Attachment 4

Site Based Management Plan
Job Details

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Document Title: Wolffdene Quarry
Site Based Management Plan
Principal Author: Yoland Dowling / Environmental Consultant
Client: Hanson Construction Materials Pty Ltd

Document Status

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<td>C. Hill</td>
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# Table of Contents

1.0 **Introduction** .........................................................................................................................................................1  
   1.1 General .................................................................................................................................................................1  
   1.2 Site Details ..........................................................................................................................................................1  
   1.3 Project Overview ................................................................................................................................................2  
   1.4 Description of Existing Environment ..................................................................................................................4  
   1.5 Potential Environmental Impacts and Risks .........................................................................................................7  
   1.6 Purpose of Site Based Management Plan ..........................................................................................................10  
   1.7 Scope and Format of the Site Based Management Plan ........................................................................................10  
   1.8 Legislation ........................................................................................................................................................12  

2.0 **Procedures** ............................................................................................................................................................13  
   2.1 Organisational Structure .......................................................................................................................................13  
   2.2 Environmental Policy ...........................................................................................................................................13  
   2.3 Implementation .....................................................................................................................................................13  
   2.4 Incidents and Complaints Procedure ..................................................................................................................14  
   2.5 Monitoring Requirements ...................................................................................................................................15  
   2.6 Communication ...................................................................................................................................................16  
   2.7 Records and Reporting ....................................................................................................................................17  
   2.8 Review and Update .............................................................................................................................................17  
   2.9 Training/Induction .............................................................................................................................................17  

3.0 **Site Based Management Strategies** ....................................................................................................................18  
   3.1 Stormwater, Erosion and Sediment Control ......................................................................................................18  
      3.1.1 Purpose ........................................................................................................................................................18  
      3.1.2 Operational Policy ...................................................................................................................................18  
      3.1.3 Performance Targets ................................................................................................................................19  
      3.1.4 Implementation Strategy/Mitigation Measures .............................................................................................19  
      3.1.5 Monitoring ................................................................................................................................................20  
      3.1.6 Audit and Review ......................................................................................................................................21  
      3.1.7 Reporting and Responsibility .....................................................................................................................21  
      3.1.8 Identification of Incident or Failure to Comply ...........................................................................................21  
      3.1.9 Corrective Action .......................................................................................................................................21  
   3.2 Air Quality (Dust) ................................................................................................................................................22  
      3.2.1 Purpose ........................................................................................................................................................22  
      3.2.2 Operational Policy ...................................................................................................................................22  
      3.2.3 Performance Targets ................................................................................................................................22  
      3.2.4 Implementation Strategy/Mitigation Measures .............................................................................................22  
      3.2.5 Monitoring ................................................................................................................................................23  
      3.2.6 Auditing and Review ................................................................................................................................23  
      3.2.7 Reporting and Responsibility .....................................................................................................................23  
      3.2.8 Identification of Incident or Failure to Comply ...........................................................................................23  
      3.2.9 Corrective Action .......................................................................................................................................23  
   3.3 Noise ....................................................................................................................................................................24  
      3.3.1 Purpose ........................................................................................................................................................24  
      3.3.2 Operational Policy ...................................................................................................................................24  
      3.3.3 Performance Targets ................................................................................................................................24
# Table of Contents

3.3.4 **Implementation Strategy/Mitigation Measures** ........................................................................................................25  
3.3.5 **Monitoring** .................................................................................................................................................................25  
3.3.6 **Auditing and Review** .........................................................................................................................................................26  
3.3.7 **Reporting and Responsibility** .......................................................................................................................................26  
3.3.8 **Identification of Incident or Failure to Comply** ............................................................................................................26  
3.3.9 **Corrective Action** ............................................................................................................................................................26

3.4 **Blasting** ...............................................................................................................................................................................27  
3.4.1 **Purpose** ............................................................................................................................................................................27  
3.4.2 **Operational Policy** .............................................................................................................................................................27  
3.4.3 **Performance Targets** .........................................................................................................................................................27  
3.4.4 **Implementation Strategy/Mitigation Measures** .............................................................................................................27  
3.4.5 **Monitoring** .......................................................................................................................................................................27  
3.4.6 **Auditing and Review** .........................................................................................................................................................28  
3.4.7 **Reporting and Responsibility** .......................................................................................................................................28  
3.4.8 **Identification of Incident or Failure to Comply** ............................................................................................................28  
3.4.9 **Corrective Action** ............................................................................................................................................................28

3.5 **Hydrocarbons and Chemicals** .............................................................................................................................................29  
3.5.1 **Purpose** ............................................................................................................................................................................29  
3.5.2 **Operational Policy** .............................................................................................................................................................29  
3.5.3 **Performance Targets** .........................................................................................................................................................29  
3.5.4 **Implementation Strategy/Mitigation Measures** .............................................................................................................29  
3.5.5 **Monitoring** .......................................................................................................................................................................30  
3.5.6 **Auditing and Review** .........................................................................................................................................................30  
3.5.7 **Reporting and Responsibility** .......................................................................................................................................30  
3.5.8 **Identification of Incident or Failure to Comply** ............................................................................................................30  
3.5.9 **Corrective Action** ............................................................................................................................................................30

3.6 **Waste** ..................................................................................................................................................................................31  
3.6.1 **Purpose** ............................................................................................................................................................................31  
3.6.2 **Operational Policy** .............................................................................................................................................................31  
3.6.3 **Performance Targets** .........................................................................................................................................................31  
3.6.4 **Implementation Strategy/Mitigation Measures** .............................................................................................................31  
3.6.5 **Monitoring** .......................................................................................................................................................................32  
3.6.6 **Auditing and Review** .........................................................................................................................................................32  
3.6.7 **Reporting and Responsibility** .......................................................................................................................................32  
3.6.8 **Identification of Incident or Failure to Comply** ............................................................................................................32  
3.6.9 **Corrective Action** ............................................................................................................................................................32

3.7 **Weeds** ..................................................................................................................................................................................33  
3.7.1 **Purpose** ............................................................................................................................................................................33  
3.7.2 **Operational Policy** .............................................................................................................................................................33  
3.7.3 **Performance Targets** .........................................................................................................................................................33  
3.7.4 **Implementation Strategy/Mitigation Measures** .............................................................................................................33  
3.7.5 **Monitoring** .......................................................................................................................................................................38  
3.7.6 **Audit and Review** ..............................................................................................................................................................38  
3.7.7 **Reporting and Responsibility** .......................................................................................................................................39  
3.7.8 **Identification of Incident or Failure to Comply** ............................................................................................................39  
3.7.9 **Corrective Action** ............................................................................................................................................................39

3.8 **Bushfire** .................................................................................................................................................................................40  
3.8.1 **Purpose** ............................................................................................................................................................................40  
3.8.2 **Operational Policy** .............................................................................................................................................................40
## Table of Contents

3.8.3 Performance Targets .......................................................................................................................... 40
3.8.4 Implementation Strategy/Mitigation Measures ................................................................................... 40
3.8.5 Monitoring .......................................................................................................................................... 40
3.8.6 Audit and Review .............................................................................................................................. 40
3.8.7 Reporting and Responsibility ............................................................................................................ 40
3.8.8 Identification of Incident or Failure to Comply ................................................................................ 41
3.8.9 Corrective Action ............................................................................................................................... 41

3.9 Rehabilitation ........................................................................................................................................... 42
3.9.1 Purpose .............................................................................................................................................. 42
3.9.2 Operational Policy ............................................................................................................................ 42
3.9.3 Performance Targets ........................................................................................................................ 42
3.9.4 Implementation Strategy/Mitigation Measures .................................................................................. 43
3.9.5 Monitoring ........................................................................................................................................ 47
3.9.6 Auditing and Review ........................................................................................................................ 48
3.9.7 Reporting and Responsibility .......................................................................................................... 48
3.9.8 Identification of Incident or Failure to Comply ................................................................................ 48
3.9.9 Corrective Action ............................................................................................................................... 49

3.10 Cultural Heritage ..................................................................................................................................... 50
3.10.1 Purpose .......................................................................................................................................... 50
3.10.2 Operational Policy ............................................................................................................................ 50
3.10.3 Performance Targets ........................................................................................................................ 50
3.10.4 Implementation Strategy/Mitigation Measures .................................................................................. 50
3.10.5 Monitoring ........................................................................................................................................ 51
3.10.6 Auditing and Review ........................................................................................................................ 51
3.10.7 Reporting and Responsibility .......................................................................................................... 51
3.10.8 Identification of Incident or Failure to Comply ................................................................................ 51
3.10.9 Corrective Action ............................................................................................................................... 51

3.11 Emergency and Incident ....................................................................................................................... 52
3.11.1 Purpose .......................................................................................................................................... 52
3.11.2 Operational Policy ............................................................................................................................ 52
3.11.3 Performance Targets ........................................................................................................................ 52
3.11.4 Implementation Strategy/Mitigation Measures .................................................................................. 52
3.11.5 Monitoring ........................................................................................................................................ 55
3.11.6 Auditing and Review ........................................................................................................................ 55
3.11.7 Reporting and Responsibility .......................................................................................................... 55
3.11.8 Identification of Incident or Failure to Comply ................................................................................ 56
3.11.9 Corrective Action ............................................................................................................................... 56
Table of Contents

List of Tables

Table 1 – Regional Climatic Statistics ......................................................................................................................... 4
Table 2 – Monthly Erosion Risk for the Region Based on Average Monthly Rainfall Depth ............................................ 5
Table 3 – Summary of Water Quality Criteria ................................................................................................................ 5
Table 4 – Identification of Potential Impacts on Surrounding Environmental Values .......................................................... 7
Table 5 – Definitions of Likelihood .................................................................................................................................. 8
Table 6 – Definitions of Consequence ............................................................................................................................. 8
Table 7 – Risk Assessment Matrix ....................................................................................................................................... 8
Table 8 – Indicative Management Option for Each Risk Assessment Rating ...................................................................... 9
Table 9 – Identification of Environmental Impacts and Risks ........................................................................................... 9
Table 10 – Monitoring Schedule ...................................................................................................................................... 15
Table 11 – Drainage Techniques ....................................................................................................................................... 19
Table 12 – Erosion Control Measures ............................................................................................................................... 20
Table 13 – Noise Emission Criteria Limits ....................................................................................................................... 24
Table 14 – Background Noise Level Range ..................................................................................................................... 25
Table 15 – General Weed Control Options ...................................................................................................................... 35
Table 16 – Weed Control Option for Ambrosia artemisiifolia .......................................................................................... 35
Table 17 – Weed Control Option for Baccharis halimifolia .............................................................................................. 36
Table 18 - Weed Control Option for Senecio madagascariensis ....................................................................................... 37
Table 19 - Weed Control Option for Lantana camara .................................................................................................... 38
Table 20 – Maintenance Schedule – Vegetation Works .................................................................................................... 48

