OPERATIONAL AND LONG-TERM ENVIRONMENTAL MANAGEMENT PLAN

PROPOSED TERTIARY CONTAINMENT CELL STEEL RIVER SITE

Prepared for

Domaine Steel River Pty Ltd

Prepared by

RCA AUSTRALIA

RCA ref 6586b-605/1

July 2008

RCA AUSTRALIA
ABN 53 063 515 711

92 Hill Street, CARRINGTON NSW 2294

Telephone: +61 2 4902 9200
Facsimile: +61 2 4902 9299
Email: administrator@rca.com.au
Internet: www.rca.com.au

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/1	1	Electronic (CD), Bound Report	Environ – Graeme Nyland	16.07.08
/1	1	Electronic report, Bound report	RCA – job archive	16.07.08

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APPENDIX A

DRAWINGS

RCA ref 6586b-605/1

16 July 2008

Domaine Steel River Pty Ltd
PO BOX 1195
NEWCASTLE NSW 2300

Attention: Mr Alan Norton

RCA AUSTRALIA
GEOTECHNICAL • ENVIRONMENTAL

Geotechnical Engineering

Engineering Geology

Environmental Engineering

Hydrogeology

Construction Materials Testing

OPERATIONAL AND LONG-TERM ENVIRONMENTAL MANAGEMENT PLAN
PROPOSED TERTIARY CONTAINMENT CELL
STEEL RIVER SITE

1 INTRODUCTION

RCA Australia (RCA) has been engaged by Mr Alan Norton of Domaine Steel River Pty Ltd (DSRPL) to prepare an Environmental Management Plan (EMP) for the proposed Tertiary Containment Cell. The Tertiary Containment Cell is required to accommodate arisings of contaminated soil which have been excavated during recent subdivision works (Stages 7 and 8) and those that are anticipated during future Stage 9 and 10 works.

The Tertiary Containment Cell is to utilise a general area of the Steel River Site that was specified for this purpose in the Steel River Project Remedial Action Plan Environmental Impact Statement (RAP/EIS), May 1997 (Ref [1]).

1.1 PURPOSE OF EMP

The purpose of this EMP is to outline management protocols for the use and long-term management of the Tertiary Containment Cell (T-cell) area. The EMP includes the following aspects:

- The location of the T-cell.
- A detail of the types and sources of material that can be placed with the T-cell.
- The management and ownership of the T-cell.

- A detailed concept design of the T-cell structure.
- The long-term management requirements for the T-cell.

2 DEFINITIONS

The following definitions have been used in this document.

Potentially Impacted spoil	Material excavated from beneath the capping material which is to be assessed as to whether it is contaminated soil or not.
Arisings	Refers to a contaminated soil unsuitable for re-use at the location from where it originated. See contaminated soil, below.
Contaminated soil	Refers to soils that do not meet the Steel River Site Specific Remediation Criteria, as it contains: • visible tar • a total PAH concentration exceeding 400mg/kg; and • a benzo(a)pyrene concentration exceeding 15mg/kg.
Remediation or civil works contractor	An earthmover engaged by DSRPL for the purpose of removing and placing arisings within the T-cell.
Environmental Consultant	Appointed by DSRPL to oversee the placement of arisings in compliance with this EMP.
Community Association	The corporation that: a) is constituted by s25 of the Community Land Development Act on registration of the Community Plan; and b) is established as a community association by s5 of the Community Land Management Act. It is comprised of the owners of Lots on the Steel River estate, and is responsible for ongoing environmental management of the site after the last land is sold by the site developer, DSRPL.
Dirty water	Water that has come into contact with, or is generated from, arisings.
Clean water	Water that has not come into contact with arisings.

3 ENVIRONMENTAL MANAGEMENT PLAN

3.1 STEEL RIVER SITE DESCRIPTION

The Steel River site is a relatively flat industrial development site located in Mayfield West, Newcastle, NSW. It is bounded by the Kooragang Goods Rail Line on the western side, the Pacific Highway, and Industrial Drive on the southern boundary, while privately owned land (and Tourle Street) form the eastern boundary. The Hunter River South Arm forms the northern boundary. The relevant sub-section of the Steel River Site is shown on **Drawing 6642-TCELL-01** (attached).

The land is zoned 4(c) Steel River zone under Newcastle Local Environmental Plan (LEP) 2003.

