.
- [x] OTHER (SPECIFY) INLAND PLAIN –

VEGETATIVE COVER

R	C	
[ ]	[ ]	PADDOCKS, PLOUGHED FIELDS, FARMLAND
[ ]	[ ]	DRAINED SWAMPS
[ ]	[ ]	TREE PLANTATIONS
[ ]	[ ]	NATURAL OR NATIVE VEGETATION
[ ]	[ ]	REGENERATED VEGETATION
[ ]	[ ]	PARKLAND
[ ]	[x]	OTHER (SPECIFY)

GRASS & WEEDS.

NATIVE VEGETATIVE STRUCTURE
- [ ] FOREST
- [ ] OPEN WOODLAND
- [x] SCRUB
- [ ] SCATTERED TREES, SAVANNAH
- [ ] HEATH
- [ ] GRASSLAND
- [ ] SWAMPY
- [ ] BARREN
- [ ] OTHER (SPECIFY)

NATIVE VEGETATIVE TYPES
- [ ] RIVERINE
- [ ] SALT MARSH, MANGROVES
- [ ] MALLEE
- [ ] MARRAM GRASS
- [ ] COASTAL MAT
- [ ] RAIN FOREST, GULLIES
- [ ] ALPINE
- [ ] OTHER (SPECIFY)

KEY
* GIVE FURTHER INFORMATION
R RARE, MINOR ETC
C COMMON, DOMINANT, MAJOR ETC

SITE CONTENTS

CONTENTS – INORGANIC

R	C	
[ ]	[x]	COARSE GRAINED CHIPPED STONE FLAKE
[ ]	[x]	FINE GRAINED CHIPPED STONE FLAKES
[ ]	[ ]	OTHER WORKED STONE, GROUND STONE
[ ]	[ ]	BURNT STONE
[ ]	[ ]	BURNT CLAY LUMPS
[ ]	[ ]	OCHRE
[ ]	[ ]	UNWORKED EXOTIC STONE
[ ]	[ ]	OTHER (SPECIFY)

CONTENTS – ORGANIC

R	C	
[ ]	[ ]	MOLLUSC SHELL
[ ]	[ ]	BONE (NON-HUMAN)
[ ]	[ ]	OTHER ANIMAL REMAINS *
[ ]	[ ]	CHARCOAL
[ ]	[ ]	GUM, BITUMEN ETC.
[ ]	[ ]	OTHER (SPECIFY)

ARTEFACTS
- [ ] BONE IMPLEMENTS
- [ ] GROUND AXES
- [ ] HAMMERSTONES, PITTED STONES
- [ ] GRINDING STONES
- [x] WORKED FLAKES *
- [ ] CORES *
- [ ] MICROLITHS *
- [ ] UNSPECIFIED CHIPPED STONE ARTEFACTS
- [ ] OTHER (SPECIFY)

BLADE

CHIPPED STONE MATERIAL

R	C	
[ ]	[ ]	MATERIAL FOREIGN TO AREA
[ ]	[x]	QUARTZ
[ ]	[x]	SILCRETE
[ ]	[ ]	FLINT, CHERT
[ ]	[ ]	OBSIDIAN, VOLCANIC GLASS
[ ]	[ ]	BASALT, GREENSTONE
[ ]	[ ]	OTHER FINE GRAINED ROCKS
[ ]	[ ]	OTHER (SPECIFY)

SHELLFISH TYPES

R	C	
[ ]	[ ]	FRESHWATER MUSSELS
[ ]	[ ]	ROCK PLATFORM
[ ]	[ ]	SANDY SHORE
[ ]	[ ]	MUDDY SHORE
[ ]	[ ]	UNIDENTIFIED
[ ]	[ ]	OTHER (SPECIFY)

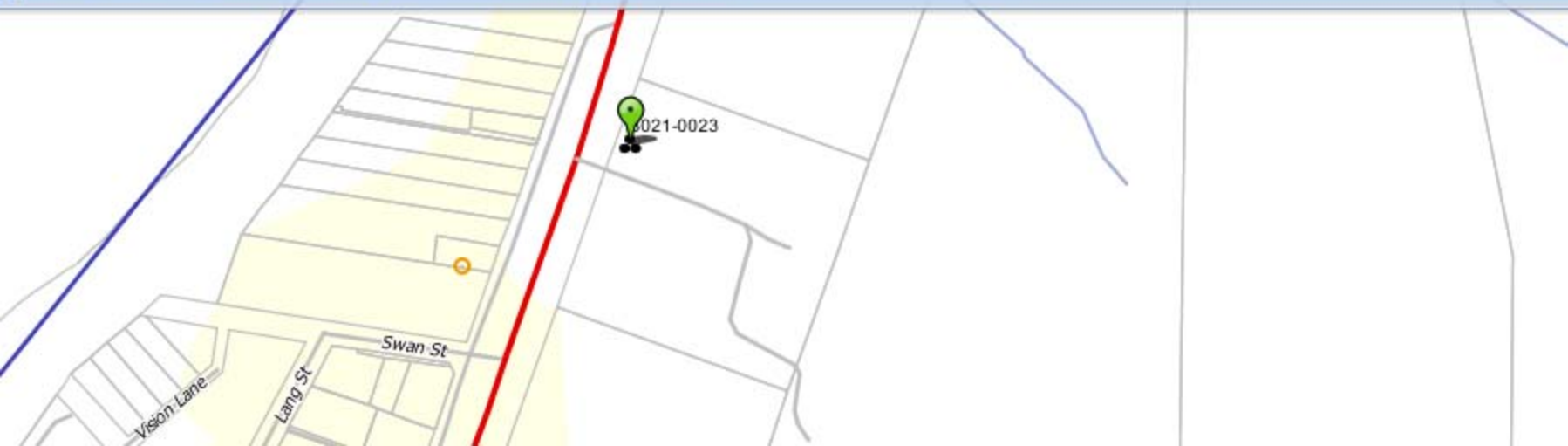
SHELLFISH SPECIES

R	C	ROCKY SHORE
[ ]	[ ]	SUBNINELLA
[ ]	[ ]	CELLANA
[ ]	[ ]	BRACHIDONTES
[ ]	[ ]	DICATHAIS
[ ]	[ ]	ABALONES
[ ]	[ ]	AUSTROCOCHLEA
[ ]	[ ]	LIMPETS OTHER THAN CELLANA
[ ]	[ ]	SCUTUS
[ ]	[ ]	MYTILUS
[ ]	[ ]	NERITES
[ ]	[ ]	CONUS
[ ]	[ ]	CRASSOSTREA
[ ]	[ ]	OTHERS (SPECIFY)