Figures

Figure 1 Site Location Plan (Drawing No.1001.197r1)
Figure 2 Site and Surrounds (Drawing No.1001.229)
Figure 3 Current and Proposed Site Layout (Drawing No.1001.228)
Figure 4.1 Conceptual Quarry Development – Stage 1 (Drawing No.1001.167A)
Figure 4.2 Conceptual Quarry Development – Stage 2 (Drawing No.1001.168A)
Figure 4.3 Conceptual Quarry Development – Stage 3 (Drawing No.1001.169A)
Figure 4.4 Conceptual Quarry Development – Long Term (Drawing No.1001.170A)
Figure 5.1 Conceptual Stormwater Management Plan – Stage 1 (Drawing No.1001.221A)
Figure 5.2 Conceptual Stormwater Management Plan – Stage 2 (Drawing No.1001.222A)
Figure 5.3 Conceptual Stormwater Management Plan – Stage 3 (Drawing No.1001.223A)
Figure 5.4 Conceptual Stormwater Management Plan – Long Term (Drawing No.1001.224A)
Figure 6.1 Discharge Emission and Monitoring Location Plan – Stage 1 (Drawing No.1001.230)
Figure 6.2 Discharge Emission and Monitoring Location Plan – Stage 2 (Drawing No.1001.231)
Figure 6.3 Discharge Emission and Monitoring Location Plan – Stage 3 (Drawing No.1001.232)
Figure 6.4 Discharge Emission and Monitoring Location Plan – Long Term (Drawing No.1001.233)
Figure 7 Bushfire Hazard Map (Drawing No.1001.234)
Figure 8 Conceptual Post Quarrying Layout (Drawing No.1001.236)
Figure 9 Rehabilitation Staging (Drawing No.1001.235)
Figure 10 Schematic of Quarry Bench Rehabilitation (Drawing No.1001.237)
Figure 11 Batter Treatment (Drawing No.1001.238)
Table of Contents

Appendices

Attachment A  Environmental Policy
Attachment B  Initial Notification Form
Attachment C  Further Notification Form
Attachment D  Spill Protocol
1.0 Introduction

1.1 General

Wolffdene Quarry is an existing hard rock quarry operated by Hanson Construction Materials Pty Ltd (‘Hanson’). The existing operation is authorised by the following approvals:

- Material Change of Use for Extractive Industry, issued by Gold Coast City Council on 23 February 2011 (Gold Coast City Council Approval Reference Number PN131878/01/DA2)
- Environmental Authority Number SR197, issued by the Department of Environment and Heritage Protection (EHP) (formerly the Environmental Protection Agency (EPA)), conditions dated 15 May 2009, for ERA 16 (2)(c) extracting rock or other material more than 1,000,000 tonnes per year, ERA 16 (3)(c) screening rock or other material more than 1,000,000 tonnes per year, ERA 43 Concrete Batching (formerly ERA 60), and the now deleted ERA 8 (3)(a) storing of 10m³ to 500m³ of chemicals of class C1 or C2 combustible liquids under AS 1940 or dangerous goods class (now devolved to Local Government).

Hanson is currently seeking approval from Gold Coast City Council (Council) for a Material Change of Use (MCU) – Extractive Industry for an increase in the scale and intensity of the existing extractive industry at Harts Road, Luscombe, Queensland (Site), see Figure 1 – Site Location Plan and Figure 2 – Site and Surrounds. As part of this approvals process, an application for the associated Environmental Authority (EA) will be made for the following ERAs:

- **ERA 16(2)(c)** – Extracting, other than by dredging, in a year, the following quantity of material – more than 1,000,000 tonnes
- **ERA 16(3)(c)** – Screening, in a year, the following quantity of material – more than 1,000,000 tonnes

The proposal also seeks approval for blasting activities necessarily associated with the extraction of material from the Site.

This revised Site Based Management Plan (SBMP) has been prepared to assist in the management and protection of surrounding environmental values and describes how the operator proposes to manage potential environmental impacts which may be caused by carrying out the increase in the scale and intensity of the existing extractive industry.

1.2 Site Details

**Location:**

The Site is located on Harts Road, Luscombe QLD 4207 (Site) (refer Figure 1 – Site Location Plan).

**Access:**

Access will be via the existing access points on Harts Road and the approved Stanmore Road.

**Real Property Description:**

- **Current Extraction Area**
  - Lot 2 on RP167150
  - Lot 1 on RP54359 (now Lot 1 on SP244693)
  - Lot 67 on WD1009
  - Lot 1 on CP893559
  - Lot 1 on CP893562

- **Proposed Quarry Extension (Extraction Area)**
  - Lot 2 on RP813599
  - Lot 80 on CP893560
  - Lot 2 on RP15903

- **Proposed Quarry Extension (Buffer Lands)**
  - Lot 117 on CP893560
  - Lot 5 on CP893561
  - Lot 101 on CP893561
  - Lot 7 on CP893561
  - Part of Lot 2 on RP813599
1.3 Project Overview

The operation uses standard quarrying methodologies that involve clearing, topsoil and overburden stripping, drilling and blasting, extraction, haulage, processing and stockpiling, with the final products sold for use in the construction industry (e.g. concrete batching, roads, etc), refer to Diagram 1 – Conceptual On-site Extraction Operations.
Site operations comprise the following basic elements:

- clearing of vegetation and stripping of topsoil and over burden material using mechanical means (i.e. bulldozer or excavator) and stockpiling for incorporation into the Site rehabilitation works where required, or use in constructing stormwater control structures (e.g. perimeter banks)
- extraction of rock using mechanical equipment (e.g. hydraulic excavator or bulldozer with ripper attachment and working on the leading edge) or where necessary drilling and blasting the exposed underlying rock to a manageable size
- loading won material from the quarry area into a crushing and screening plant situated on the floor of the extraction area using an excavator or front-end loader and/or off-road haul truck
- stockpiling the final products using a front-end loader and/or off-road haul truck within the bounds of the extraction footprint until required to be loaded into road trucks for transportation off-site for sale.

Processing and stockpiling occurs within the bounds of the extraction footprint. No additional ancillary facilities are proposed to support the on-site extractive operations, with the exception of an in pit crushing plant within the extended extraction area. The layout of the Site is shown on Figure 3 – Current and Proposed Site Layout. The quarry will be developed in several stages, refer Figure 4.1 to 4.4 – Conceptual Quarry Development for the proposed staging of development on the Site.

Major plant and equipment deployed on the Site may include, but not be limited to, the following:

- dozer
- excavator
- drill rig
- off-road haul trucks
- fixed and mobile crushing and screening plant
- front-end loader
- refuelling truck
- service vehicle
- several road haul trucks.

Chemical storage will also be carried out on-site to support the operations, however the chemical storage volumes are not considered an ERA under the EP Reg. Typical chemicals stored on-site include:

- distillate (fuel for stationary and mobile engines)
- oils (lubricants and hydraulic oils for stationary and mobile equipment)
- greases (lubrication of equipment)
- solvents (degreasers and cleaning of engine parts)
- paints and paint thinners (maintenance of equipment, buildings and signs)
- explosives (chemicals used in blasting)
- miscellaneous chemicals (weedicide, cementitious material, additives to products, cleaning agents etc).

Mobile machinery is refuelled at a designated refuelling area, however mobile machinery may at times be refuelled at locations where they are working in the field. Servicing of machinery and equipment is carried out on-site by on-site maintenance staff or mobile contractors on an ‘as needs’ basis. Oils and grease for servicing are stored on-site, however tyres will be supplied as required.

Waste tyres, oils and greases are removed by licenced regulated waste contractor where necessary for disposal off-site to a facility licenced to accept such wastes in accordance with the requirements of the current legislation and the local authority. Other wastes generated on-site are sorted into various skip bins or appropriate containers, or neatly stored within a designated area (e.g. graveyard) until collection by a licensed contractor for disposal / recycling off-site.

The land disturbance associated with the extractive industry activities is dynamic and may change depending on the distribution of raw material deposits. The proposed extent of the extraction footprint is shown in Figure 3 – Current and Proposed Site Layout. The conceptual quarry development stages are detailed in Figure 4.1 to 4.4 – Conceptual Quarry Development.

The typical hours of operation are as follows:

- 6am to 6pm for extractive industry operations – Monday to Friday
1.4 Description of Existing Environment

Regional Climate: The quarry is situated in the South East Queensland (SEQ) region, located on the southeast coast of Queensland. This region is subject to a humid, sub-tropical climate with milder winters and warmer summers. Most rain falls between November and March, with the driest month being July. The annual mean rainfall is approximately 1,032.2 mm.

Mean monthly maximum temperatures are highest in December (~ 32°C) and lowest in July (~ 22.4°C). Mean minimum temperatures can drop to 4.9°C in July.

There is a strong seasonal component to the regional weather. The region owes much of its climate variability to tropical lows / depressions and to El Niño-Southern Oscillating events.

A summary of the Regional Climatic Statistics are shown in Table 1 below:

<table>
<thead>
<tr>
<th>Jan</th>
<th>Feb</th>
<th>Mar</th>
<th>Apr</th>
<th>May</th>
<th>Jun</th>
<th>Jul</th>
<th>Aug</th>
<th>Sep</th>
<th>Oct</th>
<th>Nov</th>
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<td>89.3</td>
<td>32.6</td>
<td>40.5</td>
<td>32.9</td>
<td>77.4</td>
<td>104.4</td>
<td>133.1</td>
<td>1032.2</td>
</tr>
</tbody>
</table>

Topography and Drainage: The Site is bordered by a mountainous range with the current extraction areas situated from the crest down on multiple hills facing northwest, northeast. Current extraction is along the maximal upper slopes of these hills which have high relief and relatively steep inclines.

The proposed extraction extension areas on Lot 2 on RP813599 are situated from the crest down on the hills facing northwest and southwest. An additional extraction is also proposed adjacent to the quarry access road in the northwest corner of the Site.