3.2 TERTIARY CONTAINMENT CELL PROJECT DESCRIPTION

The Steel River site requires a contaminated material containment area for the placement of contaminated arisings generated during subdivision works. Provision for the T-cell containment area was made in Section 4.2 of the RAP/EIS 1997. Approval of the on site containment concept was made in the consent conditions of DA 97/251 approved 26 November 1997 for site remediation and preliminary infrastructure works.

The T-cell is located in an area identified during initial site master planning as being suitable for this purpose. This area has previously been capped, as part of site remedial works, with more than 2m of coal washery reject and geotechnically similar material (eg, sandstone won on site).

The construction, operation and closure of the T-Cell is described in the following sections.

The approximate volume of arisings to be generated during Stage 9 and 10 is 4500m^3. Approximately 4500m^3 is already stockpiled from the Stage 8 works awaiting placement within the T-cell. The total volume available for the T-cell is approximately 10000m^3, however based on available site investigation data, additional volume could be generated through further excavation. It is proposed that all materials will be placed in one placement event and therefore the actual required volume of the T-cell will be known prior to cell construction.

3.2.1 CONSTRUCTION OF THE BASE LINER

- Preliminary works will be initiated to control, stormwater and erosion at the T-cell site.

- The area of the containment cell will be marked in the field by survey as shown on **Drawing 6642-TCELL-01**. The area needs to be fenced prior to and during operation to prevent illegal and uncontrolled waste disposal.

- The layer of coal washery reject-type capping materials, present to a depth > 2m, will be removed and stockpiled separately in a designated area. Some of these materials may be used to create a bund surrounding the cell. Removal of these materials will be undertaken in conjunction with the environmental consultant to ensure that over-excavation, and accidental mixing of contaminated soils that may be present beneath the capping layer does not occur. Validation sampling of the potentially contaminated soils beneath the capping layer will be undertaken to determine re-use or disposal options. Any identified arisings will be placed within the T-cell. Material meeting HIL 'F' can be used as site contouring material. Material not meeting HIL 'F' may also require disposal in the T-cell. Excavation deeper than 2m from the May 2008 surface will be undertaken to create the cell void.

- The cell subgrade comprises existing uncontrolled filling materials and will be proof rolled as follows:

  - Proof rolling of the exposed subgrade will be undertaken with a heavy (minimum 10 tonne) roller. Soft or weak areas detected during the proof rolling should be excavated and replaced with compacted fill/subgrade replacement, ie, select fill comprising material with a CBR>15%.

- The T-cell will feature a two liner system consisting of a compacted clay base and walls overlain by a geomembrane GCL such as Bentofix, Elcoseal or Claymax with permeability at least less than 1E-10m/s. The compacted clay base is formed using clay or similar materials and compacted to achieve a minimum dry density ratio of 98% Standard and vertical permeability of 1E-09m/s. Compaction should be carried out in accordance with *AS3798–2007* under Level 1 control. The thickness of the base and walls of the clay liner should be a minimum of 0.5m.

- The geomembrane is overlain by an A64 bidim geotextile and a liner protection layer which can comprise any suitable material and typically crusher dust or sand is used. The objective of the liner protection layer is to facilitate trafficking over the cell during the placement and compaction of the arisings and to ensure that any sharp edges or protrusions within the contaminated soil do not penetrate the liner. The protection layer is to be at least 0.2m in thickness.

3.2.2 TEMPORARY STOCKPILE OF ARISINGS

Arisings will be excavated and transported under material tracking documentation to a temporary stockpile area on Lot 905 and Lot 906 (refer to **Drawing 6642-TCell-01**). The temporary stockpile area will be constructed from a sacrificial base of compacted CWR or similar soils no less than 0.2m in thickness.

The base will slope at a surface grade of 1% to a precast concrete prefabricated stormwater pit that will collect all runoff from the stockpile area. Soils will be maintained in this temporary stockpile location until the moisture content to achieve the required compaction is achieved. Runoff from the sump will be pumped out as required by a licensed liquid waste disposal contractor.

The stockpile area will be bunded as appropriate using on site CWR or similar soils to prevent surface water ingress and egress.

Following completion of all stockpiling the sacrificial layer will be removed and placed within the T-cell as impacted material. Validation sampling of the base, as directed by the environmental consultant, will be undertaken to validate the removal of all impacted soils. Validation sampling is to be completed prior to the commencement of capping the cell.