R	C	SOFT SHORE
[ ]	[ ]	PLEBIDONAX
[ ]	[ ]	DONACILLA
[ ]	[ ]	ANADARA
[ ]	[ ]	OSTREA
[ ]	[ ]	KATELYSIA
[ ]	[ ]	POLINICES
[ ]	[ ]	ZEACUMANTUS
[ ]	[ ]	CABESTANA
[ ]	[ ]	MACTRA
[ ]	[ ]	GLYCYMERIS
[ ]	[ ]	OTHERS (SPECIFY)

Aboriginal Place Name	Component Place Number	Component Type	Component Feature Type	Easting	Northing	Zone
BASS HIGHWAY 2	8021-0023-1	Artefact Scatter		372312	5748884	55

Page 1 of 1 20 Items per page Filter



Victorian Heritage Database search results - 24/5/2012

Grantville Avenue of Honour

Heritage Inventory (HI) Number:
Listing Authority: HI

Location:
Grantville, BASS COAST SHIRE

Statement of Significance:

FORMER GRANTVILLE HOTEL

Heritage Inventory (HI) Number: H8021-0039
Listing Authority: HI

Location:
1517-1529 BASS HIGHWAY GRANTVILLE, BASS COAST SHIRE

Statement of Significance:
The hotel is significant as part of the early European social and cultural history of Grantville and the development and settlement of Westernport Bay.

OLD QUEENSFERRY ROAD

Heritage Inventory (HI) Number: H8021-0006
Listing Authority: HI

Location:
BASS HIGHWAY GLEN FORBES and QUEENSBERRY JETTY ROAD GRANTVILLE, Bass Coast Shire

Victorian Heritage Database place details - 24/5/2012

FORMER GRANTVILLE HOTEL

Location:
1517-1529 BASS HIGHWAY GRANTVILLE, BASS COAST SHIRE

Heritage Inventory (HI) Number: H8021-0039
Listing Authority: HI
Heritage Inventory Citation
The Grantville Hotel was established on the site in the 1870's until it was destroyed by fire. The land was then used for pastoral purposes until recently. Test-pits indicate brick paving and European artefacts.

Extent of Registration:

Statement of Significance:
The hotel is significant as part of the early European social and cultural history of Grantville and the development and settlement of Westernport Bay.

Heritage Study	
Year Construction Started	
Architect / Designer	
Architectural Style	
Heritage Act Categories	Heritage Inventory Site
Municipality	BASS COAST SHIRE
Other names	
History	

Victorian Heritage Database place details - 24/5/2012

OLD QUEENSFERRY ROAD

Location:
BASS HIGHWAY GLEN FORBES and QUEENSBERRY JETTY ROAD GRANTVILLE, Bass Coast Shire

Heritage Inventory (HI) Number: H8021-0006
Listing Authority: HI
Heritage Inventory Citation
Heritage Inventory Significance: Of local significance. Possibly only surviving element of former settlement at this location. Recorded historic sites are rare in this area.

Heritage Study	
Year Construction Started	
Architect / Designer	
Architectural Style	
Heritage Act Categories	Heritage Inventory Site
Municipality	BASS COAST SHIREBASS COAST SHIRE
Other names	
History	

List of Figures

Plan Scale: 1:250000

0 5 10
km

Base Plan derived from images scanned from portions of VICROADS 1:250000 series

BELL COCHRANE & Associates Extractive Industries

For

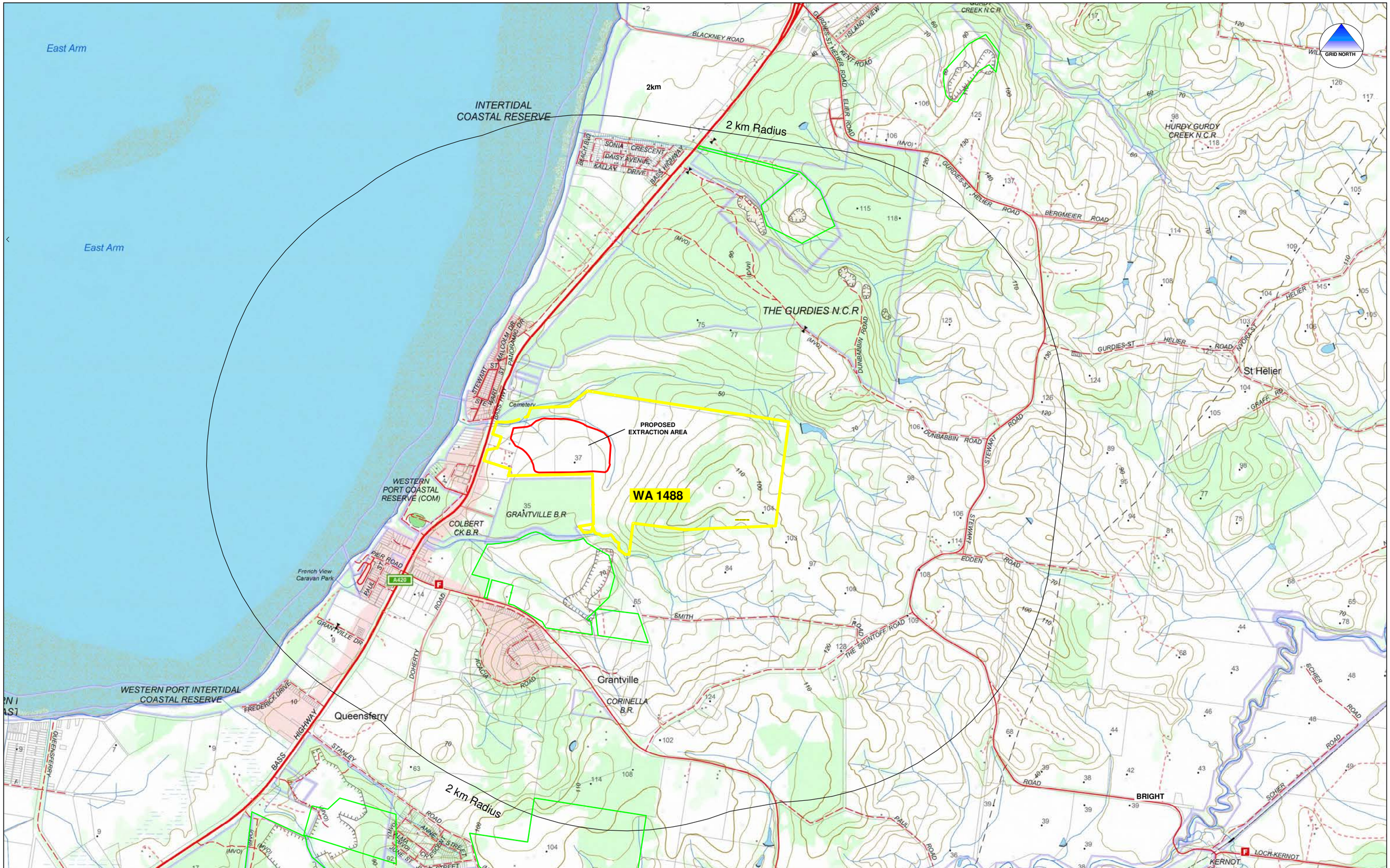
DANDY PREMIX QUARRIES PTY LTD

Drawing: A4-1168 Revision: 0 Author: IW	Project No: D10-003
Fig1_GeneralLocationPlan.WOR	Figure: 1
Date: 21/05/2012	

