



Erosion and Sediment Control Plan Bing Bong Stockyard

Western Desert Resources Ltd

Project No: GC120095

Project Name: WDRL Stockyard

Document No: GC120095_ESCP-SP

Report Date: June 2012

CONSULTING ENGINEERS AND SCIENTISTS

Offices:

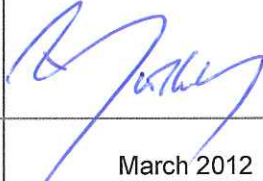
Western Australia
Queensland
Northern Territory

New South Wales
Victoria
Hanoi, Vietnam

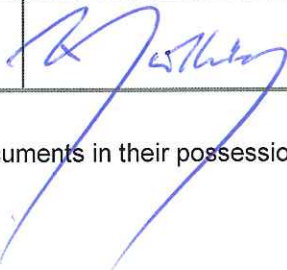


Document Control Record

Prepared by:	Joe McDonald
Position:	Water Engineer
Signed:	
Date:	March 2012

Approved by:	Brad Comley
Position:	Discipline Manager – Water
Signed:	
Date:	March 2012

REVISION STATUS

Revision No.	Description of Revision	Date	Approved
0	First Issue	March 2012	
1	Review stockyard location	June 2012	

Recipients are responsible for eliminating all superseded documents in their possession.

VDM Consulting Pty Ltd
ACN: 087 601 296

Level 8, Australia Fair Tower
42 Marine Parade
SOUTHPORT QLD 4215

PO Box 3766, Australia Fair
Southport Qld 4215

Telephone: +61 7 5509 6400
Facsimile: +61 7 5509 6411
Email: goldcoast@vdmgroup.com.au
Internet: www.vdmconsulting.com.au



RELIANCE, USES and LIMITATIONS

This report is copyright and is to be used only for its intended purpose by the intended recipient, and is not to be copied or used in any other way. The report may be relied upon for its intended purpose within the limits of the following disclaimer.

This study, report and analyses have been based on the information available to VDM Consulting at the time of preparation. VDM Consulting accepts responsibility for the report and its conclusions to the extent that the information was sufficient and accurate at the time of preparation. VDM Consulting does not take responsibility for errors and omissions due to incorrect information or information not available to VDM Consulting at the time of preparation of the study, report or analyses.

Executive Summary

VDM Consulting has been engaged by Ecoz Pty Ltd on behalf of Western Desert Resources Limited (WDRL) to prepare an Erosion and Sediment Control Plan (ESCP) for a proposed bulk iron ore Stockyard, as part of the Roper Bar iron ore mine.

The ESCP details the following:

- Erosion and Sediment Control measures for the Stockyard; and
- Maintenance and Monitoring Program.

Sediment and erosion control devices for the site have been developed in accordance with the IECA Best Practice Erosion and Sediment Control Guidelines. The following sediment and erosion control devices and stormwater management controls are to be implemented:

- Diversion/Catchment bunds;
- Sediment Basins; and
- Mulch Bunds.

Diversion/Catchment bunds will direct clean upstream runoff around the site, while at the same time directing dirty runoff from the disturbed areas of the site into the sediment basins.

Sediment basins have been modelled as having a length to width ratio of 4:1 and sized in accordance with the IECA Best Practice Erosion and Sediment Control Guidelines. Table E1 and Table E2 provide a summary of the annual sediment loss prediction and the sediment basin sizing configuration respectively.

Table E1 Annual Sediment Loss Prediction

Basin ID	Ac (ha)	Slope Grade	Intensity I_2 (mm/hr)	R	K	LS	C	P	A (t/ha/yr)	Yield (m ³ /yr)
A	2.07	1	16.1	13738	0.047	0.24	1	1.3	201.5	321
B	1.62	1	16.1	13738	0.047	0.24	1	1.3	201.5	252
C	1.83	1	16.1	13738	0.047	0.24	1	1.3	201.5	283
D	2.31	1	16.1	13738	0.047	0.24	1	1.3	201.5	358
E	6.92	1	16.1	13738	0.047	0.24	1	1.3	201.5	1074

Table E2 Sediment Basin Configuration

Catchment	Area (ha)	Settling Zone Volume (m ³)	Storage Zone Volume (m ³)	Surface Area (m ²)	Length (m)	Width (m)	Total Depth (m)	Total Volume (m ³)
A	2.07	988	494	2730	103	26.5	1.36	1482
B	1.62	898	449	2650	102	26	1.29	1347
C	1.83	723	361	2490	100	25	1.16	1084
D	2.31	1034	517	3240	143	23	1.16	1551
E	6.92	1685	1430	3000	60	50	1.3	3116

The implementation of these control measures will ensure the integrity of receiving water bodies will not be adversely impacted as a result of this construction.

Contents

1	Introduction	6
1.1	Background.....	6
1.2	Scope.....	8
1.3	Objectives	8
1.4	Relevant Legislation and Guidelines	8
1.5	Performance Criteria.....	8
2	Site Characteristics.....	9
2.1	Topography.....	9
2.2	Disturbance.....	9
2.3	Soils and Land Units.....	9
3	Erosion and Sediment Control	12
3.1	Principles of Erosion and Sediment Control	12
3.2	Management of Erosion and Sediment Control.....	13
3.3	Erosion and Sediment Control Measures.....	15
3.4	Restricted Areas	16
3.5	Construction Phase Monitoring	17
3.6	Contingencies	17
3.7	Responsibilities.....	18
3.8	Environmental Complaints and Incidents	19
3.9	Awareness and Training	20
4	Conclusions.....	21

Tables

Table E1 Annual Sediment Loss Prediction	3
Table E2 Sediment Basin Configuration.....	3
Table 2.1 Land Unit Types on the Subject Site	10
Table 3.1 Annual Sediment Loss Prediction	16
Table 3.2 Sediment Basin Configuration	16
Table 3.3 Party Responsibilities	18

Figures

Figure 1.1 Proposed Roper Bar Mine and Haul Road Layout.....	6
Figure 1.2 Stockyard Layout.....	7
Figure 2.1 Soil Types.....	9
Figure 2.2 Land Units at the Proposed Development Site	10
Figure 2.3 Existing Site Topography	11

Appendices

Appendix A – Erosion and Sediment Control Plan and Details.....	22
Appendix B – Complaints Register	23
Appendix C – Incident/Non-Conformance Notification Form.....	25

1 Introduction

VDM Consulting has been commissioned by Ecoz Pty Ltd on behalf of Western Desert Resources to prepare an Erosion and Sediment Control Plan (ESCP) for the proposed bulk iron ore Stockyard located within the vicinity of Bing Bong Port, in the Gulf of Carpentaria (the subject site). This report has been prepared to accompany an Environmental Impact Statement (EIS).