3.2.3 ARISINGS PLACEMENT

Arisings are placed in the cell in layers and compacted as determined by a geotechnical engineer who will advise on the most appropriate layering thickness. Any daily cover soils will also be compacted according to the geotechnical specification.

Daily cover will only be placed for the purpose of odour control if determined to be required. Validated clean fill soil stockpiled on site can be used for daily cover within the T-cell if odour is a problem.

Surface water within the cell will be managed by a surface gradient of 1% for each layer to allow for drainage to a low point within the cell. The low point will be pumped out by a licensed contractor following each rainfall event.

3.2.4 CAP CONSTRUCTION AND T-CELL CLOSURE

Following completion of Stage 9 and Stage 10 subdivision works the T-cell will be closed. Closure will comprise placement of the upper capping layers as follows:

- Firstly, the placement of a second liner protection layer of 0.2m in thickness.
- A GCL protection layer comprising A64 bidim geotextile is then placed over the protection layer.
- The GCL (such as Bentofix, Elcoseal or Claymax with permeability at least less than 1E-10m/s) is then placed and wrapped over the second protection layer and fixed according to the manufacturer's instructions. This thin layer forms part of the upper capping layer.
- A GCL protection layer comprising A64 bidim geotextile is then placed over the GCL.
- A 0.1m gravel drainage layer is then placed over the top of the geomembrane to provide placement of the second capping layer (2m of CWR or geotechnical equivalent). This layer facilitates drainage of any infiltrated water away from the cell as well as allowing cell trafficability.
- The coal washery reject capping layer above the drainage layer is to be compacted to 98% standard density, consistent with other capping materials on Steel River. This layer is to be at least 2.0m in thickness and placed to achieve a surface slope of 1%.

Detailed concept design is shown on **Drawing 6642-TCELL-02**. Where inconsistencies exist between the design drawings and the description provided above, the design drawings shall take precedence.

Final surface design levels will correspond to the final subdivision design level for Stage 9 and Stage 10 of Steel River, and be suitable for Lot development without need for cutting of capping material. In principle, the final surface is to grade to the surrounding surface levels ensuring a 1% slope across the surface.

Once the T-cell is completed it will not be re-opened for placement of future arisings. The T-Cell site will be developed for commercial or industrial purposes. Future arisings, if generated, will be contained in the Hole in the Wall containment cell (HitW) or appropriately disposed of off site.

3.3 THE T-CELL SITE

3.3.1 LOCATION

The T-Cell is located in proposed Lots 907, 908 and 909 which will be formed from Lot 74 in DP 270249. The proposed site is located on the mid western portion of the Steel River site, adjoining the existing primary containment cell. The footprint area of the site is approximately 1 Ha.

Following subdivision works the site will be bounded to the south by Channel Road, to the east by Proposed Road No.4 and to the north by subdivision Lots 910 and 912.

3.3.2 TOPOGRAPHY

The landform of the T-Cell is currently flat, gradually sloping at 1% downhill to the north. This landform will not vary significantly following subdivision works, but the overall site may be raised by infilling with clean material.

Regionally, the surface profile of this area grades downwards in a northerly direction towards the Hunter River. The Steel River site is of relatively low gradient and the Industrial Highway located to the south of the site is situated at a higher elevation.

3.3.3 GEOLOGY

The geology of the site of the proposed cell is expected to be generally consistent with other filled portions of the Steel River site. A capping layer of coal washery reject overlies a probable layer of compacted slag base, (potentially greater than 1m thick), likely overlying a combination of steelworks waste materials including coal washery coarse and fine rejects, slag materials and miscellaneous nonputrescible wastes.

3.3.4 HYDROGEOLOGY

Groundwater in the vicinity of the T-cell is between 6m and 7m from the present post remediation surface. Groundwater occurs within the filling materials and flows in a northerly direction.

3.3.5 SURFACE WATER

Surface water drains to the north across the T-cell following the existing topography into WQP2 located to the north of the Stage 8 subdivision.

3.3.6 FLORA AND FAUNA

The Steel River RAP/EIS concluded that the remedial works to be undertaken on the Steel River site would not impact on any significant habitat or wildlife corridor. This condition remains applicable to the T-cell and no specific conditions are required for the protection of flora and fauna during the operation of the T-cell.