Extractive Industry Work Authority No: 1488

Grantville Sand Pit, GRANTVILLE

GENERAL LOCATION PLAN



Legend

- Existing Work Authotity
- Existing nearby Work Authotities
- Extent Of Land Holding
- Crown Land (LIMS)
- Extent of tree Cover over free hold land (1995)

Plan Scale: 1:25000

0 0.5 1 km

Projection AMG Zone 55 (AGD1966) Vertical Datum AHD
Plan scanned from portions of DNRE 1:25000 series
Sheets 8021-4-4 NarNarGoon & 8021-4-1 Tonimbuk

BELL COCHRANE & Associates Extractive Industries
For
DANDY PREMIX QUARRIES PTY LTD

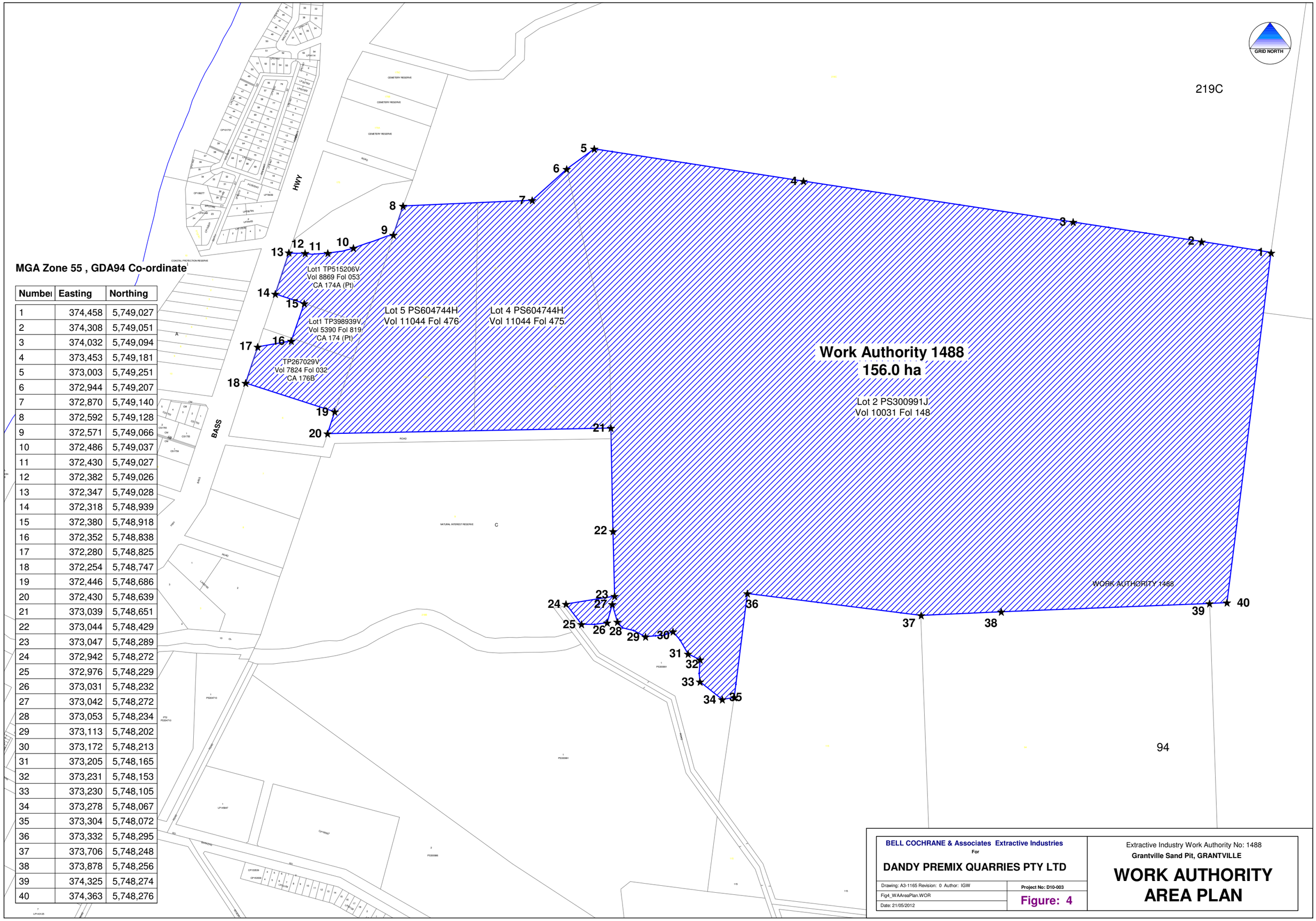
Drawing: A3-1168 Revision: 0 Author: IGW
Fig2_RegionalPlan.WOR
Date: 21/05/2012

Project No: D10-003

Figure: 2

Extractive Industry Work Authority No: 1488
Grantville Sand Pit, GRANTVILLE

REGIONAL PLAN



MGA Zone 55 , GDA94 Co-ordinate

Number	Easting	Northing
1	374,458	5,749,027
2	374,308	5,749,051
3	374,032	5,749,094
4	373,453	5,749,181
5	373,003	5,749,251
6	372,944	5,749,207
7	372,870	5,749,140
8	372,592	5,749,128
9	372,571	5,749,066
10	372,486	5,749,037
11	372,430	5,749,027
12	372,382	5,749,026
13	372,347	5,749,028
14	372,318	5,748,939
15	372,380	5,748,918
16	372,352	5,748,838
17	372,280	5,748,825
18	372,254	5,748,747
19	372,446	5,748,686
20	372,430	5,748,639
21	373,039	5,748,651
22	373,044	5,748,429
23	373,047	5,748,289
24	372,942	5,748,272
25	372,976	5,748,229
26	373,031	5,748,232
27	373,042	5,748,272
28	373,053	5,748,234
29	373,113	5,748,202
30	373,172	5,748,213
31	373,205	5,748,165
32	373,231	5,748,153
33	373,230	5,748,105
34	373,278	5,748,067
35	373,304	5,748,072
36	373,332	5,748,295
37	373,706	5,748,248
38	373,878	5,748,256
39	374,325	5,748,274
40	374,363	5,748,276