A comprehensive review of available Erosion and Sediment Control devices and Best Management Practices (BMP) was undertaken as part of this investigation. The following sections provide a summary of the mitigation measures required to meet best practice in accordance with the International Erosion Control Association Australasia Best Practice Erosion and Sediment Control Guidelines during the construction phases of the development.

This management plan is to be considered as part of an EIS process and provides conceptual design details. The level of detail provided within this report is not suitable for construction purposes, a Detailed Erosion and Sediment Control Plan outlining detailed designs will need to be completed in conjunction with detailed civil design documentation.

1.1 Background

Western Desert Resources Ltd (WDRL) operates the Roper Bar Mine camp located approximately 230 km east of Katherine, between the Towns River and Little Towns River. This will be the future site of the proposed Roper Bar Mine. Material extracted from the Roper Bar Mine will be transported to Bing Bong Port some 165 km to the east via a new haul road.

Ecoz Pty Ltd has engaged VDM Consulting on behalf of WDRL to prepare a Sediment and Erosion Control Plan for a proposed bulk iron ore Stockyard to be located close to the existing Bing Bong Port. This Stockyard will be used to store bulk iron ore prior to loading onto barges at Bing Bong Port.

Figure 1.1 shows the locations of the proposed mine site, haul road, and Bing Bong Port. Figures 1.2 shows a site plan of the stockyard facility located close to Bing Bong Port.



Figure 1.1 Proposed Roper Bar Mine and Haul Road Layout

1.2 Scope

Specifically, this report details the following:

- Erosion and Sediment Control measures for the bulk iron ore Stockyard; and
- Maintenance and Monitoring Program.

To minimise the impact of the proposed development on the external environment the proponent shall implement this ESCP. To avoid significant and/or sustained deterioration in downstream water quality this ESCP may be amended as required, in response to the Monitoring and Maintenance Program described herein.

1.3 Objectives

The objectives of this ESCP are to:

- Ensure stormwater is managed to protect downstream water quality;
- Reduce the potential for sedimentation (soil particles >1 mm are retained onsite);
- Ensure adequate drainage and pollution control measures are implemented to manage runoff from disturbed areas of the site; and
- Prevent soil erosion on site.

1.4 Relevant Legislation and Guidelines

The following legislation and guidelines were used to prepare this ESCP:

- *Water Act (NT);*
- *Waste Management and Pollution Control Act (NT);*
- *Soil Conservation and Land Utilisation Act (NT);*
- *NRETAS Erosion and Sediment Control Plan Content (2006);*
- *Department of Health and Families guidelines for preventing mosquito breeding associated with construction practice near tidal areas in the NT (2005); and*
- *IEAust. Soil Erosion and Sediment Control Engineering Guidelines for Queensland Construction Sites (June, 1996).*

1.5 Performance Criteria

The following performance criteria in accordance with NRETAS requirements have been set for the Stockyard portion of the proposed development:

- Stable embankments and drainage lines;
- No obvious accumulation of sediment within natural watercourses or drainage lines outside of the construction area;
- No unnecessary disturbance of earth or vegetation outside areas to be cleared or disturbed;
- No new biting insect breeding habitats created and no increase in mosquito numbers;
- Soil particles >1 mm do not leave the site; and
- All batters or embankments to have slopes greater than 1:4.

2 Site Characteristics

2.1 Topography

Aerial LiDAR survey has been used as the basis for topographical information. This data has produced 0.5 m contours in the location of the Stockyard. The site is generally flat with an average elevation of approximately 3.0 m AHD. There is a low ridge to the east of the site running in a north-south direction. There are three (3) small upstream catchments which enter the site. The majority of the site falls towards a small wetland to the west. Figure 2.3 shows the existing site topography.

2.2 Disturbance

The site has had no previous works undertaken on it, and is therefore free from disturbance.

2.3 Soils and Land Units

Kandosols are the dominant soil type at the subject site. Just south of the site the soil type transitions into Tenosols (Figure 2.1). The land units found on this site are shown below in Figure 2.2 and are described in Table 2.1. The entire site is within land units *Tos* and *Tol* which consists of siliceous sands and yellow podsollic soils and Shallow, gravelly yellow massive earths, with minor lateritic lithosols.



Figure 2.1 Soil Types

Table 2.1 Land Unit Types on the Subject Site

Land Unit	Land Form	Soils	Vegetation
Tos	Coastal sand sheets, dunes and cheniers with minor intervening tidal flats	Siliceous sands and yellow podsolic soils	Tall grassland of <i>Chrysopogon elongatus</i> with some <i>Melaleuca viridiflora</i> , <i>Melaleuca nervosa</i> , <i>Pandanus spiralis</i> and <i>C. bella</i>
Tol	Flat to gently undulating upland surface	Shallow, gravelly yellow massive earths, minor lateritic lithosols	<i>Eucalyptus miniata</i> , <i>E. Tetradonta</i> <i>Sorghum spp.</i>



Figure 2.2 Land Units at the Proposed Development Site

Client: Western Desert Resources Ltd
Doc No. GC120095_ESCP-SP
Doc Title: Erosion and Sediment Control Plan – Stockyard

3 Erosion and Sediment Control

The purpose of this section is to provide a set of best practice site management procedures to control the severity and extent of soil erosion and pollutant transport during the construction phase of the proposed development.