4 SITE MANAGEMENT

4.1 RESPONSIBILITY

4.1.1 DSRPL

T-cell construction works will be undertaken by a civil works contractor appointed by DSRPL. DSRPL will be responsible for ensuring that the contractor fulfils the requirements of their contract which is to include that all activities are undertaken in accordance with this EMP.

4.1.2 CIVIL CONTRACTOR

The Remediation Contractor will be responsible for:

- ensuring that all arisings are placed within the T-cell in accordance with this EMP; and
- ensuring safety and environmental protection during the placement of the arisings.

An environmental consultant is to be engaged to oversee the T-cell operations. The responsibilities of the environmental consultant are outlined in Section 4.2.

4.2 ENVIRONMENTAL CONSULTANT

The Environmental Consultant will be responsible for verifying to DSRPL that all arisings are placed within the T-cell in accordance with this document, and the detailed construction design.

5 SAFETY AND ENVIRONMENTAL CONTROLS

5.1 HAZARD IDENTIFICATION AND MANAGEMENT

Prior to placement of arisings the selected civil contractor is to develop a site specific plan for identifying potential hazards, minimising the risk of incidents and responding to incidents and emergency situations. This plan is to identify the appropriate actions to be taken on identification of a hazard and is to include, but not be limited to, the following:

- Site security during operation of the T-cell.
- Road and access arrangements within the operational Steel River Site.
- Transport of contaminated soils within the operational Steel River Site.
- Health and Safety requirements.
- Contingency management.

- Ensuring contamination of presently validated areas of Steel River does not result as a consequence of T-cell construction and filling.

5.2 HEALTH AND SAFETY REQUIREMENTS

The selected civil contractor is to develop a site specific health and safety plan for the placement of arisings that is designed to protect the health and safety of on site personnel and the public.

5.3 SITE IDENTIFICATION

The T-cell is to be appropriately identified within the subdivision works area as an area for arising placement. Training in the use of this cell is to be undertaken as part of the induction programme for contractors involved in this project to help ensure that misuse of the cell does not occur. Training should include, as a minimum, an outline of the type of soils suitable for placement within the cell, PPE requirements for workers within the cell, work methodology, decontamination procedures and liner protection requirements.

5.4 WATER POLLUTION

5.4.1 EROSION AND SEDIMENT CONTROL

The selected civil contractor is to develop, to the satisfaction of the DSRPL, an erosion and sedimentation control plan for the cell construction. The sediment and erosion control plan is to include, but not be limited to, the following:

- All clean water is to be diverted around the T-cell emplacement area.
- No contaminated water is to enter the site stormwater system.
- Drying or treatment of arisings is to be undertaken within the designated stockpile area and leachate collected within the drainage sump located therein. No treatment or drying is to be undertaken at the site of arising origin.
- All arisings are to be transported from the origin site to the T-cell in suitably sealed trucks.
- Silt fencing will be placed around the containment cell work area during cell construction.
- Any dust suppression will be undertaken using clean water and at a rate that does not generate free surface water or considerable leachate.
- Where truck wheels have been contaminated with arising material, truck wheel cleaning is to be undertaken prior to exit from the T-cell compound. A suitable shaker pad is to be constructed at the exit point. Wherever possible, truck wheels are to be prevented from contacting contaminated soils.
- All other equipment used and potentially contaminated during the operation of the T-cell is to be cleaned within the cell.

- If waters become contaminated these will be dealt with in a manner appropriate to the degree of contamination. The environmental consultant will determine the method of treatment or disposal.

5.4.2 SURFACE WATER MONITORING

Surface water monitoring throughout the subdivision works is undertaken by DSRPL as part of their responsible site management programme. This monitoring is considered to be sufficient to monitor operations at the T-cell.

5.5 AIR QUALITY AND NOISE

The selected civil contractor is to develop, to the satisfaction of the DSRPL, and NCC as appropriate, an air quality and noise control plan for the cell construction. This plan can be incorporated in the overall plan for the subdivision works. The air quality and noise control plan is to include, but not be limited to, the following:

- Dust management measures which may include road and stockpile spraying.
- Odour management may be required. If odours are excessive the contractor should apply an odour suppressant to stockpiles and open work areas.
- Noise management through the use of noise attenuation equipment that is consistent with good contemporary practice.