The elevations of the Site range between 35 m and 297 m Australian Height Datum (AHD). Any overland flow from the quarry area flows along natural drainage lines where it is then directed to the on-site water storages / treatment devices. An additional water storage to capture runoff from the longer term quarry extension area is proposed in the northern corner of the Site adjacent to the access road.

Geology and Hydrology: The Site is within the Neranleigh - Fernvale beds of Devonian to Carboniferous age, consisting of mixed metavolcanic (e.g. greywacke, meta-greywacke, greenstone) and sedimentary rocks. In particular the lithology is described as containing mudstone, shale, arenite, chert, jasper, basic metavolcanics, pillow lava, conglomerate.
Based on historical Site operations, no interference with groundwater is likely to occur.

**Contaminated Land:**

The Site is not listed on the Environmental Management Register (EMR) or Contaminated Land Register (CLR).

**Acid Sulphate Soil:***

The Site is not located at or near an area were acid sulphate soils have previously been identified or within a prospective land zone containing acid sulphate soils.

**Erosion Risk:**

<p>| Table 2 - Monthly Erosion Risk for the Region Based on Average Monthly Rainfall Depth |
|-----------------------------------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|</p>
<table>
<thead>
<tr>
<th>Jan</th>
<th>Feb</th>
<th>Mar</th>
<th>Apr</th>
<th>May</th>
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<th>Aug</th>
<th>Sep</th>
<th>Oct</th>
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<th>Dec</th>
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<tbody>
<tr>
<td>H</td>
<td>H</td>
<td>H</td>
<td>M</td>
<td>M</td>
<td>M</td>
<td>L</td>
<td>L</td>
<td>L</td>
<td>M</td>
<td>H</td>
<td>H</td>
</tr>
</tbody>
</table>

Notes: E = Extreme, H = High, M = Medium, L = Low, VL = Very Low

**Vegetation:**

The Site is mapped as comprising remnant vegetation that is predominantly ‘Least Concern Regional Ecosystem’ with pockets of ‘Of Concern Regional Ecosystem’. These are as follows:

- **Remnant Vegetation Containing of Concern Regional Ecosystems:**
  - 12.3.11 (100%) – Eucalyptus siderophloia, E. tereticornis, Corymbia intermedia open forest on alluvial plains usually near coast;
  - 12.11.9 (100%) – Eucalyptus tereticornis open forest on metamorphics +/- interbedded volcanics. Usually higher altitudes.

- **Remnant Vegetation Containing Least Concern Regional Ecosystems:**
  - 12.11.3 (100%) – Open forest generally with Eucalyptus siderophloia, E. propinqua on metamorphics +/- interbedded volcanics
  - 12.11.5 (100%) – Open forest complex with Corymbia citriodora, Eucalyptus siderophloia, E. major on metamorphics +/- interbedded volcanics
  - 12.11.10 (100%) – Notophyll vine forest +/- Araucaria cunninghamii on metamorphics +/- interbedded volcanics
  - 12.11.11 (100%) – Araucarian microphyll vine forest on metamorphics +/- interbedded volcanics; usually southern half of bioregion.

There are also pockets of high value regrowth vegetation containing ‘Least Concern Regional Ecosystem’ and a PMAV Category X area (over parts of Lot 80 on CP893560). See Figure 2 – Site and Surrounds.

**Waterways:**

There are no permanent natural water bodies present on-site, however the Site is mapped as comprising several ephemeral streams with mapped stream order classes 1 and 2 that intercept the quarry area. These mapped watercourses are ephemeral erosional drainage channels which flow for several hundred metres off-site before discharging into the Albert River, a freshwater to marginal meandering river that discharges into the Logan River approximately 12km North of the Site before flowing out to the Coral Sea.

Water quality on-site is currently conditioned under Environmental Authority SR197. Water released from operational areas is to comply with the nominated Release Water Quality Objectives listed in Table 3 below.

<p>| Table 3 – Summary of Water Quality Criteria |
|---------------------------------------------|-----------|----------|</p>
<table>
<thead>
<tr>
<th>Parameter</th>
<th>Release Criteria</th>
<th>Type</th>
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<tbody>
<tr>
<td>Turbidity</td>
<td>50 NTU or equal to or less than 10% above background if greater than 50 NTU</td>
<td>Upper Limit</td>
</tr>
<tr>
<td>Suspended Solids</td>
<td>50 mg/L</td>
<td>Upper Limit</td>
</tr>
<tr>
<td>pH</td>
<td>6.5 – 9.0</td>
<td>Range</td>
</tr>
<tr>
<td>Visual Oil &amp; Grease</td>
<td>None Present</td>
<td>N/A</td>
</tr>
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</table>

**Flooding:**

The Site is not subject to flooding as shown on the Queensland Gold Coast City Council Planning Scheme Overlay Map (OM17: Natural Hazard (Flood) Management Areas).

**Existing Land Use:**

Extractive Industry
Adjacent Land Use:
North – undeveloped/undisturbed area and rural residential.
East – predominantly undeveloped/undisturbed and extractive industry.
South – undeveloped/undisturbed area and rural residential.
West – undeveloped/undisturbed area and rural residential.

Environmental Sensitive Receptors:
The nearest sensitive receptor to the development is a rural residence, approximately 400 m to the west of the Site boundary; see Figure 2 – Site and Surrounds.

Cultural Heritage:
There are no known or registered matters of Aboriginal Cultural Heritage significance within the Site. Hanson has engaged Jabree Limited to prepare a Preliminary Cultural Heritage Assessment for the Site. A copy of the Assessment is included with the development application. In accordance with the recommendations of the Assessment, Hanson will engage suitably qualified experts to undertake additional surveys prior to any land disturbance activities on the Site.

Air Quality:
The ambient air quality for the area is influenced primarily by current extractive industry operations, agricultural activities and use of unsealed access roads.

Dust levels within the vicinity are relatively pristine (low) for the majority of the time as Hanson adopts dust control measures to mitigate impacts.

Noise:
Noise levels on-site are consistent with current extractive industry operations. Noise levels on-site are conditioned in accordance with the Environmental Authority SR197; Schedule F - Table 2 and Table 3.

Visual Amenity:
During early stages of development, the visual amenity will be protected by the natural topography, buffer distances and surrounding vegetation to provide effective visual safeguards from potential viewpoints. It is anticipated that the visual impact of the quarrying activities will change as the extent of the quarrying increases and as the rehabilitation activities of disturbed areas are undertaken.

From conceptual modelling of the visual amenity carried out, some properties situated on elevated hill slopes to the north and west of the Site may have views to the quarry benches in the mid to long term stages of development, however progressive rehabilitation will assist with mitigating visual impacts.
1.5 Potential Environmental Impacts and Risks

The identification of activities and their potential environmental impacts is fundamental to designing and implementing procedures and measures proposed in the SBMP. This section outlines the possible impacts on existing environmental values which may occur due to the extractive industry operations on-site. Activities associated with on-site operations have been tabulated against environmental issues to provide a focus for preparing this SBMP, refer to Table 4 – Identification of Potential Impacts on Surrounding Environmental Values.

<table>
<thead>
<tr>
<th>Item No.</th>
<th>Activity</th>
<th>Potential Environmental Impact</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Vegetation Clearing</td>
<td>Stormwater Quality and Soil Erosion, Air Quality (Dust), Noise Emissions, Fauna and Flora, Weeds and Visual Amenity</td>
</tr>
<tr>
<td>2</td>
<td>Topsoil Stripping and Stockpiling</td>
<td>Stormwater Quality and Soil Erosion, Air Quality (Dust), Noise Emissions, Weeds, Visual Amenity</td>
</tr>
<tr>
<td>3</td>
<td>Extraction of Raw Materials</td>
<td>Stormwater Quality and Soil Erosion, Air Quality (Dust), Noise Emissions, Visual Amenity</td>
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<tr>
<td>4</td>
<td>Blasting</td>
<td>Air Quality (Dust), Noise Emissions (Air Overpressure) and Ground Vibrations</td>
</tr>
<tr>
<td>5</td>
<td>Handling and Stockpiling of Raw Material</td>
<td>Stormwater Quality, Air Quality (Dust), Noise Emissions</td>
</tr>
<tr>
<td>6</td>
<td>Crushing and Screening of Raw Material</td>
<td>Stormwater Quality, Air Quality (Dust), Noise Emissions</td>
</tr>
<tr>
<td>7</td>
<td>Handling, Storage and Haulage of Processed Material</td>
<td>Stormwater Quality, Air Quality (Dust), Noise Emissions</td>
</tr>
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<td>8</td>
<td>Maintenance Activities</td>
<td>Stormwater Quality, Waste Generation and Land Contamination</td>
</tr>
<tr>
<td>9</td>
<td>Handling of Hydrocarbons and Chemicals on-site</td>
<td>Stormwater Quality, Waste Generation and Land Contamination</td>
</tr>
<tr>
<td>10</td>
<td>Site Rehabilitation</td>
<td>Stormwater Quality and Soil Erosion, Air Quality (Dust), Noise Emissions, Weeds, Visual Amenity</td>
</tr>
<tr>
<td>11</td>
<td>Stormwater Management</td>
<td>Stormwater Quality</td>
</tr>
<tr>
<td>12</td>
<td>Waste Management (i.e. paper, food packaging and scraps, waste oil/lubricates, oily rages, spilled raw material and packaging)</td>
<td>Stormwater Quality, Land Contamination, Fauna, Visual Amenity</td>
</tr>
</tbody>
</table>

The risk assessment adopted is a qualitative risk-based approach designed to assess risk based on:

- the likelihood of an environmental impact or event occurring
- the consequences of the occurrence on the surrounding environment.