Clearing of the site and the construction of erosion and sediment controls is to comply with the NT Government Department of NRETAS's Erosion and Sediment Control Plan Content dated 2006. Due consideration should be given to stripped topsoil being retained and reused in drains, disturbed areas and rehabilitation of the site. The construction contractor will be responsible for the implementation, inspection, repair and modification of the specified erosion and sediment controls.

3.1 Principles of Erosion and Sediment Control

The principles of effective erosion and sediment control for the proposed clearing and earthworks have been based on the following:

- Appropriately integrate the development into the site;
- Integrate erosion and sediment control issues into site and construction planning;
- Develop effective and flexible erosion and sediment control (ESC) plans based on anticipated soil, weather and construction conditions;
- Minimise the extent and duration of soil disturbance;
- Control water movement through the site;
- Minimise soil erosion;
- Promptly stabilise disturbed areas;
- Maximise sediment retention on site;
- Maintain all ESC measures in proper working order at all times; and
- Monitor the site and adjust ESC practices to maintain the required performance standard.

3.1.1 Site Installation Sequence

The following sediment and erosion control devices and stormwater management controls will be implemented on the site;

- Tree Clearing – Clearing of vegetation will be undertaken where necessary and is to be restricted to identified areas only;
- Diversion/Containment Bund – Used to divert clean water from upstream catchments around the site, and convey flow within disturbed areas to sediment basins;
- Mulch Bund (Batter) – Used to reduce the velocity of water flowing through the site; and
- Sediment Basin – Used to trap and retain sediment via settlement of suspended particles.

These controls have been developed in accordance with IECA Best Practice Erosion and Sediment Control guidelines and the location of these devices is presented in Appendix A.

3.2 Management of Erosion and Sediment Control

The following measures are to be implemented to maintain the current environmental values onsite.

Commitment:

- No deterioration in downstream water quality and no net increase in runoff quantity.

Issue:	Runoff - Stormwater Management - Contamination of Surface water - Erosion and Sedimentation.
Objectives:	• To ensure that there is no deterioration in stormwater quality or any reduction in the environmental values of the downstream receiving waters as a result of the proposed construction activities on the subject site; • To control stormwater runoff to minimise sediment loss from the site and pollution of natural waterways and drainage systems; • To comply with relevant governing statutory requirements; • To prevent soil erosion and contamination of the stormwater drainage system and waterways; • To prevent sediment from being deposited off site; and • Compliance with Environmental Protection Policies.
Management Procedure:	Pre-Construction (Sediment and Erosion Control): • Sediment erosion controls will be developed as construction progresses through each development stage; • Site personnel informed of the erosion and sediment controls; • Install vehicular shake down grids/rubble grids at designated construction exits to remove sediment from vehicles prior to exiting site. Any sediment dispersed onto roads shall be swept up immediately and placed in construction rubble waste bin. Construct exits in accordance with IEAust Guidelines at designated exits; • Minimise vegetation removal to areas designated for clearing. Clearly identify "No Go Areas" where vegetation is to be maintained. • Install diversion drains to direct clean stormwater away from disturbed areas; • Install mulch mounds to reduce runoff velocities and encourage sedimentation and filtration of eroded soils; and • Transportation of soil and other fill: Trucks shall have their loads secured and covered. Any spillage shall be collected and removed streets on a daily basis and placed in a construction rubble waste bin for removal. Construction (Mitigation of Water Quality): • Sediment fences to be erected at the base of all batters and soil stockpiles to prevent sediment laden stormwater migrating away from source; • Regular inspections as soon as practicable after storm events to check and maintain controls; • Inspection dates and actions taken to be recorded and available for review upon request;

	• Sediment to be removed from fences and basins when controls are 40% full and at the completion of construction. All material to be re-used or stored on-site in a controlled manner or taken off-site for re-use or disposal at a licensed waste disposal facility; • Monitoring of water quality to determine the effectiveness of the sediment and erosion control management practices; and • Progressive re-vegetation of filled and disturbed areas.
Performance Indicators:	• Visual evidence of deterioration of baseline water quality of downstream water courses directly attributable to the site; • Pollutant concentrations that exceed the water quality objectives (TSS 90th percentile all other analytes 80th percentile); • Visible erosion; and • Failure of control measures.
Responsibility:	Site Foreman and Environmental Management Officer.
Critical Dates:	Prior to commencement of work/construction safety induction (include training, awareness of commitments, directives, working hours and approval conditions for stormwater management, water quality and sediment and erosion control).
Monitoring:	Regular inspection as soon as practicable after storm events to check and maintain controls. Site visits from Environmental Management Officer during construction. Monitoring regime to be in accordance with the approved site Stormwater Management Plan. WQ monitoring by qualified personnel.
Reporting:	Report incidents to Site Foreman. Upon notification of Environmental Management Officer (EMO). EMO to certify compliance of measures by way of letter upon completion, and if necessary notify Project Manager of non-compliance. Site Manager (during construction) to report to relevant authority.
Corrective Action:	All corrective actions shall be agreed upon, dependent upon the severity of non-conformance and parameter concerned, between Construction Engineering, the Environmental Consultant and relevant authority. Remove sediment from fences when controls are 40% full and at completion of construction. Observations and monitoring data shall be used to guide implementation of additional measures, if and when required. The triggering of a performance indicator will require: • Locate source of water quality deterioration; • Prevent continuing deterioration by repairing existing measures, construct additional measures or modify procedures; • Review strategies/management plans in consultation with relevant authority; and • Repair existing controls, construct additional controls or modify procedures to prevent future deterioration in water quality.

3.3 Erosion and Sediment Control Measures

The following erosion and sediment control measures have been developed and adopted for the proposed development.

3.3.1 Diversion/Containment Bund

Diversion/containment bunds are to be constructed along the northern and eastern sides of the proposed site area. These control measures will serve two main functions. Firstly they will divert clean runoff from upstream catchments around the site works. This will help minimise the volume of water which will require treatment.

Secondly these measures will contain untreated runoff and direct it toward sediment basins. These bunds should be regularly inspected and any damage from onsite vehicles should be repaired immediately. Any build-up of sediment should be removed as soon as practically possible. Details of the size and locations of these bunds is provided in Appendix A.