BELL COCHRANE & Associates Extractive Industries
For
DANDY PREMIX QUARRIES PTY LTD

Drawing: A3-1165 Revision: 0 Author: IGW
Fig4_WAAreaPlan.WOR
Date: 21/05/2012

Project No: D10-003

Figure: 4

Extractive Industry Work Authority No: 1488
Grantville Sand Pit, GRANTVILLE

WORK AUTHORITY AREA PLAN

LEGEND

- Surveyed Property Boundary & Proposed Work Authority Boundary (Yellow)
- Proposed Extraction Boundary (Red)
- Proposed Development (Grey/White)
- 2011 Aircored Drillhole Location
- BH 1 — March 2012 Groundwater Monitoring Bores
- 2010 Topogarphic Contours (1m Interval)
- Existing Fences

PLAN SCALE: 1:5000

0 100 200 300 400 500

metres

BELL COCHRANE & ASSOCIATES Extractive Industries Ph: 03 9710 1800 Fax: 03 9710 1811
20 Waratah Street St Andrews 3761 email:- admin@bellcochrane.com.au

Aerial Photography flown by Landair Surveys 05/2012
Images Digitally Orthorectified using DTM provided by Landair Surveys

BELL COCHRANE & Associates Extractive Industries

For

DANDY PRE MIX QUARRIES P/L

Drawing: NS-1166 Revision: 0 Author: I.W., A.M.

Project No: D10_003

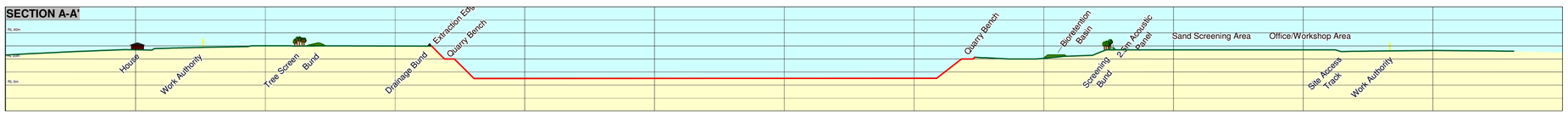
Horizontal Datum : MGA (AGD94) Vertical Datum: AHD

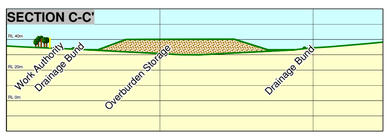
Date: 24/05/2012 Fig3_SitePlan0512.WOR

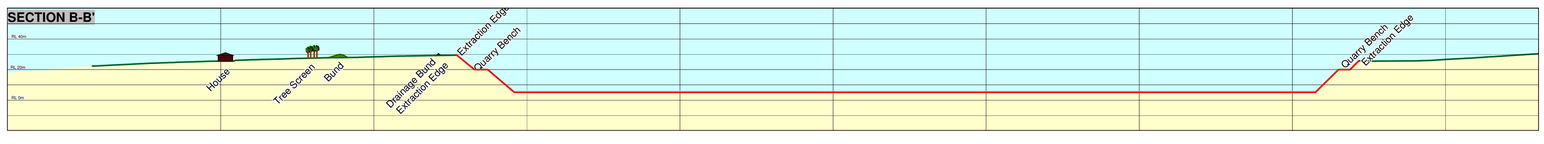
Figure: 3

Grantville Sand Pit, GRANTVILLE

2012 SITE PHOTO PLAN showing WA BOUNDARY, PROPOSED DEVELOPMENT & DRILLHOLE LOCATIONS



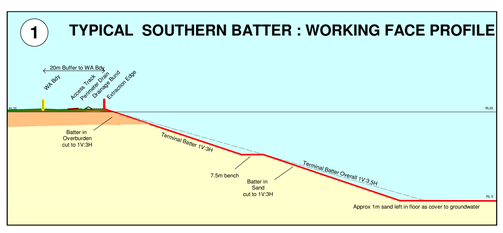


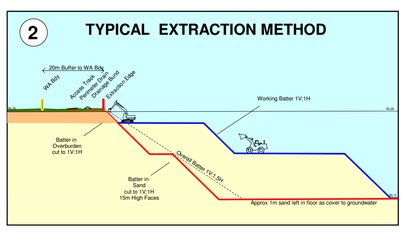


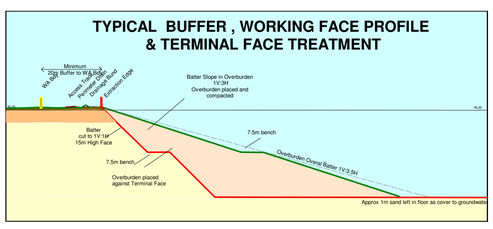
Scale 1:2000

0 100 150 200
metres

BELL COCHRANE & ASSOCIATES Extractive Industries Ph: 03 9710 1800 Fax: 03 9710 1811 email: admin@bellcochrane.com.au
20 Waratah Street St Andrews 3761







LEGEND

- Surveyed Property Boundary & Proposed Work Authority Boundary (Yellow)
- Extraction Boundary (Red)
- 2010 Topogarphic Contours (1m Interval)
- Existing Fences
- Directional Drainage Lines
- A — A' Cross Section Line Location
- 1 Typical Profile

Bell Cochrane and Associates Extractive Industries

for

DANDY PREMIX QUARRIES Pty Ltd

Extractive Industry Work Authority No: 1488

Grantville Sand Pit, GRANTVILLE

DEVELOPMENT PLAN

Author: AJM/CLB	Drawing: NS-1164 Rev:3 , 24/05/2012
Survey Source: Landair Surveys	Contours: 1 metre
Orthophoto Date May 2012	**Project No: D10_003**
Projection: MGA Zone 55 (GDA 94)	**Figure: 5**
Fig5_DevelopmentPlan.WOR	

GRID NORTH

All Plant and Stockpiles Removed
Landscaped and Sown to Pasture
27mRL

Farm Dam

20mRL

Tree Screens

Access Track

Tree Screens

~5mRL

Shallow Water Body

Overall Batter 1V:3.5H

Landscaped and Sown to Pasture
~13mRL

Overal Batter 1V:3.5H

A'