The likelihood and consequences are scored between 1 and 5 for each potential impact or event. Table 5 – Definitions of Likelihood and Table 6 – Definitions of Consequence outline the identifiers and scores used in the risk assessment.
Table 5 – Definitions of Likelihood

<table>
<thead>
<tr>
<th>Rating</th>
<th>Descriptor</th>
<th>Score</th>
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<tbody>
<tr>
<td>Rare</td>
<td>May occur only in exceptional circumstances</td>
<td>1</td>
</tr>
<tr>
<td>Unlikely</td>
<td>Could occur but doubtful</td>
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</tr>
<tr>
<td>Possible</td>
<td>Might occur at some time in the future</td>
<td>3</td>
</tr>
<tr>
<td>Likely</td>
<td>Will probably occur</td>
<td>4</td>
</tr>
<tr>
<td>Almost Certain</td>
<td>Is expected to occur in most circumstances</td>
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</tbody>
</table>

Table 6 – Definitions of Consequence

<table>
<thead>
<tr>
<th>Rating</th>
<th>Descriptor</th>
<th>Score</th>
</tr>
</thead>
<tbody>
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<td>Negligible</td>
<td>Impacts not requiring any treatment or management action</td>
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</tr>
<tr>
<td>Minor</td>
<td>Nuisance or insignificant environmental harm requiring minor management action</td>
<td>2</td>
</tr>
<tr>
<td>Moderate</td>
<td>Serious environmental impacts, readily manageable at low cost</td>
<td>3</td>
</tr>
<tr>
<td>Major</td>
<td>Substantial environmental impacts, manageable but at considerable cost and some disruption</td>
<td>4</td>
</tr>
<tr>
<td>Catastrophic</td>
<td>Severe environmental impacts with major consequent disruption and heavy cost</td>
<td>5</td>
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</table>

The consequence and likelihood scores are then plotted on the Risk Assessment Matrix, see Table 7 – Risk Assessment Matrix. The final risk level assigned is a product of the likelihood and consequence scores. The higher the risk score, the higher the priority is for management.

Table 7 – Risk Assessment Matrix

<table>
<thead>
<tr>
<th>Likelihood</th>
<th>Consequence</th>
<th>Negligible</th>
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<th>Major</th>
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</table>
Table 8 describes the possible actions required for each risk assessment rating.

### Table 8 – Indicative Management Option for Each Risk Assessment Rating

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<th>Risk Rating</th>
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<th>Indicative Management Option</th>
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<tr>
<td>Extreme</td>
<td>16 – 25</td>
<td>Manage by implementing Site management and emergency procedures, plant design controls and regular monitoring</td>
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<tr>
<td>High</td>
<td>10 – 15</td>
<td>Manage by implementing Site management and emergency procedures, specific monitoring and may require some operation/plant design controls</td>
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<tr>
<td>Medium</td>
<td>5 – 9</td>
<td>Manage by implementing specific monitoring or response procedures</td>
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<tr>
<td>Low</td>
<td>1 – 4</td>
<td>Manage by routine procedures, unlikely to need specific application of resources</td>
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Site activities have been tabulated against environmental risk to provide a focus for preparing the SBMP, see Table 9 – Identification of Environmental Impacts and Risks.

### Table 9 – Identification of Environmental Impacts and Risks

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Table 9 – Continued

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<th>Stormwater and Soil Erosion</th>
<th>Groundwater</th>
<th>Land Contamination</th>
<th>Air Quality (Dust)</th>
<th>Noise</th>
<th>Waste</th>
<th>Fauna and Flora</th>
<th>Visual Amenity</th>
<th>Spread of Declared Plants</th>
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Equipment

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<th>Land Contamination</th>
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<th>Fauna and Flora</th>
<th>Visual Amenity</th>
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<td>1x2=1</td>
<td>3x3=9</td>
<td>3x3=9</td>
<td>2x1=2</td>
<td>2x1=2</td>
<td>1x1=1</td>
<td>2x2=4</td>
<td></td>
</tr>
<tr>
<td>Light Vehicles</td>
<td>Low</td>
<td>Low</td>
<td>Low</td>
<td>Low</td>
<td>Low</td>
<td>Low</td>
<td>Low</td>
<td>Low</td>
<td>Low</td>
<td>Low</td>
</tr>
<tr>
<td></td>
<td>1x1=1</td>
<td>1x1=1</td>
<td>1x2=1</td>
<td>3x1=3</td>
<td>3x1=3</td>
<td>2x1=2</td>
<td>2x1=2</td>
<td>1x1=1</td>
<td>2x2=4</td>
<td></td>
</tr>
</tbody>
</table>

1.6 Purpose of Site Based Management Plan

The SBMP is a management document which links the potential environmental impacts with commitments and measures to safeguard the environment. It is the principal management tool for guiding environmental management at the Site.

The SBMP provides the framework for environmental management at the Site and is a practical guide at the operational level to prevent, or minimise environmental impacts.

1.7 Scope and Format of the Site Based Management Plan

The SBMP consists of a number of self-contained sections to provide ready reference, ready filing and easy access to information for managing the Site and activities. It comprises Environmental Impact Identification and Assessment,

Environmental management is a dynamic process and needs to respond to new technologies and scientific advances. The SBMP has been designed to be modified in response to monitoring results, changing circumstances (technological, economic or social), changing legislation (statutory requirements), operational experiences, design trials and community expectation.

The SBMP attempts to concisely describe the commitments made for environmental management by:

- identifying aspects of the Site that require environmental management
- establishing practical and achievable measures for the containment of environmental impacts to acceptable levels
- identifying authority and responsibility for implementing management measures during construction, operation and decommission stages of a quarry
- nominating acceptable performance criteria for the measuring of impact levels and any sources from which the criteria may have been derived, including legislative requirements and government policies
- describing courses of action (and responsibilities) for responding to incidents of non-compliance and emergency events which may be detected or arise
- establishing procedures for monitoring and reporting.

Environmental Management Strategies set out the:

- environmental policy which provided the framework for the preparation of the SBMP
- organisational and management structure
- environmental objectives/goals providing the basis for environmental management measures.

The SBMP has been developed for environmental elements that have been identified to pose a potential risk to the surrounding environment in relation to the Site and activities. These environmental elements include:

- Stormwater, Erosion and Sediment Control
- Air Quality (Dust)
- Noise
- Blasting
- Hydrocarbon and Chemicals
- Waste
- Weeds
- Bushfire
- Rehabilitation
- Cultural Heritage
- Emergency and Incident.

The structure of the SBMP comprises a series of procedures for ease of implementation. The elements of the SBMP are based on a standard format (that may be adapted for a particular issue or activity) as follows:

- purpose
- operational policy
- performance targets
- implementation strategy/mitigation measures
- monitoring
- auditing and review
- reporting and responsibility
- identification of incident or failure to comply
- corrective actions.

Copies of reference documents, for example the Environmental Authority issued in accordance with the \textit{Environmental Protection Act 1994 (EP Act)} and \textit{Sustainable Planning Act 2009 (SPA)} conditions, shall be held in a \textit{SBMP Documents Reference Folder} along with relevant codes, protocols, work procedures, environmental guidelines and action plans. Monitoring records, inventories and registers of relevant items such as inventories, water monitoring records, air quality monitoring records and public complaint record will be included in a \textit{SBMP Monitoring Records Folder}.
The SBMP shall provide the necessary basis for effective and efficient environmental management at the Site. It shall direct the management of the Site and significant environmental issues by the implementation of ‘Leading Practice’ industry measures.

1.8 Legislation

In Queensland, the *Environmental Protection Act 1994* (EP Act) is the principal legislation for protecting the environment. The EP Act was assented on 1 December 1994 and was proclaimed on 1 March 1995. The object of the EP Act is to “protect Queensland’s environment while allowing for development that improves the total quality of life, both now and in the future, in a way that maintains the ecological processes on which life depends (ecologically sustainable development)”.

The EP Act imposes a General Environmental Duty on corporations, government departments and individuals, in order to meet the primary objective. The duty relates to the notion that everyone must take all reasonable and practicable measures to prevent or minimise environmental harm.

Under Subdivision 4, Section 19 of the EP Act, an activity may be prescribed as an Environmentally Relevant Activity (ERA) if the Governor in Council is satisfied:

(a) a contaminant will or may be released into the environment when the activity is carried out; and

(b) the release of the contaminant will or may cause environmental harm.

Schedule 2 of the *Environmental Protection Regulation 2008* (EP Reg) lists prescribed ERAs. The proposed development is considered an ERA and is described as follows:

- **ERA 16(2)(c)** – Extracting and screening activities: Extracting, other than by dredging, in a year, the following quantity of material – more than 1,000,000 t
- **ERA 16(3)(c)** – Extracting and screening activities: Screening, in a year, the following quantity of material – more than 1,000,000 t

The EP Act provides for the preparation of Environmental Protection Policies to enhance or protect Queensland’s Environment. Relevant policies include:

- *Environmental Protection (Noise) Policy 2008*;
- *Environmental Protection (Air) Policy 2008*; and
- *Environmental Protection (Water) Policy 2009*.

Other legislation and Policies particularly relevant to the operations include:

- *Sustainable Planning Act 2009* (SPA) and Regulation;
- *Environmental Protection (Waste Management) Regulation 2000*;
- *Waste Reduction and Recycling Act 2011* (WRR Act);
- *Vegetation Management Act 1999* (VMA) and Regulation;
- *Land Protection (Pest and Stock Route Management) Act 2002* (LP Act) and Regulation;
- *Mining and Quarrying Safety and Health Act 1999* (MQSH Act) and Regulation 2001;
- *Queensland Explosives Act 1999* and Regulation;
- *Aboriginal Cultural Heritage Act 2003* (ACHA);
- *Fire and Rescue Services Act 1990* and Regulation; and
2.0 Procedures

2.1 Organisational Structure

An overview of the proposed management hierarchy for the Site is as follows:

- Hanson Management
  - Northern Region Operations Manager
    - Aggregates
    - Quarry Manager
      - Quarry Foreman
      - Administration Staff
    - Production Supervisor
      - Maintenance Supervisor
    - Production Personnel
      - Maintenance Personnel

2.2 Environmental Policy

Site management is committed to being environmentally responsible and to conducting activities in compliance with environmental legislation and will strive to achieve leading practice environmental management. In the process of implementing this policy, management shall:

- implement work programs to protect the surrounding environment
- meet the requirements of all laws, acts, regulations and standards relevant to its operations and activities
- make the most efficient use of natural resources taking due regard of environmental issues and ensuring land maintains long term productivity
- implement a program to train all Employees in general environmental issues and individual workplace environmental responsibilities
- continually improve environmental practices to reflect changing legislation, new technology and scientific advances, lessons learned from environmental incidents and increasing knowledge and experience of Site specific issues
- allocate necessary resources to ensure the implementation of the environmental policy.

2.3 Implementation

Implementation of the SBMP will require:

- commitment by the Owners, Managers and Employees of the Site
- access to technical expertise for tasks such as environmental monitoring, modelling or assessment, as needed.

Management shall ensure that sufficient funding is provided to implement the SBMP.

All Employees and subcontractors shall be informed of the environmental management objectives and the specifics of the SBMP including protection of buffer areas, impact minimisation measures, operational practices, maintenance measures, reporting measures, and individual responsibilities. They shall also be made aware of penalties if development conditions are breached and reporting requirements for incidents involving environmental harm and safety.
Each Employee shall be responsible for implementing environmental policies within the scope of their duty statement or job description.