The bunds are only proposed for the northern and eastern sides of the site as the entire site will be filled and graded in a south north direction. In addition the existing southern catchments will drain away from the earthworks area and thus will not require diversion.

These bunds will remain in place during the operational phase of the development to prevent clean stormwater entering the site and to control contaminated runoff from the proposed stockyard areas.

3.3.2 Mulch Bund (Batter)

The removal of vegetation from the site will expose soils and result in the site to be more susceptible to erosion. In order to reduce internal catchment flow lengths mulch bunds are proposed as a temporary control measure. These bunds will reduce the velocity of stormwater flowing across the site and help to pond water adding in sedimentation. These bunds have been aligned across the site to intercept sheet flow. Regular inspections and maintenance are required to repair damage caused by the movement of on-site vehicles.

3.3.3 Sediment Basins

The major sediment control for the site will be the installation of sediment basins. Sediment basins are generally required where:

- Areas with exposed highly erodible soils;
- Areas with exposed slopes greater than 2%; and
- Areas with exposed soils after 30 September or before May 1.

As construction may continue outside these dates, sediment basins will be required.

Sediment basins are required to be sized to capture the Q10 runoff volume of the contributing catchments and allow for 3 months of sediment storage based on the Universal Soil Loss Equation.

Table 3.1 and Table 3.2 provide a summary of the annual sediment loss prediction and the sediment basin sizing configuration respectively.

Table 3.1 Annual Sediment Loss Prediction

Basin ID	Ac (ha)	Slope Grade	Intensity I_2 (mm/hr)	R	K	LS	C	P	A (t/ha/yr)	Yield (m ³ /yr)
A	2.07	1	16.1	13738	0.047	0.24	1	1.3	201.5	321
B	1.62	1	16.1	13738	0.047	0.24	1	1.3	201.5	252
C	1.83	1	16.1	13738	0.047	0.24	1	1.3	201.5	283
D	2.31	1	16.1	13738	0.047	0.24	1	1.3	201.5	358
E	6.92	1	16.1	13738	0.047	0.24	1	1.3	201.5	1074

Table 3.2 Sediment Basin Configuration

Catchment	Area (ha)	Settling Zone Volume (m ³)	Storage Zone Volume (m ³)	Surface Area (m ²)	Length (m)	Width (m)	Total Depth (m)	Total Volume (m ³)
A	2.07	988	494	2730	103	26.5	1.36	1482
B	1.62	898	449	2650	102	26	1.29	1347
C	1.83	723	361	2490	100	25	1.16	1084
D	2.31	1034	517	3240	143	23	1.16	1551
E	6.92	1685	1430	3000	60	50	1.3	3116

The above volumes and dimensions are the minimum requirements. As the sediment basins will function as stilling ponds during the operational phase of the development, there is an opportunity to construct the basins to accord with the ultimate design. In this case the basins will provide a greater storage capacity than that specified within the above tables.

The configuration of the sediment basins are to have a minimum length to width ratio of 4:1. The minimum depth of the “settling zone” is to be 0.6 m. The side batters of the basins will be at a slope of 1:6.

Artificial flocculation will be applied on retained runoff to assist in the settling process. This will be completed via the application of Gypsum within 24 hours of the conclusion of each storm event and before any pumping out of the basin. Application of the Gypsum will occur by broadcasting it over the surface by hand, ensuring an even spread over the basin surface at a rate of 32 kg per 100 m³ of water.

3.4 Restricted Areas

All areas identified as being non-clearable areas should be flagged and/or marked on the ground so as to restrict movement of vehicles or persons to this area. All areas to be cleared should be provided to clearing contractors, downloaded onto GPS units prior to the commencement of any clearing activities.

3.5 Construction Phase Monitoring

Prior to construction onsite, it is recommended the contractor shall undertake a series of data collection exercises to define the existing stormwater quality. Samples will be analysed for total suspended solids (TSS), pH, dissolved oxygen (DO) and hydrocarbons with the results being used as water quality indicators for construction phase monitoring. Monitoring during the construction phase will be conducted to determine the impact of activities on the subject site only. Sampling by the proponent will be undertaken in accordance with procedures set out in the Environmental Protection Authority's Water Quality Sampling Manual. A NATA registered laboratory will be used to perform the analysis of collected samples. Monitoring reports will be compiled upon request.

3.5.1 Investigation Indicators

The following indicators are used to identify if the objectives of the ESCP are being met:

- Visible evidence of deterioration of baseline water quality of downstream watercourses that is directly attributable to the site;
- Pollutant concentrations that exceed the water quality objectives (TSS 90th percentile all other analytes 80th percentile);
- Visible significant erosion; and/or
- Failure of control measures.

The triggering of an investigation indicator will require the following remedial actions:

- Locate source of water quality deterioration;
- Prevent continuing deterioration with temporary controls;
- Repair existing controls, construct additional controls or modify procedures to prevent future deterioration in water quality; and
- During the operational phase of the development, if there is a significant deterioration in water quality, the management plan and strategies will be reviewed.

3.6 Contingencies

During construction, the Contractor/Principal/Site Foreman shall allocate sufficient resources (personnel, plant, equipment and materials) to the site and store on-site, at suitable locations and at all times sufficient quantities of materials to immediately attend to any non-conformance.

Corrective actions may be agreed upon, dependent upon the severity of non-conformance and/or emergency and parameter involved, between the Principal, Construction Contractor, Environmental Consultant, and relevant Government Representatives.

3.7 Responsibilities

It should be noted that the basic responsibility for environmental protection rests with all employees and sub-contractors. Table 3.3 presents the specific responsibilities that pertain to this CMP.

Table 3.3 Party Responsibilities

Party	Primary Responsibility
Project Manager	• Overall implementation of the ESCP and management of environmental impacts and risks. • Responsible for reporting any incidents to relevant authorities if required. • Issue and distribution of ESCP. • Revision of the ESCP, as required, to reflect the <i>status quo</i>. • Revisions are to be made by replacing the entire document by consecutively numbered amendments. • Implementation, monitoring, reporting and corrective actions within the ESCP.
Construction Manager/Site Manager Safety Officer	• Implementation of strategies, requirements, procedures and measures to ensure that appropriate environmental protection is in place. • Induction, supervising and monitoring of the ESCP. • To attend construction at all times during working hours. • Site inspections (random, daily) to ensure adherence to the different plans and procedures. • Direct actions, as required, to protect the environment and to minimise and/or rectify any environmental concerns.
All other site personnel	• Adherence to Site Safety Rules and ESCP.