B

B'

Tree Screens

Overall Batter 1V:3.5H

20mRL

Landscaped and Sown to Pasture

A

~33mRL

Overall Batter 1V:3H

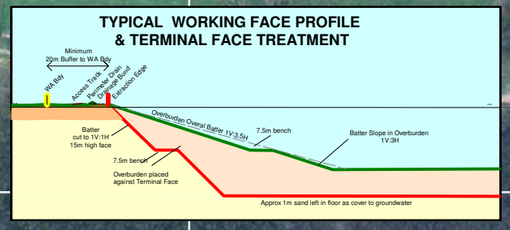
Landscaped and Sown to Pasture

40mRL

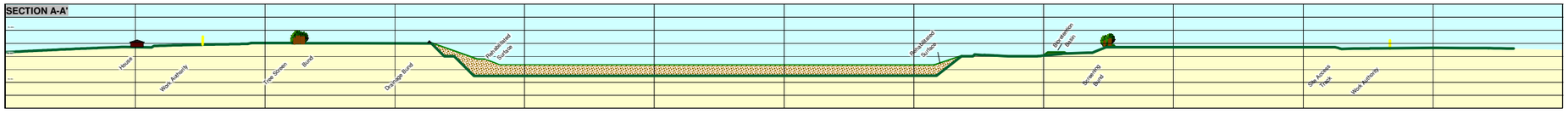
C

C'

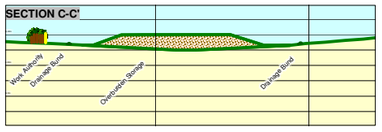
TYPICAL WORKING FACE PROFILE & TERMINAL FACE TREATMENT



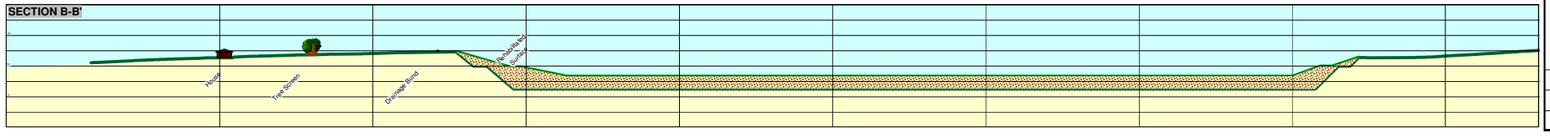
SECTION A-A'



SECTION C-C'



SECTION B-B'



0 40 80 120 160 200

metres

BELL COCHRANE & ASSOCIATES Extractive Industries
Ph: 03 9710 1800 Fax: 03 9710 1811 email: admin@bellcochrane.com.au

Drawing: A3-1169 Revision: 0 Author: AJM

Project No: D10-OO3

Contours: 1metre Vertical Datum: AHD Scale: 1:4000

Date: 26/5/2012 Rev: 0 Fig6_RehabilitationPlan.WOR

Figure: 6

DANDY PREMIX QUARRIES Pty Ltd
Work Authority No. 1488
Grantville Sand Pit, GRANTVILLE

REHABILITATION PLAN

Bell, Cochrane & Associates
Extractive Industries
A.B.N. 37 652 984 062
CONSULTANTS TO THE QUARRYING & SAND EXTRACTION INDUSTRIES

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ST. ANDREWS, VIC., 3761
Australia

Telephone: (03) 9710 1800
Facsimile: (03) 9710 1811
email: admin@bellcochrane.com.au

ACCOMPANYING DOCUMENTS

Environmental Monitoring Program

&

Community Engagement Plan

Work Plan for

Extractive Industry Work Authority No. 1488

1381 – 1395 Bass Highway, Grantville 3984

Prepared for

Dandy Premix Quarries Pty Ltd

Dandy Premix Quarries Pty Ltd
21 – 23 Bennet Street
DANDENONG VIC 3175

Tel: 03 9703 8260
Fax: 03 9793 2096

Project No. D10-003
May 2012

Environmental Monitoring Program

for

Extractive Industry Work Authority No. 1488

1381 – 1395 Bass Highway, Grantville 3984

Prepared for

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Project No. D10-003
May 2012

Environmental Monitoring Program

The following Environmental Monitoring Program (EMP) considers the impacts of the quarry on the existing landform, flora (especially mature growth Native Vegetation) and fauna, ambient air quality, noise emissions and the potential impact upon the neighbouring waterway of Deep Creek and Western Port Bay.

The EMP proposes appropriate controls and responsibilities, monitoring and reporting formats.

Activity/ Location	Potential Environmental Impact	Procedures / Controls & Responsibilities	Monitoring , Review & Reporting	Compliance / Regulatory Authority
Very limited & controlled Native Vegetation removal	Limited loss of habitat	Select clearing plan for Site Access Track designed to avoid and /or control & minimise Native Vegetation removal. Native Vegetation removal to be managed in accordance with the DPI Work Plan.	Inspection by Quarry Mgr, Mgr Sustainability & Managing Director	Work Plan Conditions – DPI, DSE & Council Plannining Permit & Council Planning Scheme Particular Provisions, 52.17 Native Vegetation.
Site Access Tracks	Erosion & siltation	Quarry foreman to follow work plan, drainage maintenance; adequate cleaning of silt traps; avoid proliferation of roads & tracks.	Quarry Mgr to monitor roads & tracks for compliance with Work Plan, on-going maintenance to roads & drains.	Work Plan Conditions - DPI; Standard Operating Procedures (SOP's).
Water Quality Management - Sediment control of water storage dams / bioretention basin / sediment traps & drainage ways - monitoring program	Turbid water discharges off site to Deep Creek, drainage way impacts,	Follow Work Plan - maintain adequate freeboard in water storages, monitor crest & batters of Extraction Pit for structural integrity, maintain drains & empty associated sediment traps regularly. Monthly sampling and NATA laboratory analysis of surface water quality.	Quarry Mgr to inspect regularly & particularly before storm events. Maintain records of inspections & monitoring. Review, act upon and report against water quality analysis results.	Work Plan conditions – DPI, Planning Permit Conditions, EPA, Melb Water, SRW & PPWCMA.