Site management must be vigilant in implementing the commitments required for environmental management to ensure the timely and effective execution of the required measures.

The Quarry Manager shall be responsible for the day-to-day operations and implementation of the SBMP. Surveillance, monitoring results and complaints received shall be reported to the Quarry Manager.

Various timeframes and/or trigger mechanisms are provided in the SBMP to guide environmental management including regular reviews of performance to help the continual improvement of the environmental management system where required. This provides a feedback loop for actioning amendments to practices, initiating studies and amending plans.

The currency of the SBMP should be checked regularly (at least once a year) to ensure up-to-date versions are available and to avoid confusion and mistakes.

2.4 Incidents and Complaints Procedure

The objective of the incidents and complaints procedure is to ensure there is a response to all complaints and that these complaints are investigated and appropriate action is taken.

The Quarry Manager will be responsible for ensuring that all Employees are familiar with the procedure for incidents and complaints recording. The Quarry Manager or authorised delegate will liaise personally with the complainant to discuss the nature of the complaint, identify the possible cause and explain actions to prevent further complaints.

When an environmental incident/complaint occurs, appropriate action is to be undertaken within two days to either determine the source of the complaint and/or minimise further impact. In the case of an incident, corrective action is to be implemented and an assessment conducted to determine what, if any, preventative action can be instigated to prevent a similar incident from occurring again.

All complaints received shall be reported to the Quarry Manager. Any Employee involved in an incident having environmental implications or who becomes aware of any situation that develops into an incident, shall notify the Quarry Manager as soon as practicable.

Employees are to show respect and understanding to complainants.

The following details shall be recorded at the receipt of an incident or complaint:

- date, time, location and nature of the incident or complaint
- type of communication (telephone, letter, email, personal etc.)
- name, contact address and contact telephone number of the person reporting the incident or complaint (i.e. note: if the complainant does not wish to be identified then ‘not identified’ is to be recorded)
- details of incident or complaint
- proposed response/investigation to be undertaken
- name of person responsible for receiving and/or investigating the complaint.

All incidents and complaints reported shall be filed in a complaint/incident register available on the Site.

All incidents and complaints will be investigated. The investigations should include:

- determining what activities (and equipment) were being carried out or operated at the time of the complaint
- determining whether at the time of the complaint, normal day-to-day activities were conducted
- identifying whether equipment or activities on-site were the source of complaint (or whether other activities in the locality were the cause of the complaint)
- determining what actions may be carried out to resolve complaints and/or minimise the likelihood of further complaints.
The incident/complaint form shall be checked by the Quarry Manager after receipt of complaints to ensure appropriate corrective action has been taken and that the issue has been resolved.

If monitoring is undertaken to investigate a complaint, the Quarry Manager may make the results of the monitoring available for viewing by the complainant on request.

After becoming aware of any incident or complaint which results in the release of contaminants not in accordance with the conditions of any relevant development or environmental approval, the Quarry Manager shall notify the relevant administering authority in writing within 24 hours. An example of a standard form for such notification is attached (Appendix B – Initial Notification Form). Within 14 days of the incident/emergency, the Quarry Manager must – in addition to the information provided in the initial notification form – provide further information as shown in the attached form (Appendix C – Further Notification Form).

A summary of the results of any relevant action or environmental monitoring (not previously supplied) in relation to the incident/emergency shall be supplied to the administering authority within six weeks of the incident/emergency if required.

2.5 Monitoring Requirements

The controls nominated in this SBMP will require regular surveillance and review to ensure that performance aligns with design criteria and also reflects the dynamic nature and changing needs of the operation.

Monitoring will consist primarily of visual inspection of the entire management system, but particularly on the erosion control structures prior to and as soon as practicable following storms and/or extended periods of heavy rain. Other key aspects of the operation that have potential to impact on the environment shall also be regularly monitored and measured. These shall include:

- recording of information to track performance
- inspecting and monitoring of operational controls
- assessing the level of conformance with objectives and targets.

The indicative locations of potential emission releases and established monitoring locations are shown on Figure 6.1 to 6.4 – Discharge, Emission and Monitoring Plan Stage 1 to Long Term.

Table 10 – Monitoring Schedule provides a summary of environmental indicators to be monitored and the frequency of monitoring.

<table>
<thead>
<tr>
<th>Item</th>
<th>Aim</th>
<th>Responsible Person</th>
<th>Schedule</th>
</tr>
</thead>
<tbody>
<tr>
<td>Complaints</td>
<td>Resolution and Prevention</td>
<td>Quarry Manager</td>
<td>As Received</td>
</tr>
<tr>
<td>Stormwater</td>
<td>Confirm operation of water conveyance structures and containment of contaminated waters</td>
<td>Operators/ Quarry Manager</td>
<td>Monthly surveillance of on-site water storages and treatment systems and following major rainfall event (&gt;25 mm within 24 hours)</td>
</tr>
<tr>
<td></td>
<td>Assess adequacy of stormwater control measures to minimise erosion</td>
<td>Quarry Manager</td>
<td>Quarterly Inspection and following major rainfall event (&gt;25 mm within 24 hours)</td>
</tr>
<tr>
<td></td>
<td>Confirm refuelling and chemical handling areas are free of spills</td>
<td>Quarry Manager</td>
<td>Weekly</td>
</tr>
<tr>
<td>Surface Water Quality</td>
<td>Confirm on-site containment of surface water from on-site disturbed areas</td>
<td>Operators/ Quarry Manager</td>
<td>Daily surveillance</td>
</tr>
<tr>
<td></td>
<td>Confirm effective operation of extraction pit/sediment trap system</td>
<td>Quarry Manager</td>
<td>Monthly</td>
</tr>
<tr>
<td></td>
<td>Confirm receiving waters are not impacted by operations</td>
<td>Quarry Manager/ Consultant</td>
<td>As per Environmental Authority conditions and/or following</td>
</tr>
<tr>
<td>Item</td>
<td>Aim</td>
<td>Responsible Person</td>
<td>Schedule</td>
</tr>
<tr>
<td>--------------------------</td>
<td>------------------------------------------</td>
<td>----------------------------</td>
<td>--------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Airborne Dust</td>
<td>Confirm adequacy of control measures</td>
<td>Quarry Manager</td>
<td>Daily Surveillance</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Quarry Manager</td>
<td>Monthly Dust Deposition Monitoring</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Quarry Manager</td>
<td>Following Complaint or on request from the administering authority</td>
</tr>
<tr>
<td>Noise</td>
<td>Confirm adequacy of control measures</td>
<td>Quarry Manager</td>
<td>Daily Surveillance</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Quarry Manager</td>
<td>Following Complaint or request from the administering authority</td>
</tr>
<tr>
<td>Rehabilitation</td>
<td>Assess progress and compliance with</td>
<td>Quarry Manager</td>
<td>Annually</td>
</tr>
<tr>
<td></td>
<td>Rehabilitation Plans</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Monitor performance</td>
<td>Quarry Manager/Consultant</td>
<td>1 month after seeding, 3 months after seeding, 6 months after seeding, 12 months after seeding</td>
</tr>
<tr>
<td>Weeds</td>
<td>Prevent spread of weeds</td>
<td>Quarry Manager</td>
<td>Weekly Surveillance, Quarterly Inspection (minimum)</td>
</tr>
<tr>
<td>Waste Management</td>
<td>Record of regulated wastes disposed off-site</td>
<td>Quarry Manager</td>
<td>Event</td>
</tr>
<tr>
<td>Update Material Safety Data Sheet Register</td>
<td>Site safety</td>
<td>Quarry Manager</td>
<td>Event/Annually</td>
</tr>
<tr>
<td>Maintenance</td>
<td>Confirm maintenance and contract maintenance records are being maintained</td>
<td>Quarry Manager</td>
<td>Quarterly</td>
</tr>
<tr>
<td>Site Signage</td>
<td>Confirm signage is maintained</td>
<td>Quarry Manager</td>
<td>Annually</td>
</tr>
<tr>
<td>Site Entrance</td>
<td>Confirm access is properly maintained and suitable for use</td>
<td>Quarry Manager</td>
<td>Daily Surveillance</td>
</tr>
<tr>
<td>Visual Amenity</td>
<td>Ensure visual exposure is controlled and minimised</td>
<td>Quarry Manager</td>
<td>Quarterly Surveillance</td>
</tr>
<tr>
<td>Demarcation of Extraction Limits</td>
<td>Confirm compliance with Environmental Authority and lease agreement</td>
<td>Quarry Manager</td>
<td>Annually and prior to each stage of extraction</td>
</tr>
<tr>
<td>Development Works.</td>
<td>Limit disturbance to design limits</td>
<td>Quarry Manager</td>
<td>As required prior to the works commencing</td>
</tr>
</tbody>
</table>

### 2.6 Communication

Effective communication must take place on environmental matters between operational staff and management and external stakeholders.

Internal communication mechanisms relating to environmental aspects and impacts, objectives and targets, training and awareness, incidents and feedback on lessons learnt and suggestions for improvement, may occur in the form of:

- action requests
- environmental incident reporting
- environmental reporting
- inductions and environmental awareness training
- tool-box meetings
- verbal advice
- minutes and other forms of written correspondence.

External communications mechanisms for environmental communications relevant to Site operations/activities may include:

- formal and informal correspondence with government authorities
• media releases
• formal correspondence with interest groups
• community complaints and enquiries.

2.7 Records and Reporting

All environmentally relevant documentation, including policies, procedures, forms, records, and reports required to be kept as per this SBMP shall be available at the approved/licensed premises for a period of at least five years and be available for inspection by an authorised person. If monitoring is required following a complaint, the report shall:

• record the date and time of sampling
• be endorsed by a person or body possessing appropriate experience and qualifications to perform the required measurements on all records of analysis results
• record the results of all analyses, measurements and observations and interpretations (if appropriate)
• be made available on request to any authorised person who must be permitted to make copies thereof.

2.8 Review and Update

The Quarry Manager will review and update this SBMP as required to ensure that it meets operational requirements and relevant environmental legislation and standards. Reasons for updating the SBMP may include:

• identification of deficiencies or opportunities for improvement
• following recommendations from audits
• changes to operations
• changes to legislation.

2.9 Training/Induction

The Quarry Manager is responsible for ensuring that training and education programs are provided to inform and develop people. Personnel receiving on-the-job training are assessed on their level of understanding and competency prior to completion of the training. Training continues until the person reaches an acceptable level of competence.