3.8 Environmental Complaints and Incidents

The Site Manager shall investigate all environmental complaints. Where considered appropriate and/or required, the Site Manager shall notify the relevant statutory authority. Complaints received by external parties will also be subject to investigation by the Site Manager or EMO.

Should an environmental incident occur during the course of construction, the Landowner shall take prompt action to minimise any impact and, where necessary, seek the advice of the relevant authorities.

All complaints will be treated with respect. The Site Manager shall maintain a Complaints Register (refer Appendix B) and shall direct an appropriate course of action relating to the complaint. The Complaints Register will be included in any audit reports during construction and shall record the date, time and nature of any complaint, the name and contact details of the complainant, action taken, person responsible for action, and resolution of complaint. The Site Manager shall certify each entry on the record.

3.8.1 Environmental Notifications

In the event of a major incident/non-conformance that may cause or causes environmental harm, as soon as practicable after being made aware of the incident, the following people have a duty to notify the relevant authority of the incident:

- The person carrying on the activity;
- An employee or agent carrying on the activity;
- An employer carrying on the activity; and
- The occupier of the premises where the incident occurs.

Notification must be given as soon practicable after the person becomes aware of the incident.

The Site Manager shall furnish the following details:

- The time, date, nature, duration and location of the incident;
- The location of the place where non-conformance occurred;
- The nature of the non-conformance;
- The circumstances in which the incident occurred (including the cause of the incident, if known);
- The action taken or proposed to be taken to deal with the incident; and
- Other information prescribed by the regulations.

3.9 Awareness and Training

A copy of this document will be available from the following officers at the site:

- Site Manager; and
- Safety Officer.

Awareness and Training forms part of Safety Inductions conducted prior to site work. It is a requirement that no person shall undertake any site work unless properly inducted. As part of their site induction and training all personnel engaged in construction shall be made aware of the provisions of this document in order to promote a general awareness of the environment and to minimise any potential impact and/or disturbances to the environment. Evidence of environmental induction of personnel in this project shall be maintained on project records.

4 Conclusions

This study has reviewed the construction impact of the proposed construction on receiving waters. Based on this study the following erosion and sediment control measures have been developed:

- Diversion/Containment Bunds;
- Mulch Bunds and
- Sediment Basins.

Sediment basins have been sized to capture sediment carried by runoff from the contributing catchments and have been designed using the IECA Best Practice Erosion and Sediment Control guidelines with a minimum storage depth of 0.6 m.

In summary, the integrity of receiving water bodies will not be adversely impacted as a result of this construction provided the sediment control measures described herein are implemented.

Appendix A – Erosion and Sediment Control Plan and Details

ROPER BAR MINE TO BING BONG BULK IRON ORE STOCKYARD

CONTRACT GC120095-EP03 EROSION AND SEDIMENT CONTROL



LOCALITY PLAN

SCHEDULE OF DRAWINGS	
Drawing No.	Drawing Title
GC120095-EP03-N000	COVER SHEET, SCHEDULE OF DRAWINGS
GC120095-EP03-N001	OVERALL LAYOUT PLAN
GC120095-EP03-N002	CATCHMENT PLAN
GC120095-EP03-N003	SEDIMENT AND EROSION CONTROL PLAN
GC120095-EP03-N004	SEDIMENT AND EROSION DETAILS AND NOTES