Activity/ Location	Potential Environmental Impact	Procedures / Controls & Responsibilities	Monitoring , Review & Reporting	Compliance / Regulatory Authority
Extraction	Changed surface, erosion potential, batter slips	Quarry foreman to follow extraction plan, establish drainage controls above extraction areas, repair /stabilise any slips.	Quarry Mgr to monitor excavation daily; maintain record book of inspections & repair/ remediation activities; report / discuss significant changes with DPI.	Work Plan conditions - DPI, Standard Operating Procedures (SOP's).
Noise	Environmental noise impacts & OH&S impacts	Quarry foreman to assess noise levels at boundaries for excessive noise levels; modify/manage equipment useage, Maintain/ upgrade mobile plant mufflers; monitor for compliance with NIRV Guidelines.	Quarry Mgr to review routine monitoring data, review non-compliances & implement changes as required.	Work Plan conditions – DPI, Council Planning Permit Conditions, SOP's, EP Act 1970 & NIRV
Dust	Visual amenity & local resident impacts, potential OH&S impacts	Quarry foreman to conduct daily visual inspections, Sep – Apr, refer to BoM climate model predictions (meteorograms) to assist proactive management, direct staff to water roads, inspect plant dust control measures daily, alter or suspend operations in accordance with weather conditions. Ensure required OH&S dust monitoring of employees is completed.	Quarry Mgr to review dust deposition gauges monthly monitoring data, ensure BoM "Weatherzone" subscription is current & review OH&S employee monitoring results for compliance with OH&S Act.	Work Plan conditions – DPI, Council Planning Permit conditions, SOP's, OH& S Act 1985 & EP Act 1970, PEM-SEPP (AQM).

Activity/ Location	Potential Environmental Impact	Procedures / Controls & Responsibilities	Monitoring , Review & Reporting	Compliance / Regulatory Authority
Waste Products	Wastes have the potential to adversely impact the environment, including a visual impact on habitat from municipal wastes, possible soil contamination from hydrocarbon spills and the potential to adversely impact drainage way biota;	Quarry foreman to ensure hydrocarbon wastes & domestic wastes are regularly removed in accordance with prescribed methods; Installed Workshop and bulk fuel storage bund triple interceptors are operative & maintained; ensure spill kits are available & serviceable.	Quarry Mgr to inspect site weekly.	Work Plan conditions – DPI, Planning Permit conditions, DSE Western Port Ramsar Site – Strategic Management Plan, SOP's & EP Act 1970 SEPP Waste Management.
Noxious Weeds / Pest Animals	Degrade ecological values; biodiversity changes.	Quarry foreman to minimise areas of disturbance, wash newly arrived mobile plant; institute regular (seasonal as minimum) weed inspections & initiate noxious weed control programs such as spraying /removal /burning; initiate pest animal controls as reqd.	Quarry Mgr to conduct three monthly inspections; review routine inspection reports, evaluate weed spraying programs and the control of pest animals.	Work Plan conditions – DPI, Council Planning Permit conditions, SOP's, C & LP Act 1994 and consultation with local Landcare Group & environmental groups through the Community Reference Group (CRG).
Progressive Rehabilitation / Extraction Pit	Land forming and revegetation to improve habitat and ecological values.	Quarry foreman to follow Work Plan incl. Rehabilitation Plan requirements, monitor areas under rehabilitation and assess success of plantings, control of noxious weeds & pest animals.	Quarry Mgr to conduct six monthly monitoring of rehabilitation works.	Work Plan conditions – DPI, Council Planning Permit conditions, Melb Water, SRW & PPWCMA.

Community Engagement Plan for

Extractive Industry Work Authority No. 1488

1381 – 1395 Bass Highway, Grantville 3984

Prepared for

Dandy Premix Quarries Pty Ltd

Dandy Premix Quarries Pty Ltd
21 – 23 Bennet Street
DANDENONG VIC 3175

Tel: 03 9703 8260
Fax: 03 9793 2096

Project No. D10-003
May 2012

Community Engagement Plan

Dandy Premix Quarries Pty Ltd (DPQ) will meet its duty to consult with the community under the *Mineral Resources (Sustainable Development) Act 1990* (MRSDA) by sharing relevant information about the quarry's activities that may affect the community and by providing reasonable opportunities for the community to express their views about activities at the DPQ Grantville sand quarry.

When engaging with the community, DPQ will engage in a two-way communication process, be clear on the purpose of its consultation, including those matters that are non-negotiable and DPQ will provide regular feedback to the community on how their input has influenced decisions.

The DPQ Community Engagement Plan will:

- Identify any community likely to be affected by DPQ quarrying activities conducted under WA1488;
- Include proposals for identifying community attitudes and expectations;
- Provide information to the community;
- Facilitate DPQ receiving information from the community;
- Provide a means of analysing community feedback and the consideration of community concerns;
- Register, document and respond to complaints and other communications from members of the community in relation to quarrying activities conducted at the WA 1488 site; &
- Be a "living" document/plan that evolves over time in keeping with and reflecting changing community aspirations and expectations.

Communities Affected by the Proposal & What Has Been Done

Local communities with the potential to be impacted by or an interest in the proposed DPQ sand quarry's operations are becoming more identifiable after almost 12 months of site development investigations and the consideration of on-site and off-site impacts. The DPQ Community Engagement Manager (CEM) has already been and/or will be, in contact with all local residents, businesses, local organisations and community interest groups regarding the Grantville sand quarry proposal.

The Department of Primary Industries (DPI) chairs the Grantville Environmental Review Committee (Grantville ERC) that meets quarterly to consider and address issues of local community concern in relation to the operation of all quarries in the Grantville area. Apart from DPI, the ERC is comprised of representatives of the local Grantville community, all Work Authority holders in the area and the Bass Coast Shire Council.

DPQ will commence it's participation on this ERC at the scheduled October 2012 meeting and thereafter be an active and contributing member of the Grantville ERC.

Information available from the Grantville ERC in relation to identification of the relevant local communities and issues that affect, concern and/or are of interest to these communities, have been shared with DPQ. Due regard to these communities and their known issues has been incorporated into the DPQ Grantville CEP, e.g. noise impact of truck engine brakes.

9.1.1 Communities of Place

The neighbouring community is comprised of residents in the immediate vicinity of the proposed DPQ Grantville sand quarry, namely those residing in relative proximity on the Bass Highway, Deep Creek Street, Smith Street, Stewart Street, Swan Street, Lang Street, Blackwood Drive and Dunbabbin Road.

Some of the near neighbours comprising this community have become known to DPQ through specific proposal enquiries and direct one-on-one communication and consultation. Regular, informative two-way communication will continue to take place on a personal, but informal level with numerous of these near residents. The DPQ Community Engagement Plan will also provide a second, more structured and official means for these communications to occur regularly and be recorded.