All Employees and sub-contractors will be inducted on the environmental management procedures and practices to be carried out at the quarry and be made aware of:

• General Environmental Duty, whereby a person in the performance of their duties shall not do so in a manner which will cause, or is likely to cause, environmental harm unless the person takes all reasonable and practicable measures to prevent or minimise that harm
• Duty to Notify Environmental Harm, whereby if a person in the performance of their duties becomes aware that serious or material environmental harm is caused or may be caused by their activity or by someone else’s activity, that person must, as soon as practicable, report the nature and circumstances of the event to the Quarry Manager and Operations Manager
• Compliance with Environmental Authority and Other Statutory Requirements, whereby a person in the performance of their duties for the conduct of the use shall do so in a manner which ensures that the provisions of any relevant Environmental Authority, or permit and any other statutory permission or approval are complied with.

A brief training package detailing the importance of observing all environmental safeguards and outlining the potential environmental impacts will be implemented for all personnel working on-site. This will be done:

• at the commencement of employment as part of the Site Induction and Safety Procedures;
• at least every 24 months thereafter
• at any stage, should there be a change in operational procedures.

A record of all Employee training/inductions will be maintained on-site.
3.0 Site Based Management Strategies

3.1 Stormwater, Erosion and Sediment Control

3.1.1 Purpose

- To provide a set of leading practice Site management procedures to:
  - control drainage
  - minimise the severity and extent of soil erosion and pollutant transport occurring as a result of land disturbance necessary for extraction to receiving waters.
- Incidents involving water contamination within a local government's jurisdiction could be deemed a breach of the development permit (under SPA) as well as Section 440 ZG of the EP Act.
- Extraction activities on-site have the potential to impact on overland flow water quality (e.g. elevated suspended solids, turbidity and chemical spills such as hydrocarbons). These activities include:
  - vegetation clearing
  - topsoil striping
  - quarry pit development
  - stockpiling of topsoil and product
  - spillage during handling of materials
  - use of hydrocarbons and other chemicals.
- Potential water discharges from Site operations include:
  - controlled discharge of stormwater after collection within the quarry pit sump(s) and/or sediment basin(s)
  - overtopping of on-site sediment basin(s), quarry pit and excavated settling traps
  - overland flow from disturbed areas including hardstand storage areas
  - overland flows from handling areas of hydrocarbons and other chemicals.

3.1.2 Operational Policy

- To carry out on-site ERAs so as to prevent or minimise as far as practicable, any contamination of stormwater, on-site soil erosion and any release of contaminated water off-site.

3.1.3 Performance Targets

- To ensure adequate drainage and sediment control measures are implemented to manage and treat runoff from disturbed areas on-site.
- Minimise the potential for erosion.
- Prevent stormwater from contacting wastes or contaminants on the Site by segregating clean water from disturbed areas, where practicable.
- To ensure that water discharging from disturbed areas on-site does not impact on aquatic ecosystems and water quality downstream of the quarrying operations.
- Stormwater leaving the Site during and post extraction operations is of no lesser quality than that which exited the Site pre-development.
- The quality of any water releases from Site operational areas to satisfy the conditions of the EA. Current licence conditions under SR197 are as follows:
  - the pH value must not be less than 6.5 and not more than 9.0
  - the concentration of suspended solids must not exceed 50 mg/L
  - dissolved oxygen to be a minimum of 6mg/L
  - no organisms or contaminants capable of causing environmental harm
  - no visible litter, oil or greases, visible scum, or other objectionable matter.
3.1.4 Implementation Strategy/Mitigation Measures

- Land disturbance is to be minimised to that which is absolutely necessary.
- Land disturbance is to be minimised during periods of high soil erosion risk (December to March), where practicable.
- Any vegetation clearing is to be staged as far as practical.
- Conceptual Stormwater Management Plans for the various stages of the quarry development are provided as Figure 5.1 to 5.4 – Conceptual Stormwater Management Plan – Stage 1 to Long Term.

The stormwater control principles for the development comprise:

- a general philosophy that any overland flow from disturbed areas is considered to be contaminated with sediment/suspended solids therefore requires treatment prior to release
- overland flows from the disturbed areas within the quarry area are to be captured in the quarry sump/pit, sediment basin or excavated settling trap for treatment by sedimentation/settlement prior to discharging (naturally or pumped) as either concentrated flow into an existing drainage line or as sheet flow over the adjacent grassed buffer area
- extraction pit designed to retain overland flow up to and including a 24-hour, 1-in-10-year storm event
- design stormwater drainage works to handle a 1-in-10 year peak flow
- manage stormwater by use of preventative procedures such as using a perimeter bund, diversion banks or drains, containment, recycling, treatment and by use of corrective procedures such as maintenance, de-silting and revegetation of disturbed areas
- diversion of overland flow from clean catchments around and away from disturbed areas to the extent practicable using a diversion bank and natural contours where practicable.

Various options or techniques that may be used on-site to control drainage are provided in Table 11 – Drainage Techniques.

### Table 11 – Drainage Techniques

<table>
<thead>
<tr>
<th>Technique</th>
<th>Symbol</th>
<th>Typical Use</th>
</tr>
</thead>
<tbody>
<tr>
<td>Catch Drain</td>
<td>CD</td>
<td>The catchment and diversion of sheet flow across a slope or around soil disturbance.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Best used in non-dispersive soils, otherwise the drain must be lined with non-dispersive soil (minimum 100 mm thick) prior to placement of a channel liner.</td>
</tr>
<tr>
<td>Compost Berm</td>
<td>CB</td>
<td>Primarily used as a sediment filter berm, but can be used as a Flow Diversion Bank.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Used when on-site land clearing produces significant quantities of organic matter.</td>
</tr>
<tr>
<td>Diversion Channel</td>
<td>DC</td>
<td>Diversion of large concentrated flows.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Permanent flow diversion channels.</td>
</tr>
<tr>
<td>Flow Diversion Banks/Perimeter Bund (earth, sandbags, etc)</td>
<td>DB / PB</td>
<td>Diversion of minor flows when in situ subsoils are dispersive or otherwise highly erodible.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Flow diversion at the base of hill slopes.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Cross drainage on unsealed roads.</td>
</tr>
<tr>
<td>Chute</td>
<td>CH</td>
<td>Discharge of concentrated flows down steep slopes.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Control of flow into sediment basins.</td>
</tr>
<tr>
<td>Level Spreader</td>
<td>LS</td>
<td>Conversion of minor flows back to ‘sheet’ flow.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Discharge of ‘sheet’ flows down grassed slopes or into bushland.</td>
</tr>
</tbody>
</table>

**Stormwater Contamination Management**

- Measures to be taken to minimise the potential for contamination of stormwater overland flow from Site are as follows:
  - construct access road(s) at ground level and using compacted base coarse where necessary;
  - consider construction of hardstand areas using compacted base coarse with a cover of gravel mulch where practicable.
- prevent, and where not possible to prevent, minimise the contact of incident rainfall and stormwater runoff with wastes or other contaminants
- clean up any spillage of wastes, contaminants or other materials as quickly as practicable
- direct all surface water runoff from the areas utilised for the operation and product stockpiles to the quarry pit, sediment basin or excavated sediment trap for treatment before being released
- recycle waters collected in the sediment dam, excavated sediment trap or quarry pit(s) to the maximum extent practical (e.g. dust suppression and watering rehabilitated areas)
- undertake any necessary on-site maintenance in an area where contaminants cannot be released to surrounding receiving waterways or on-site sediment basin(s) or excavated settling traps
- store all hazardous materials, chemicals and food product wastes generated on-site under cover or with appropriate safeguards
- undertake rehabilitation of disturbed areas and final batters progressively to the extent practicable; and
- dispose of wastes off-site on a regular basis.

**Erosion Control Measures**

- Reasonable and practicable erosion control measures will be implemented on-site to limit soil erosion including stabilising and vegetating road embankments and batters, temporary overburden and topsoil stockpiles and diversion banks or perimeter bunds. Table 9 – *Erosion Control Measures* provides soil stabilisation techniques that may be applied on-site.

**Table 9 – Erosion Control Measures**

<table>
<thead>
<tr>
<th>Technique</th>
<th>Type Use</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gravelling G</td>
<td>Protection of non-vegetated soils from raindrop impact erosion.</td>
</tr>
<tr>
<td></td>
<td>Stabilisation of hardstand areas including Site office area, processing areas, temporary car parks and access roads.</td>
</tr>
<tr>
<td>Revegetation R</td>
<td>Temporary and permanent stabilisation of soil.</td>
</tr>
<tr>
<td></td>
<td>Stabilisation of long-term stockpiles.</td>
</tr>
<tr>
<td></td>
<td>Includes turfing and temporary seeding.</td>
</tr>
<tr>
<td>Grass G</td>
<td>Permanent protection, low-to-medium velocity chutes, channels and exposed soil surfaces.</td>
</tr>
<tr>
<td>Rock Mattress RM</td>
<td>Suitable for temporary and permanent high velocity chutes and spillways.</td>
</tr>
<tr>
<td>Rock Lining RL</td>
<td>High velocity drainage channels.</td>
</tr>
<tr>
<td></td>
<td>Drainage chutes.</td>
</tr>
<tr>
<td></td>
<td>Sediment basin/trap spillways or outfall.</td>
</tr>
</tbody>
</table>

**Table 12 – Erosion Control Measures**

<table>
<thead>
<tr>
<th>Technique</th>
<th>Symbol</th>
<th>Type Use</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gravelling G</td>
<td>G</td>
<td>Protection of non-vegetated soils from raindrop impact erosion.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Stabilisation of hardstand areas including Site office area, processing areas, temporary car parks and access roads.</td>
</tr>
<tr>
<td>Revegetation R</td>
<td>R</td>
<td>Temporary and permanent stabilisation of soil.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Stabilisation of long-term stockpiles.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Includes turfing and temporary seeding.</td>
</tr>
<tr>
<td>Grass G</td>
<td>G</td>
<td>Permanent protection, low-to-medium velocity chutes, channels and exposed soil surfaces.</td>
</tr>
<tr>
<td>Rock Mattress RM</td>
<td></td>
<td>Suitable for temporary and permanent high velocity chutes and spillways.</td>
</tr>
<tr>
<td>Rock Lining RL</td>
<td>RL</td>
<td>High velocity drainage channels.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Drainage chutes.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Sediment basin/trap spillways or outfall.</td>
</tr>
</tbody>
</table>

**3.1.5 Monitoring**

- The Quarry Manager shall carry out monthly surveillance of on-site water storages and treatment systems.
- Inspection of Site water storages and treatment systems shall also be carried out by the Quarry Manager immediately prior to anticipated runoff-producing rainfall and as soon as practicable following the event.
- The inspections should consider:
  - condition of banks and batters
  - condition of inlet and outlet zones, including structure integrity, possible clogging, excessive sediment deposition or erosion
  - flows entering non-operational areas
  - pollutant levels within any treatment devices
  - weed infestation.
- The Quarry Manager may engage the services of a suitably qualified and experienced person to conduct the water quality sampling and review monitoring results to provide advice in relation to the water quality management if a complaint is received or requested by the administering authority.
- Any surface water sampling will be undertaken in accordance with the EHP’s *Monitoring and Sampling Manual, September 2009* or subsequent editions.
3.1.6 Audit and Review

- The effectiveness of the stormwater, erosion and sediment control management strategies will be reviewed as necessary, or at least once every year.