PREPARED FOR

WESTERN DESERT RESOURCES

PREPARED BY



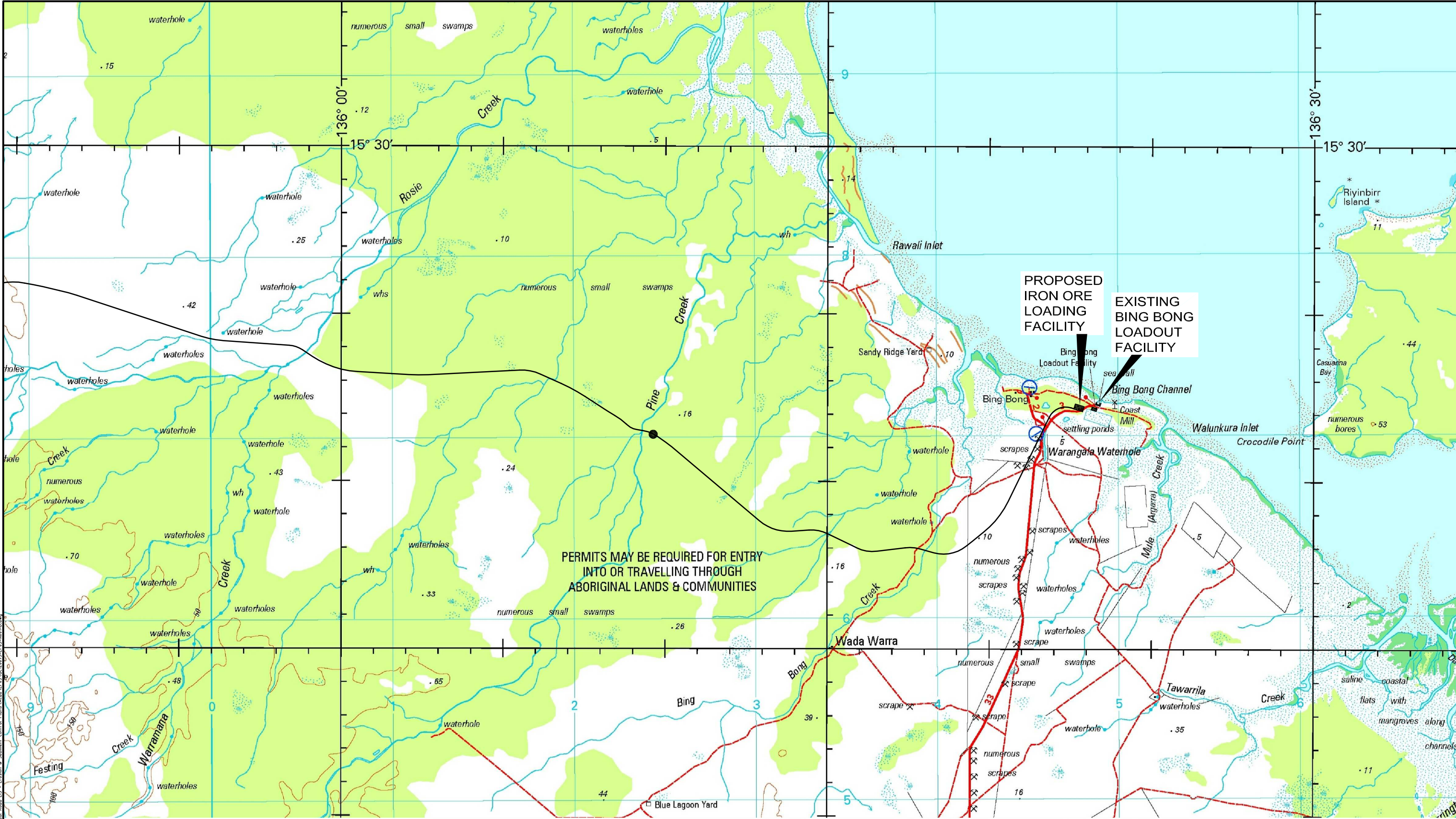
GOLD COAST

Level 8, Australia Fair Tower
42 Marine Parade, Southport QLD 4215
PO Box 3766, Australia Fair, Southport QLD 4215
Phone: +61 7 5509 6400
Fax: +61 7 5509 6411
Email: goldcoast@vdmgroup.com.au
VDM Engineering (Eastern Operations) Pty Ltd
ABN 91 087 601 296

DATE : 02-03-2012

PROJECT No.:	DRAWING No.:	VERSION:
GC120095-EP03	N000	A

This page has been intentionally left blank.



DATUM
HORIZONTAL DATUM: MGA ZONE 53 (GDA94)
VERTICAL DATUM: AHD

OVERALL LAYOUT PLAN

ROPER BAR MINE TO BING BONG
HAUL ROAD
FOR
WESTERN DESERT RESOURCES

B	HAUL ROAD ALIGNMENT UPDATED	15-06-12	
A	ORIGINAL ISSUE	27-03-12	
VER.	DESCRIPTION	APPR.	DATE

COPYRIGHT (C)
This drawing is copyright and the property of VDM. It must not be retained, copied or used without the authority of VDM.

DISCLAIMER
This drawing and its contents are electronically generated, are confidential and may only be used for the purpose for which they were intended.
VDM will not accept responsibility for any consequences arising from the use of the drawing for other than its intended purpose or where the drawing has been altered, amended or changed either manually or electronically by any third party.

NOTE
This is an uncontrolled document issued for information purposes only, unless the checked sections are signed or completed.
Figured dimensions take precedence over scale. Do not scale reduced size drawings. Verify dimensions prior to commencing any on-site or off-site works or fabrication.



GOLD COAST
Level 8, Australia Fair Tower
42 Marine Parade, Southport QLD 4215
PO Box 3766, Australia Fair, Southport QLD 4215
Phone: +61 7 5509 6400
Fax: +61 7 5509 6411
Email: goldcoast@vdmgroup.com.au
VDM Engineering (Eastern Operations) Pty Ltd
ABN 91 087 601 296

PROJECT:
**EROSION AND
SEDIMENT CONTROL
for
BULK IRON ORE
STOCKYARD**

DRAWING TITLE :
OVERALL LAYOUT PLAN

DEVEL. APPLIC. No.:		DATE : 15-06-12	
PROJECT LEADER : BRAD COMLEY		DESIGNER : JOE McDONALD	
DRAFTSPERSON : ANNETTE LEGGE		CHECKED :	
APPROVED FOR AND ON BEHALF OF VDM ENGINEERING (EASTERN OPERATIONS) PTY LTD ACN 087 601 296			
RPEQ No. :			
SCALE : AS SHOWN		DATUM : AHD	FULL SIZE : A1
PROJECT No.: GC120095-EP03		DRAWING No. : N001	VERSION: B

FILENAME: BA-1012-GC120095-Haul Road ES - Erosion & Sediment Control Plans-Vdm-EP03-GC120095-EP03-N001-B.dwg
PLOTTED: 15 Jun 2012

This page has been intentionally left blank.

FILENAME: B:\2012\GC120095_Haul_Road_ES - Erosion & Sediment Control Plans\Task\EP03_GC120095_EP03_N002_C.dwg
PLOTTED: 18 Jun 2012

ROPER BAR MINE TO BING BONG
HAUL ROAD
FOR
WESTERN DESERT RESOURCES

C	LAYOUT AMENDED	18-06-12	
B	ALTERNATE STOCKYARD LOCATION	15-06-12	
A	ORIGINAL ISSUE	28-03-12	
VER.	DESCRIPTION	APPR.	DATE

COPYRIGHT (C)
This drawing is copyright and the property of VDM. It must not be retained, copied or used without the authority of VDM.

DISCLAIMER
This drawing and its contents are electronically generated, are confidential and may only be used for the purpose for which they were intended.
VDM will not accept responsibility for any consequences arising from the use of the drawing for other than its intended purpose or where the drawing has been altered, amended or changed either manually or electronically by any third party.

NOTE
This is an uncontrolled document issued for information purposes only, unless the checked sections are signed or completed.
Figured dimensions take precedence over scale. Do not scale reduced size drawings. Verify dimensions prior to commencing any on-site or off-site works or fabrication.