Dust emissions are currently monitored on the Steel River Site as part of DSRPLs responsible site management programme. It is considered that this monitoring is sufficient for the present context of cell construction monitoring.

5.6 LAND MANAGEMENT AND CONSERVATION

5.6.1 MATERIAL ACCEPTANCE

The use of the cell is limited to:

- excavated contaminated soils generated within the Steel River site; and
- where the actual contaminants were present on site before site remediation by BHP Billiton. The soil is to be 'validated' as contaminated soil by the Environmental Consultant prior to placement within the T-cell.

5.6.2 RECORDING OF QUANTITIES RECEIVED AND CELL LOCATION

The civil contractor will be responsible for providing estimates to the environmental consultant of the quantities received and placed.

5.6.3 LOCATION OF MATERIALS AND COMPACTION

The civil contractor is required to certify that the cell construction is in accordance with the construction design drawings (not as yet prepared). This can be achieved by a combination of survey, material quantities and geotechnical testing records, to the satisfaction of DSRPL.

All survey and testing is to be undertaken by appropriately qualified professionals.

5.6.4 CLEAN MATERIALS

The cell design includes the use of clean materials for some components. Clean materials may be sourced from on site or off site. All materials that are used for 'clean material' purposes are to meet the site specific remediation criteria and guidelines suitable for use in parks, recreational open space and playing fields for analytes not included in the site specific criteria and as determined appropriate by the environmental consultant. Approval from the environmental consultant is to be sought prior to importing clean materials to the site.

5.6.5 DOCUMENTATION

The civil contractor is to maintain all materials tracking documentation relating to the placement of arisings within the T-cell. The contractor is to also provide an 'as built' report for the T-cell and associated validation documentation to certify the T-cell closure in accordance with the construction design drawings. Photographs of the construction of the cell are to be taken to assist validation and for the historical record.

5.7 LONG-TERM MANAGEMENT AND MONITORING

5.7.1 T-CELL SITE MANAGEMENT

At the completion of Stage 9 and Stage 10 subdivision works the T-cell will be closed. Following successful validation of the T-cell closure, the site will be suitable for commercial or industrial development in accordance with the Steel River Stage 9 and 10 EMP (S910EMP) [Ref 2] which incorporates and supercedes the Site Construction Guidelines on the Stage 9 and 10 subdivision site.

At the time of writing, the S910EMP was in draft form. Following completion of Stage 9 and 10, and auditor sign off on the successful closure of the T-cell, the S910EMP will require amendment to reflect that the T-cell site is then a developable area. The revised S910EMP is to include the as-built drawings and description of the T-cell.

In addition to the requirements of the S910EMP and the Site Construction Guidelines, construction on the T-cell site should minimise excavation of the upper capping layer.

Typical construction should include high level footings suitable for lightly loaded and settlement tolerant structures. Lightly loaded structures would include those requiring an allowable bearing pressure up to 100kPa on pad and strip footings and 5kPa over slabs on ground. Settlements can be expected to be limited to the order of 5-15mm. Heavier loads are not suitable for this site.

5.7.2 LEACHATE AND GROUNDWATER MONITORING

The cell civil contractor will be required to install four boreholes around the new containment cell area (north, north eastern, eastern and southern boundaries) six months prior to cell filling. Two rounds of sampling are to occur before the cell is constructed. These boreholes are to be numbered BH27, BH28 BH29, and BH30. This will maintain an appropriate borehole density for the perimeter of the containment areas. It is permissible for existing BH26 and BH27 to be destroyed during operation of the containment cell if this is unavoidable.

The installation of the BH27, BH28, BH29 and BH30 should be undertaken:

- at suitable locations;
- with the knowledge of BHP Billiton;
- by suitably qualified drillers; and
- under the supervision of appropriately qualified environmental personnel.

Following installation the bores should be developed such that they are suitable for groundwater monitoring. Steel River Pty Ltd should provide BHP Billiton with a copy of the bore logs and enable BHP Billiton to include the bores in their monitoring programme.

Routine monitoring by BHPB should commence in the next monitoring round following closure of the T-cell. If these works are not undertaken by BHPB, the Community Association will take over this responsibility.

6 LIMITATIONS

This EMP has been prepared for Domaine Steel River Pty Ltd on behalf of the Steel River Community Association in accordance with an agreement with RCA dated 28 November 2007. The services performed by RCA have been conducted in a manner consistent with that generally exercised by members of its profession and consulting practice.