3.1.7 Reporting and Responsibility

- Complaints regarding stormwater or incidents are to be reported to the Quarry Manager as soon as practicable and recorded within the complaint register on-site.
- The Quarry Manager shall maintain a record of surveillance monitoring of on-site water storages and treatment systems, of any corrective actions taken and complaints or incidents reported.
- Records of complaint or incidents, including results of any monitoring program undertaken on-site, will be kept for a minimum of five years for inspection by relevant statutory authorities.

3.1.8 Identification of Incident or Failure to Comply

- Significant soil erosion evident within disturbed areas following rainfall events.
- Water released from site not complying with the nominated conditions of the Environmental Authority.

3.1.9 Corrective Action

- If a discharge with significant variation in water quality occurs as a result of on-site activities, an investigation will be conducted and, if deemed necessary, those on-site activities shall be scaled back to an appropriate level until the cause of the problem is resolved.
3.2 Air Quality (Dust)

3.2.1 Purpose

- The EP Act and the associated EPP (Air) provide the legislation and regulatory controls for management of emissions to the atmosphere.
- Quarry activities have the potential to generate dust that if inadequately controlled, has the potential to cause nuisance to surrounding rural residents. Activities on-site that may generate dust emissions include:
  - crushing and screening operations
  - rock drilling and blasting
  - wind action on topsoil stockpiles and disturbed areas
  - topsoil/overburden stripping, extraction and transportation (earthmoving machinery ground-interaction, materials digging, loading and dumping, haul truck tyre/unsealed road interaction, unsealed roads, material spillage from haul trucks)
  - product stockpiling and dispatch (stockpiles and stockpile pads, product loading, truck tyre-road interaction, material spillage from trucks)
  - rehabilitation works.

3.2.2 Operational Policy

- To protect the amenity at surrounding rural residences and to minimise the likelihood of complaint.

3.2.3 Performance Targets

- Dust and particulate matter not exceeding the following levels when measured at the boundary of any sensitive receptor:
  - dust deposition of 120 mg/m²/day, when monitored in accordance with Australian Standard AS 3580.10.1 Methods for sampling and analysis of ambient air – Determination of particulates – Deposited matter – Gravimetric method; and
  - an aerodynamic diameter of less than 10 µm (PM10) suspended in the atmosphere of 50 µg/m³ over a 24 hour averaging time when monitored in accordance with Australian Standard AS 3580.9.6 Methods for sampling and analysis of ambient air – Determination of suspended particulate matter – PM10 high volume sampler with size-selective inlet – Gravimetric method.

3.2.4 Implementation Strategy/Mitigation Measures

- Specific control measures to be implemented for particular operational phases or activities include, but are not necessarily limited to:
  - dampening down of cleared areas, extraction working areas, haul roads, stockpiles and other hardstand areas by water spraying when visual surveillance indicates excessive dust generation and propagation from point or mobile sources
  - installation and maintenance of water sprays or dust extraction systems on crushing and screening plant
  - limiting topsoil/overburden removals at any one time to that necessary while providing for effective production
  - limiting removal of topsoil/overburden to periods of favourable weather conditions
  - positioning the quarry and associated activities to utilising the surrounding topography as a wind break where practicable
  - restricting vehicle and mobile machinery movements to designated routes and hardstand areas
  - temporarily revegetating topsoil stockpiles where practicable
  - as soon as practicable, revegetate completed areas to stabilise the landscape
  - enforcing a <40 kph maximum speed limit on unsealed haul and internal roads
  - covering all loads of material leaving the Site
  - clearing of spillage from side rails, tailgates and draw bars of trucks (following loading and tipping)
  - cleaning of trafficable areas as necessary
  - where possible, sealing with bitumen or other equivalent hard surface material, or otherwise maintaining trafficable to the satisfaction of the administering authority
  - levelling of loads and securing of tailgates prior to truck exiting Site to avoid spillage
- installing a riffle bar/vibration grid or rubble zone at the Site exit
- ensuring Employees and contractors are aware of dust minimisation practices
- daily visual surveillance of control measures to ensure system performance accords with design and implementation criteria.

### 3.2.5 Monitoring

- Dust deposition monitoring is carried out on a monthly basis at monitoring points illustrated in Figure 6.1 to 6.4 – Discharge, Emission and Monitoring Plan Stage 1 to Long Term.
- Daily visual surveillance will be undertaken by all Employees to ensure dust generation on-site is being controlled.
- When requested by the administering authority, dust and particulate monitoring will be undertaken to investigate any complaint relating to environmental nuisance or health caused by dust and/or particulate matter and the results notified within 14 days to the administering authority following completion of monitoring. Monitoring shall be carried out at a place(s) relevant to the potentially affected dust-sensitive place and must include:
  - for a complaint alleging dust nuisance – dust deposition or total suspended solids (TSP); and
  - for a complaint alleging adverse health effects caused by dust – the concentration of particulate matter, per cubic metre, with an aerodynamic diameter of less than 10 µm (PM10) suspended in the atmosphere over a 24 hour averaging time.

### 3.2.6 Auditing and Review

- Air quality management strategies shall be reviewed at least every three years or earlier if required.

### 3.2.7 Reporting and Responsibility

- All complaints relating to dust shall be recorded in the complaint register or work diary.
- The Quarry Manager shall investigate complaints and take actions in accordance with the complaint handling procedure.
- The Quarry Manager will be responsible for ensuring that dust suppression equipment, where installed, is maintained and in good working order.
- The Quarry Manager shall maintain records of any dust monitoring undertaken on-site for a minimum of five years.
- Dust deposition monitoring results will be stored in a readily accessible location and may be provided to administering authority upon request.

### 3.2.8 Identification of Incident or Failure to Comply

- Receipt of a nuisance dust complaint.
- Dust levels above the 120 mg/m²/day.
- Observations of uncontrolled visible dust being generated on-site and leaving the Site boundary.

### 3.2.9 Corrective Action

- If a complaint is received as a result of on-site activities, an investigation will be conducted and action taken to resolve the cause of the problem as far as practicable.
- The Quarry Manager will undertake appropriate action to rectify any identified deficiencies in dust control, which may include requesting the services of a specialist consultant to investigate and to give advice on dust control measures that should be implemented at the Site to prevent further environmental nuisance.
3.3 Noise

3.3.1 Purpose

- The EP Act and the associated Environmental Protection (Noise) Policy 2008 provide the legislation and regulatory controls for management of noise emissions.
- The land surrounding the Site comprises rural land and extractive industry to the east.
- Uncontrolled or unmitigated Site noise has the potential to be a nuisance at neighbouring sensitive receptors (e.g. rural residences). Site equipment or activities that have potential to generate significant noise have been identified and include:
  - excavator/bulldozer (clearing vegetation, stripping topsoil, extraction, landforming, rehabilitation)
  - rock drilling and blasting (raw material extraction)
  - processing plant (crushing and screening)
  - front-end loader (out-loading, feeding processing plant)
  - off highway truck (product haulage)
  - road truck (product delivery)
  - light vehicle (Employee vehicles and service vehicles).
- Blasting management (Section 3.4) deals with noise due to Site blasting activities.

3.3.2 Operational Policy

- To protect the acoustic environment and amenity at surrounding rural dwellings, and to minimise the likelihood of complaints.

3.3.3 Performance Targets

- Noise levels on-site are currently conditioned as follows in accordance with the EHP EA SR197 Schedule F - Table 2: Noise should not exceed the levels as listed in Table 13 – Noise Emission Criteria Limits when measured at the boundary of any surrounding noise sensitive receptors.

Table 13 – Noise Emission Criteria Limits

<table>
<thead>
<tr>
<th>Period</th>
<th>Noise Level at a Noise Sensitive Place Measured as the Adjusted Maximum Sound Pressure Level $L_{A_{max, , adj, , T}}$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monday to Saturday 7am – 6pm</td>
<td>Background noise level plus 5 dB(A)</td>
</tr>
<tr>
<td>Monday to Saturday 6pm - 10pm</td>
<td>Background noise level plus 5 dB(A)</td>
</tr>
<tr>
<td>Monday to Saturday 10pm – 7am</td>
<td>Background noise level plus 3 dB(A)</td>
</tr>
<tr>
<td>All other times and public holidays</td>
<td>Background noise level</td>
</tr>
</tbody>
</table>

Noise Limits at a Commercial Place

<table>
<thead>
<tr>
<th>Period</th>
<th>Noise Level at a Commercial Place Measured as the Adjusted Maximum Sound Pressure Level $L_{A_{max, , adj, , T}}$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monday to Saturday 7am – 6pm</td>
<td>Background noise level plus 10 dB(A)</td>
</tr>
<tr>
<td>Monday to Saturday 6pm - 10pm</td>
<td>Background noise level plus 10 dB(A)</td>
</tr>
<tr>
<td>Monday to Saturday 10pm – 7am</td>
<td>Background noise level plus 8 dB(A)</td>
</tr>
<tr>
<td>Public holidays</td>
<td>Background noise level plus 5 dB(A)</td>
</tr>
</tbody>
</table>
In accordance with the current EA, for the purpose of assessing compliance with the above criteria, the range of values for background noise levels should be as follows:

**Table 14 – Background Noise Level Range**

<table>
<thead>
<tr>
<th>Time Period</th>
<th>Background noise level (dB(A))</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monday to Saturday (7am – 6pm)</td>
<td>40-50</td>
</tr>
<tr>
<td>Monday to Saturday (6pm – 10pm)</td>
<td>35-45</td>
</tr>
<tr>
<td>Monday to Saturday (10pm – 7am)</td>
<td>30-40</td>
</tr>
<tr>
<td>At all other times and public holidays</td>
<td>30-40</td>
</tr>
</tbody>
</table>

### 3.3.4 Implementation Strategy/Mitigation Measures

- Hours of operation will be restricted to the following:
  - 6am to 6pm for extractive industry operations – Monday to Friday
  - 8am to 3pm for extractive industry operations – Saturday
  - 6am to 10pm for haulage by vehicles accessing directly onto Stanmore Road – Monday to Friday
  - 8am to 3pm for haulage by vehicles accessing directly onto Stanmore Road – Saturdays
  - 9am to 5pm for blasting – Monday to Saturday
  - Plant Maintenance, 24 hours, 7 days a week
  - No operations on Sundays.