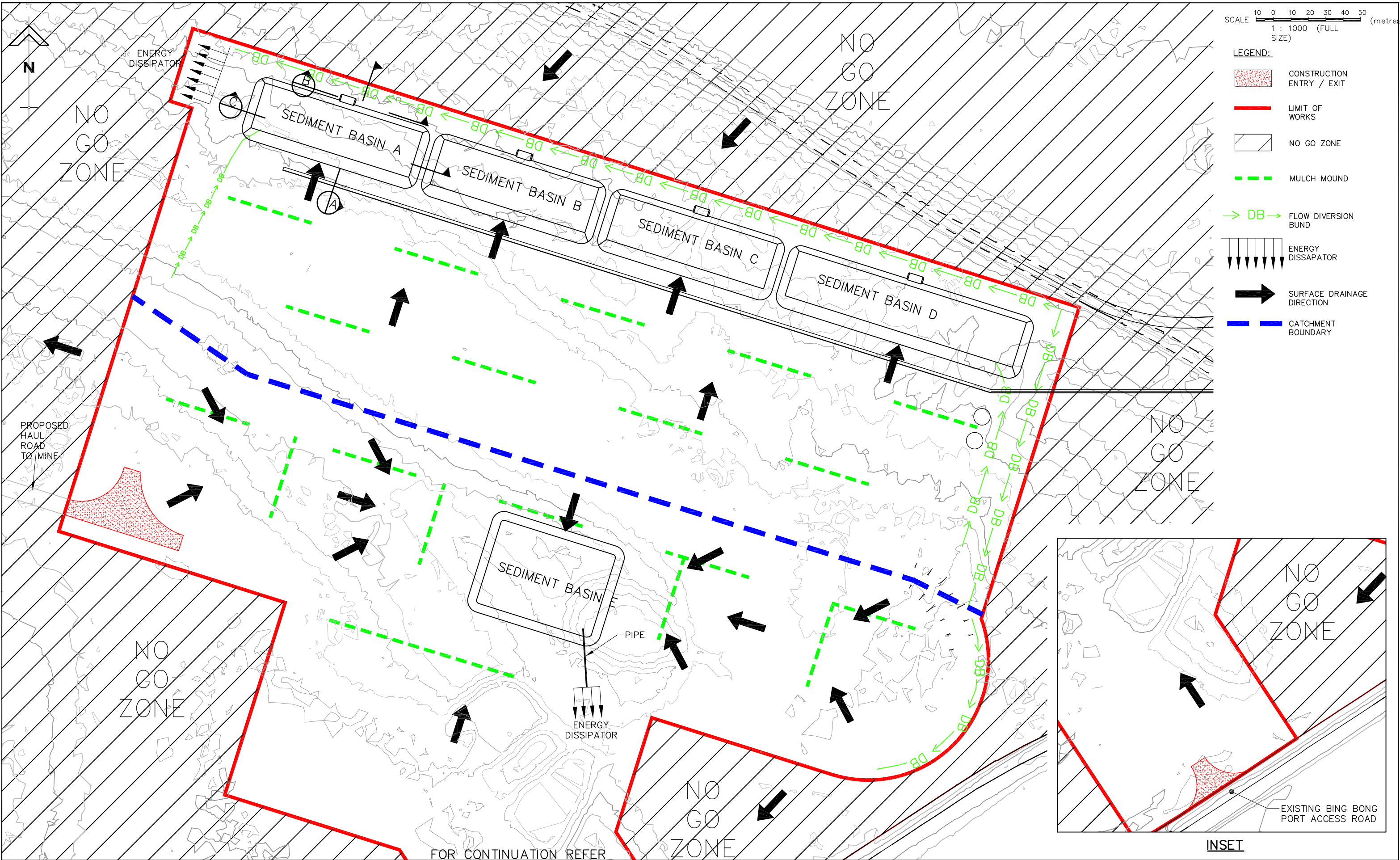
GOLD COAST
Level 8, Australia Fair Tower
42 Marine Parade, Southport QLD 4215
PO Box 3766, Australia Fair, Southport QLD 4215
Phone: +61 7 5509 6400
Fax: +61 7 5509 6411
Email: goldcoast@vdmgroup.com.au
VDM Engineering (Eastern Operations) Pty Ltd
ABN 91 087 601 296

PROJECT:
**EROSION AND
SEDIMENT CONTROL
for
BULK IRON ORE
STOCKYARD**

DRAWING TITLE:
CATCHMENT PLAN

DEVEL APPLIC. No. :		DATE : 18-06-12
PROJECT LEADER : BRAD COMLEY	DESIGNER : JOE McDONALD	
DRAFTSPERSON : ILZA MITCHELL	CHECKED :	
APPROVED FOR AND ON BEHALF OF VDM ENGINEERING (EASTERN OPERATIONS) PTY LTD ACN 087 601 296		
RPEQ No. :		
SCALE : AS SHOWN	DATUM : AHD	FULL SIZE : A1
PROJECT No.:	DRAWING No. :	VERSION:
GC120095-EP03	N002	C

This page has been intentionally left blank.



ROPER BAR MINE TO BING BONG
HAUL ROAD
FOR
WESTERN DESERT RESOURCES

INSET			
VER.	DESCRIPTION	APPR.	DATE
C	LAYOUT AMENDED		18-06-12
B	ALTERNATIVE STOCKYARD LOCATION		15-06-12
A	ORIGINAL ISSUE		28-03-12

COPYRIGHT (C)
This drawing is copyright and the property of VDM. It must not be retained, copied or used without the authority of VDM.

DISCLAIMER
This drawing and its contents are electronically generated, are confidential and may only be used for the purpose for which they were intended.
VDM will not accept responsibility for any consequences arising from the use of the drawing for other than its intended purpose or where the drawing has been altered, amended or changed either manually or electronically by any third party.

NOTE
This is an uncontrolled document issued for information purposes only, unless the checked sections are signed or completed. Figured dimensions take precedence over scale. Do not scale reduced size drawings. Verify dimensions prior to commencing any on-site or off-site works or fabrication.