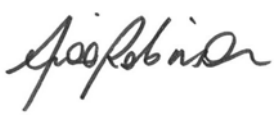
This EMP has been prepared for the sole use of Domaine Steel River Pty Ltd. The EMP may not contain sufficient information for purposes of other uses or for parties other than Domaine Steel River Pty Ltd. This EMP shall only be presented in full and may not be used to support objectives other than those stated in the EMP without written permission from RCA.

Domaine Steel River may assign this EMP to the Steel River Community Association and provide a copy to Newcastle City Council for their reference.

The information in this EMP is considered accurate at the date of issue with regard to the current conditions of the site. Conditions can vary across any site that cannot be explicitly defined by investigation.

Environmental conditions including contaminant concentrations can change in a limited period of time. This should be considered if the EMP is used following a significant period of time after the date of issue.

Yours faithfully
RCA AUSTRALIA



Fiona Robinson
Principal Environmental Engineer

Paul Noonan
Principal Environmental Engineer

REFERENCES

[1] Steel River Project – Remedial Action Plan - Environmental Impact Statement Prepared for BHP Long Products Division May 1997 by AGC Woodward–Clyde Pty Limited, 1997.

[2] Steel River Stage 9 and 10 EMP (S910EMP), July 2008, RCA Australia Pty Ltd.

Appendix A

Drawings

DRG STATUS : DA ISSUE NOT FOR CONSTRUCTION

Issue	Details of Issue	Des'd	Drn	Chk'd	Approved	Date
C	DA ISSUE	KSB	KSB	BGP		17.06.08
B	DA ISSUE	KSB	KSB	BGP		28.05.08
A	ISSUED FOR CLIENT/ RCA COMMENT	KSB	KSB			15.05.08

INITIALS SHOWN IN THE ADJACENT ISSUE RECORDS INDICATE THE STAGES UNDERTAKEN IN THE DRAWING APPROVAL PROCESS. DRAWINGS ARE ONLY TO BE USED WHEN APPROVED BY PATTERSON BRITTON & PARTNERS AND THEN ONLY AS NOTED FOR DRG STATUS. THE ORIGINAL SIGNATURES CAN BE FOUND ON THE REVERSE SIDE OF THE ORIGINAL OF THE DRG REGISTER/TRANSMITTAL FORM No.5.2.2. HELD BY PATTERSON BRITTON & PARTNERS

8 Telford Street
Newcastle East 2300

telephone (02) 4928 7777
facsimile (02) 4926 2111
mail@newcastle.patbrit.com.au
A.C.N. 003 220 228