The Bass Coast Shire Council is also a key member of the community of place. A number of consultative discussions have already taken place with planning and environmental representatives from the Shire, in addition to a detailed project briefing meeting with the Leadbeater Ward councillor, Cr Veronica Dowman who is also the current Mayor of the Bass Coast Shire Council. Further meetings are scheduled including a briefing meeting with other local Ward Councillors and the prospective Leadbeater Ward candidates at the upcoming 2012 local government election.

Communities of Interest

The majority of DPQ Grantville site employees are proposed to be local residents. Accordingly, these people have a community of interest with the quarry's development as it impacts very positively on their opportunity for local employment.

The Bass Coast Shire is acknowledged as the one of the fastest growing regional shires in Victoria with population forecast to increase by a further 50% over the ensuing 20 years to 2032. The most recent (2006) socio-demographic profile of the shire highlights a significantly higher than State average mature adult population and a lower than State average rates of employment coupled with lower municipal household (gross) incomes.

This statistical snapshot supports the importance of local employment generation in the Bass Coast Shire and S21.06-7 of the Bass Coast Planning Scheme provides recognition of the importance of the known sand resources in The Gurdies – Grantville area and the local employment opportunities it presents to the local population.

A range of local businesses in Grantville, San Remo, Wonthaggi, Lang Lang and Korumburra who DPQ will purchase a range of goods and services from are also considered to be communities of interest with economic interests linked to the DPQ Grantville development proposal.

Numerous local community based sports and service clubs such as Rotary, the Grantville Cemetery Trust, the Grantville CFA, etc. will also be beneficiaries of DPQ support and are therefore considered to have a community of interest in the immediate and ongoing future of the proposed DPQ Grantville sand quarry. In this regard, it should be noted the DPQ sand quarry proposal is wholly dependent upon the quarry development proposal obtaining the required Department of Primary

Industries (DPI), statutory referral agencies and Bass Coast Shire Council Planning Permit approvals.

The ready availability and reduced cost of locally sourced construction sand from the proposed DPQ Grantville sand quarry will be beneficial to local construction activities and may assist certain types of existing local and future manufacturing industries. The local farming community and neighbouring residents are also potential beneficiaries of the proposed DPQ Grantville sand quarry.

A number of local schools, including the Newhaven College, Bass Valley Primary and San Remo Primary schools, along with special interest groups such as the Seagrass Partnership, the Grantville and District Foreshore Reserve Committee of Management, and the Friends of Bass Valley Bush Incorporated are also seen as communities of interest. DPQ has already commenced proactive consultative engagement with some of these communities of interest about their goals, values and expectations. Moreover, how the DPQ Grantville sand quarry proposal may impact upon their interests and how the quarry can play a role in support of their education and future aspirations.

Communities of Standing

Those communities of standing with a special or legal interest in the land covered by WA 1488 include the Department of Primary Industries (DPI), the Department of Sustainability and Environment (DSE), the Department of Planning and Community Development (DPCD) including Aboriginal Affairs Victoria (AAV), Environment Protection Authority (EPA), Melbourne Water, Southern Rural Water, The Port Phillip and Westernport Catchment Management Authority (PPWCMA) and the Bass Coast Shire Council.

The proposed DPQ sand quarry development proposal has a high level of impact with each of these communities of standing and a commensurate level of consultative engagement is currently being undertaken with each.

Assessment of the Level of Impact on each of the Communities

Community	Values / Issues / Concerns	Potential Impact Level	Reason
Communities of Place – • Nearest neighbours to the DPQ Grantville sand quarry – 1353 & 1421 Bass Highway, Deep Creek Street, Smith Street, Stewart Street, Swan Street, Lang Street, Blackwood Drive & Dunbabbin Road • Residents of Grantville	Privacy and a high regard for the natural environment / noise, dust and traffic / that quarry operating times are adhered to, that the opportunity for communication and to be heard is available, open and honest. The environment is returned to its natural state after quarrying operations and that the quarry could be used as a fire refuge in the event of a bushfire emergency.	Low to Medium	Additional heavy vehicle traffic on local section of Bass Highway. However, most residents are to the west of the Bass Highway and are screened from the highway which already carries large volumes of heavy vehicle traffic – minimal additional impact anticipated. Predominant winds are from north-west and west sectors placing quarry downwind of the majority of local residents. Infrequent east and south-east winds pose a higher potential for dust impact to local residents. Establishment of a DPQ Grantville CRG and access to a DPQ website will facilitate communication. The quarry Rehabilitation Plan has the site returned to pasture for grazing in keeping with its history over many decades.
Communities of Interest – • Employees & prospective employees • Local Businesses incl. Farms • Schools	Meaningful employment and viable business operations, the maintenance of a healthy local business community / support for local businesses and community groups, inclusion and balanced	Medium	DPQ is forecast to directly employs >20 EFT local residents and a number of other sub-contractors. DPQ will trade extensively with numerous local businesses. DPQ will support local community sports

Community	Values / Issues / Concerns	Potential Impact Level	Reason
• Service Clubs – Rotary, Lions, etc. • Community Organisations – Sports Clubs, CFA, etc. • Environmental Groups – Seagrass Partnership, Friends of Bass Valley Bush Inc., etc.	development with proper consideration of the local environment / potential for employment and business income, local availability of sand for local processing and manufacturing, increased heavy vehicle traffic in Grantville.		clubs and other community welfare groups, schools and special interest groups in the area. A minimal increase (if any) in heavy vehicle traffic is anticipated through Grantville township as a direct result of the DPQ sand quarry, given site is approximately 2km north of the township and will generally service the Melbourne supply demand to its north.
Communities of Standing – • DPI, DSE, DPCD incl. AAV • EPA • WorkSafe • PPWCMA, SRW & Melbourne Water • Bass Coast Shire Council • Bass Coast Landcare Network	Protection of the environment and local amenity, cultural heritage, community development and sustainability, site safety / loss of native vegetation, visual amenity, cultural heritage approval to access land for extraction, infrastructure needs and road upgrades/maintenance, local employment / establishment of a viable local business, additional local source of construction sand products.	Medium	DPQ proposed Development Plan is technically sound and adequately address all issues of concern. A unique opportunity also exists through the DPQ development proposal to secure a range of local employment & training. Other DPQ sites have an exemplary record of safety and environmental performance and the DPI have not received a single complaint about the DPQ Launching Place (WA375) hard rock quarry site in over 10 years of regulatory compliance administration.