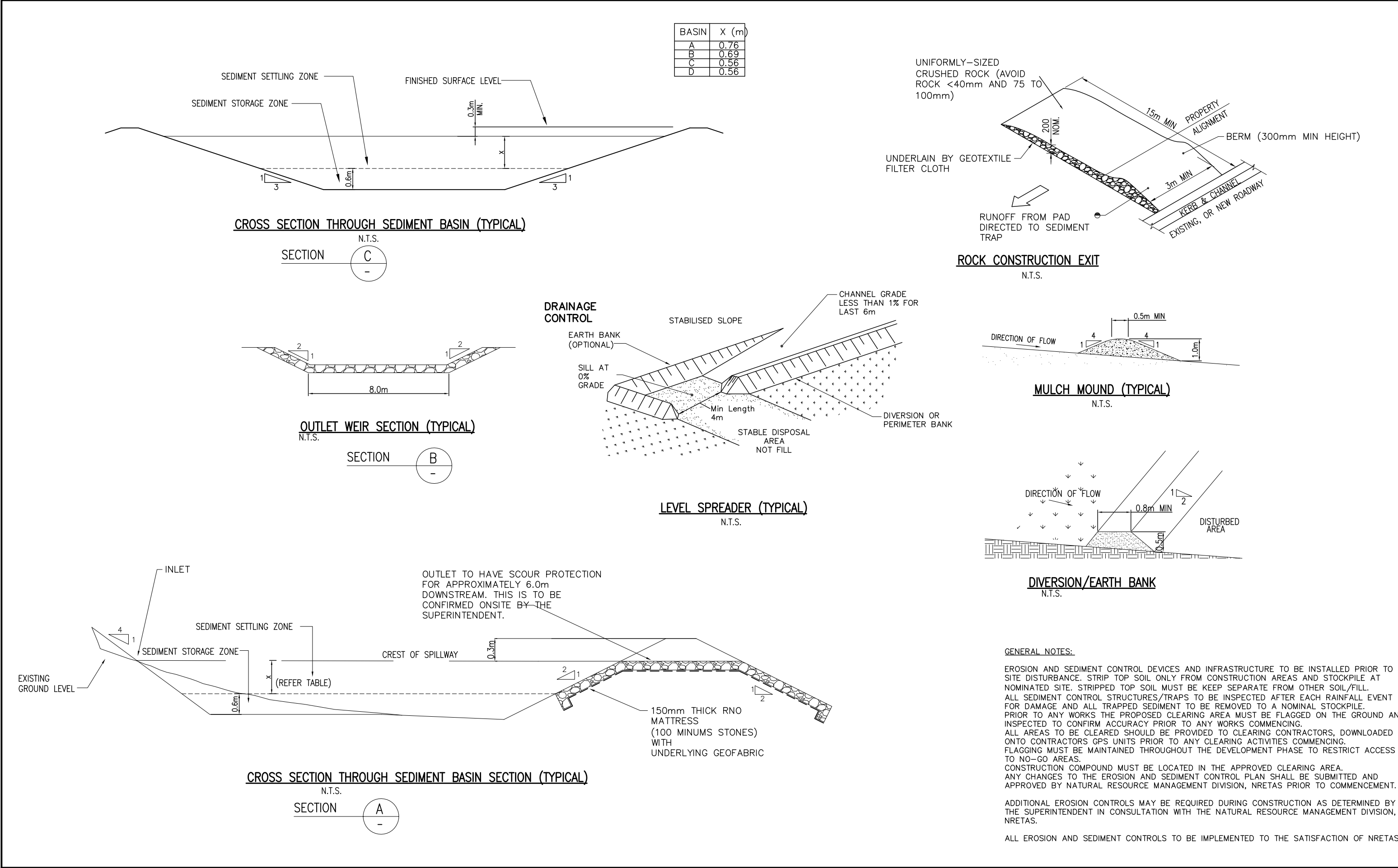
VDM CONSULTING
GOLD COAST
Level 8, Australia Fair Tower
42 Marine Parade, Southport QLD 4215
PO Box 3766, Australia Fair, Southport QLD 4215
Phone: +61 7 5509 6400
Fax: +61 7 5509 6411
Email: goldcoast@vdmgroup.com.au
VDM Engineering (Eastern Operations) Pty Ltd
ABN 91 087 601 296

PROJECT:
**EROSION AND SEDIMENT CONTROL
for
BULK IRON ORE STOCKYARD**

DRAWING TITLE :
**EROSION AND SEDIMENT
CONTROL PLAN**

DEVEL. APPLIC. No.:		DATE: 18-06-12	
PROJECT LEADER: BRAD COMLEY		DESIGNER: JOE McDONALD	
DRAFTSPERSON: ILZA MITCHELL		CHECKED:	
APPROVED FOR AND ON BEHALF OF VDM ENGINEERING (EASTERN OPERATIONS) PTY LTD ACN 087 601 296			
RPEQ No.:			
SCALE: AS SHOWN		FULL SIZE: A1	
PROJECT No.:		VERSION:	
GC120095-EP03		C	

This page has been intentionally left blank.



ROPER BAR MINE TO BING BONG HAUL ROAD FOR WESTERN DESERT RESOURCES																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																			
---	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

This page has been intentionally left blank.

Appendix B – Complaints Register

Complaints Register

For the recording of any complaint pertaining to construction and the environment.

Date:	Time:
Name and Contact Details of Complainant:	
Details of Complaint:	
Action Taken:	
Responsible Person:	
Resolution/Notes:	
Site Manager:	Date:
Date:	Time:
Name and Contact Details of Complainant:	
Details of Complaint:	
Action Taken:	
Responsible Person:	
Resolution/Notes:	
Site Manager:	Date:
Date:	Time:
Name and Contact Details of Complainant:	
Details of Complaint:	
Action Taken:	
Responsible Person:	
Resolution/Notes:	
Site Manager:	Date:

Appendix C – Incident/Non-Conformance Notification Form

Incident/Non-Conformance Notification Form

Name of Designated Contact:		
Telephone Number:		
Location of the Incident:		
Date and Time of Incident:		
Cause of the Incident:		
Environmental Harm: (Caused/threatened/suspected)		
Details of Actions: (to prevent further incidents and/or recurrence)		
Mitigation: (actions to mitigate any environmental harm)		
Site Manager:		Date