Patterson Britton & Partners Pty Ltd
consulting engineers

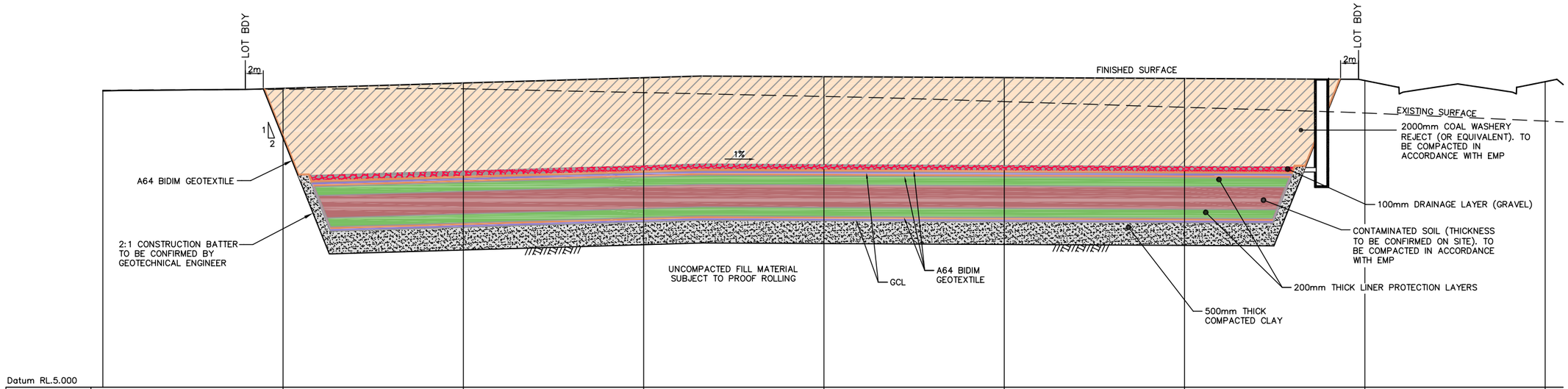
Client: DOMAINE STEEL RIVER PTY LTD

Project: STEEL RIVER STAGE 9
CIVIL WORKS - TERTIARY CONTAINMENT CELL

Title: TERTIARY CONTAINMENT CELL GENERAL ARRANGEMENT

Drawing No. 6642-TCELL-01
Issue C
Cad File No. Xref.(s) 6642-TCELL-01

A1



Datum RL.5.000

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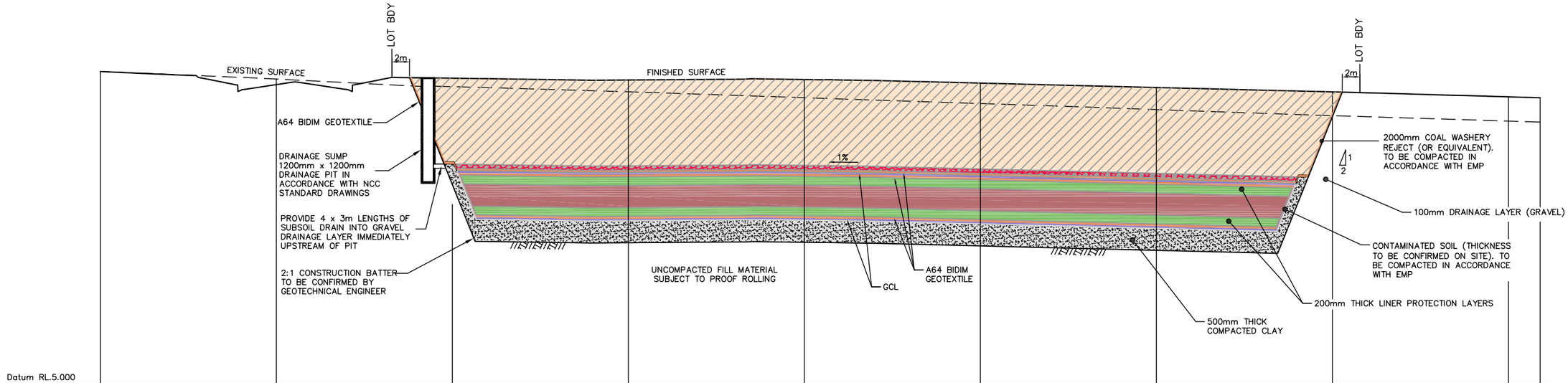
CHAINAGE	20.000		40.000		60.000		80.000		100.000		120.000		140.000		160.000		180.000		

SECTION 1

SCALE HORIZONTAL 1:250
VERTICAL 1:50



Datum RL.5.000

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CHAINAGE	0.000		20.000		40.000		60.000		80.000		100.000		120.000		140.000		160.000		163.611

SECTION 2

SCALE HORIZONTAL 1:250
VERTICAL 1:50

VERTICAL
0 1 2 3 4 5m
1:50 (A1) 1:100 (A3)

HORIZONTAL
0 5 10 15 20 25m
1:250 (A1) 1:500 (A3)

DRG STATUS : DA ISSUE NOT FOR CONSTRUCTION

Issue	Details of Issue	Des'd	Drn	Chk'd	Approved	Date
D	MINOR AMENDMENT – REISSUED FOR DA	KSB	KSB	BP		15.07.08
C	DA ISSUE	KSB	KSB	BGP		17.06.08
B	DA ISSUE	KSB	KSB	BGP		28.05.08
A	ISSUED FOR CLIENT/ RCA COMMENT	KSB	KSB			15.05.08

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consulting engineers

Client: DOMAINE STEEL RIVER PTY LTD

Project: STEEL RIVER STAGE 9
CIVIL WORKS - TERTIARY CONTAINMENT CELL

Title: TERTIARY CONTAINMENT CELL SECTIONS AND DETAILS

Drawing No. 6642-TCELL-02
Issue D
Cad File No.
Xref.(s) 6642-TCELL-02

A1