Schedule of Engagement with the Communities

Activity	Timeframe	Communities	Level of Engagement	Comments
Introductory Letter and Personal Visit or Door – knocking	• February 2012 and ongoing	• Communities of Place; • Communities of Interest.	• Inform; • Involve; & • Collaborate	A considerable amount of personal visitation has already occurred and will continue informally separate to the CEP
Site Tours and Open Days	• April 2014 and Annually thereafter • As requested	• Communities of Place; • Communities of Interest; • Communities of Standing.	• Inform; • Consult; & • Involve.	An initial Stakeholder Consultative Meeting was held on 8 March 2012 for referral agencies and Bass Coast Shire Council incorporating a site tour. Various other site tours have and continue to be conducted. DPQ encourages the conduct of site tours to enhance the various communities understanding of the site conditions, operations and issues.
Establish a website	March - June 2013	• Communities of Place; • Communities of Interest; & • Communities of Standing.	• Inform; & • Involve	The website will be both a source of information and a means of registering community complaints and feedback. The website will have the ability to register complaints received and

Activity	Timeframe	Communities	Level of Engagement	Comments
				provide an interim reply acknowledging receipt of the communication. A full and formal response will follow from the CEM once the complaint/issue has been evaluated. Information available on the website will (in the main) reflect community expectations of DPQ and the nature of information of considered to of value.
Briefing of Bass Coast Shire Council	March / April 2012 & Ongoing	• Communities of Standing	• Inform; • Consult; • Involve; & • Collaborate	A project introduction meeting was held with the Shire's Planning and Environment officers in early March 2012 and officers from these departments represented Council at the Stakeholder Consultative Meeting on 8 March 2012 at the Grantville Transaction Centre. A further meeting was held with Council's Engagement Facilitator in April 2012 and a public meeting is being scheduled for August 2012. A briefing meeting was also held in early March 2012 with the Cr. Veronica Dowman,

Activity	Timeframe	Communities	Level of Engagement	Comments
				Leadbeater Ward, who is the current shire Mayor and represents Council on the Grantville ERC.
Members of Parliament – Project Briefing & Overview • State MLA & MLC; & • Federal MP	August 2012	• Communities of Standing	• Inform; • Consult; • Involve; & • Collaborate	The active support of Members of Parliament for extractive industry operations in their electorate is important. Their electorate offices are valuable community assets used by many as a means of expression. In this sense they act as an important barometer of community views on local issues including the economy and environment.
Community Reference Group (CRG)	March 2013	• Communities of Place; & • Communities of Interest;	• Inform; • Involve; & • Collaborate	Subject to local community support, DPQ will establish a Community Reference Group (CRG) specific to the DPQ Grantville sand quarry with the Communities of Place and Interest. The planned public meeting of August 2012 and personal one-on-one engagements throughout 2012/13 will determine local support for the CRG. If a formal CRG is not established, annual

Activity	Timeframe	Communities	Level of Engagement	Comments
				site visits will be used to address issues of site environmental performance with the community in addition to any individual response made to any complaint/approach received during the intervening period.

Registering, Documenting and Responding to Community Feedback and Complaints

Feedback and complaints from the community will be registered electronically as part of an effective DPQ complaint handling practice.

The complainant will be advised within three working days of the receipt and registration of their complaint by DPQ. Once the complaint has been evaluated and any corrective actions taken, the complainant will be informed of the actions taken as a result of the complaint. DPQ will make all reasonable effort to respond to feedback and complaints in a timely and fair manner. Should the nature of a complaint require a lengthy resolution process, communication will be maintained until the issue is resolved or DPQ has done all that can reasonably expected of it to address the issue.

Establishment of a DPQ Grantville Community Reference Group (CRG) comprised of local residents (Community of Place), businesses and interest groups (Communities of Interest) will provide an invaluable forum for the receipt, evaluation and collaborative resolution of complaints and feedback from the community.

The proposed CRG will also be an important medium for the dissemination and assessment of environmental performance information and operational issues from the quarry by volunteer community representatives.

DPQ has allocated the role of Community Engagement Manager (CEM) to Garry Cranny, Manager Sustainability to oversee the management of feedback and complaints including the conduct of quarterly reviews. It is intended this will enable DPQ to respond positively to community input and better understand how it can maintain and improve its community standing and satisfaction.

As discussed in 9.3 above, DPQ is committed to the benefits of establishing a website which would allow DPQ to disseminate information and for the community to lodge feedback and complaints electronically. The DPQ email address is also being widely distributed to facilitate electronic input from the community.

DPQ will comply with all privacy legislation to protect the privacy rights of complainants and other stakeholders.

Managing Community Expectations

The proposed DPQ Grantville sand quarry will develop a significant area of cleared grazing land that has been farmed for decades. The Work Authority site is well known to the local community and it is expected there will be some negative responses to the property's development for sand extraction, despite widespread local acknowledgement of the importance of The Gurdies – Grantville sand resource for the Melbourne Supply Area (MSA) and the opportunities for local employment and business income it will generate.

The DPQ Community Engagement Plan will provide additional opportunities for the community to provide input to ensure their changing expectations are continually understood and properly managed.

A substantial number of personal meetings, stakeholder briefings and site tours have occurred to date and more will follow. The neighbouring Community of Place are always encouraged to visit the site if they have an issue or if DPQ can be of assistance to them. We believe this openness, honesty of approach and compliance

with regulatory conditions will assist DPQ to become a trusted and creditable member of the Grantville community.

The CEM will review the Community Engagement Plan on an annual basis to reflect any changes in community expectations and to reinforce that DPQ wishes to become accepted as a valuable member of the community, which shares the community's aspirations about protection of the Bass Coast natural environment and local amenity together with the significant aquatic values of Western Port Bay (RAMSAR site).

Analysing and Incorporating Community Input

DPQ will analyse and use input received (feedback, concerns, complaints and general or specific information) from the various communities affected by the quarry, in its decision making process, provided the input is legitimate and it relates to an area of development, operation or rehabilitation that is negotiable.

Where appropriate, specialist consultant advice will be commissioned to assess the efficacy of the input for implementation.

Part of the CEM's role in reviewing and managing the Community Engagement Plan will involve making management aware of opportunities for community inclusiveness and the building of trust.

DPQ will provide community feedback to all contributors and will always avail itself of the opportunity for meaningful dialogue. The regular distribution of information on the quarry's operations and development and matters of community interest registered with DPQ will be disseminated through the local community via the website, notices or a Newsletter. When opportunities are identified from community input to work with the community(s) those opportunities will be pursued.

Input from Community of Interest group, the Bass Coast Landcare Network at Phillip Island will see this group providing YVQ with native vegetation tube stock of local provenance required for screen planting and revegetation at the DPQ Work Authority site in accordance with the DPI approved Development and Rehabilitation Plans. Income received from DPQ for this project will assist the Landcare Network, primarily made-up of local volunteers, to fund their ongoing operations.