- The following noise control measures may be implemented to assist in mitigating noise associated with the Site activities (if necessary):
  - position the processing plant and ancillary equipment away from adjacent residences as far as practicable
  - positioning of stockpiles between noise generating sources and sensitive receptors to act as a barrier to provide noise attenuation
  - enclosing fixed engines, pumps and compressors, where practicable
  - operating and maintaining modern, well maintained, roadworthy product delivery trucks fitted with high efficiency mufflers
  - shutting down equipment when not in use
  - fitting broadband reversing alarms, rather than audible sirens or beepers, on mobile equipment where practicable
  - avoiding unnecessary operation of plant or revving of mobile or stationary motors and engines.

### 3.3.5 Monitoring

- The Quarry Manager will ensure regular surveillance of the Site to qualitatively assess noise generation from plant and machinery.

- The Quarry Manager will ensure all Site plant, machinery and vehicles are, at a minimum, serviced in accordance with the manufacturers’ specifications.

- The Quarry Manager/ Employees will be responsible for:
  - ensuring that equipment at the Site is used for its intended purpose;
  - operating equipment so as not to cause unnecessary noise; and
  - ensuring that any extraneous noises are rectified.

- The Quarry Manager may initiate a noise survey following a noise complaint or when requested by the administering authority to investigate a noise complaint.

- The measurement and reporting of noise levels will be undertaken by a person, or body, possessing both the qualifications and the experience appropriate to perform the required measurements.

- Monitoring must include:
  - \( L_{A10, \text{adj},10 \text{ mins}} \)
  - \( L_{A1, \text{adj},10 \text{ mins}} \)
  - the level and frequency of occurrence of impulsive and tonal noise
  - atmospheric conditions including temperature, relative humidity, and wind speed and direction
  - effects due to extraneous factors such as traffic noise, insects, birds, and so on
  - location, date and time of recording.
Method of measurements and reporting of noise monitoring must comply with the current edition of the EHP Noise Measurement Manual.

3.3.6 Auditing and Review

- Noise management strategies will be reviewed at least every three years or earlier if required.

3.3.7 Reporting and Responsibility

- All noise complaints received at the Site will be recorded in the complaint register and reported to the Quarry Manager.
- The Quarry Manager will investigate complaints and take actions in accordance with the complaints’ handling protocol.
- The Quarry Manager will maintain records of any noise monitoring undertaken on-site for a minimum of five years.

3.3.8 Identification of Incident or Failure to Comply

- Receipt of a noise complaint.
- Operating outside of approved hours of operation.

3.3.9 Corrective Action

- If a complaint is received as a result of on-site activities an investigation will be conducted and action taken to resolve the complaint to the furthest practicable extent.
- The Quarry Manager may request the services of a specialist consultant, to investigate and to give advice on noise control devices or practices that may be implemented at the Site to prevent environmental nuisance.
3.4 Blasting

3.4.1 Purpose

- Blasting will be required to fragment rock to a manageable size that can be transported and fed into the on-site crushing and screening plant.
- Blasting practice has the potential to generate excessive noise and vibration impacts that may cause annoyance and discomfort to surrounding neighbours and in extreme circumstances cause damage to buildings, structures and services.
- Section 440ZB of the EP Act provides the legislation for blasting.

3.4.2 Operational Policy

- To ensure blasting activities are carried out in a manner that minimises annoyance, discomfort and any adverse effects being caused by the impact of air blast overpressure and ground-borne vibration at surrounding rural residences.
- All blasting to be carried out by a competent person.

3.4.3 Performance Targets

- Any blasting should not exceed the following levels when measured at any surrounding sensitive receptors:
  - air blast overpressure greater than 115 dB Z (linear peak) for 4 out of any 5 consecutive blasts; or
  - air blast overpressure greater than 120 dB Z (linear peak) for any blast; or
  - ground vibration caused by blasting operations must not exceed a peak particle velocity of 5 mm/sec for more than 5% of the total number of blasts carried out over any 12 month period, when measured at any point within one metre of any residential boundary or in or on any other noise sensitive place; or
  - ground vibration caused by blasting operations must not exceed a peak particle velocity of 10 mm/sec at any time, when measured at any point within one metre of any residential boundary or in or on any other noise sensitive place.

3.4.4 Implementation Strategy/Mitigation Measures

- Hours of blasting will be restricted to 9am to 5pm (Monday to Saturday).
- Handling, transport and use of explosives shall be carried out in accordance with the requirements of MQSH Act.
- The Site will adopt modern blasting technology.
- Only suitably experienced and qualified blasting personnel shall be employed or contracted to provide blasting services.
- Preference shall be given to larger yielding but smaller number of blasts rather than a large number of smaller yielding blasts.
- The quarry face shall be orientated so that they do not face directly towards adjacent residences, where practicable.
- Keep the maximum instantaneous charge or charge mass per delay, to the lowest possible level.
- A blast plan shall be prepared for each shot, containing hole layout, initiation sequence, charging, stemming type and height, charge weight and any other design element required for good blasting practice.
- Blast areas may be wetted down to minimise dispersion of dry and fine materials where practicable or where it is identified as a source of potential complaint or non-conformance.

3.4.5 Monitoring

- Where any complaint regarding blast vibration or overpressure is received, consideration will be given to available monitoring results and locations, and if required, or advantageous, a monitor will be installed at the appropriate location for the next five blasts to assess compliance or when requested by the administering authority.
Monitoring and reporting shall be undertaken by a person or body possessing both the qualifications and the experience appropriate to perform the required measurements.

Monitoring will be conducted in accordance with the Australian and New Zealand Environmental Council (1990) Technical Basis for Guidelines to Minimise Annoyance Due to Blasting Overpressure and Ground Vibration, as follows:

i) Measurements of air blast overpressure shall be taken at an appropriate location which is exposed to the blasting and is at least 3.5 m from any noise affected building or structure, at a position between 1.2 metres and 1.5 metres above the ground.

ii) Ground-borne vibration transducer (or triaxial array) shall be attached to a cube or cylinder of equal diameter and length and having a mass of at least 30 kg, to ensure good coupling with the ground. Where the blast site and the measurement site cannot be shown to be on the same underlying strata, the mass shall be buried so that its uppermost surface is at the same level as the ground surface.

iii) Ground-borne vibration transducer (or array) shall be placed at a distance of at least the longest dimension of the foundations of a noise affected building or structure away from such building or structure and placed between that building or structure and the site of the blasting.

At least the following descriptors, characteristics and conditions shall be monitored:

- maximum instantaneous charge (MIC) of blast
- location of the blast within the quarry (including X, Y and Z coordinates and bench level)
- distance from blast to monitoring point, location of monitoring point and date and time of recording/measurement
- overpressure level (dB linear peak)
- peak particle velocity and frequency (for ground vibration monitoring only)
- effects due to extraneous factors including estimated wind speed and direction and weather conditions
- measurement instrumentation used
- name of the person performing the measurement.

3.4.6 Auditing and Review

The Quarry Manager is to review the effectiveness of the blast management strategies as necessary or at least every three years.

3.4.7 Reporting and Responsibility

- All blast complaints received will be recorded in the complaints' register and reported to the Quarry Manager.
- The Quarry Manager will investigate all complaints and will maintain records of blast monitoring undertaken and blast records for a minimum of five years.
- The Quarry Manager will be responsible to ensure staff and/or contractors are aware of the blast management strategies.
- Upon request by the administering authority, the results of blast monitoring conducted will be reported to the administering authority.

3.4.8 Identification of Incident or Failure to Comply

- Receipt of a blast complaint.
- Blasting operations not complying with the EP Act or Environmental Authority conditions.

3.4.9 Corrective Action

- If a blast complaint is received as a result of on-site blasting activities, an investigation will be conducted and action taken to resolve the complaint to the furthest practicable extent.
- Undertake appropriate action to rectify any identified deficiencies in the management of on-site blasting.
- The Quarry Manager may request the services of a specialist consultant to investigate and to give advice on blasting techniques or to audit blasting methods.
3.5 Hydrocarbons and Chemicals

3.5.1 Purpose

- The MQSH Act and associated regulation places a number of obligations on the storage and handling of dangerous goods on-site, so that it is:
  - protected against damage and deterioration
  - secured to prevent loss, misuse and theft
  - for a liquid, bunded to contain spillage
  - stored and handled in a way having regard to the National Occupational Health and Safety Council’s (NOHSC) *National Code of Practice for the Storage and Handling of Dangerous Goods* [NOHSC:2017].

- Site operations have the potential to contaminate land and water in and surrounding the quarry development by the release of various hydrocarbons and chemicals used and/or stored in small volumes on-site. These chemicals could include:
  - distillate (fuel for stationary and mobile engines)
  - oils and greases (lubricants and hydraulic oils for stationary and mobile equipment)
  - miscellaneous chemicals (e.g. weedicide).

3.5.2 Operational Policy

- To manage the on-site handling of hydrocarbons and chemicals to prevent soil and water becoming contaminated.

3.5.3 Performance Targets

- No land contamination that would require the Site to be registered on the Environmental Management Register or Contaminated Land Register.

- No serious spills of oils, greases, fuels or other hazardous chemicals (for this purpose hydrocarbon spill incidents have been classified as follows: minor <5 L, major 5 to 20 L, and serious >20 L).

- No preventable release of hydrocarbons and chemicals to the environment.

3.5.4 Implementation Strategy/Mitigation Measures

- Specific control measures to be implemented include, but are not necessarily limited to:
  - providing appropriate drains and bunds to ensure stormwater runoff is excluded from washing areas
  - chemical tank storage to be bunded so that the capacity of the bund is able to contain at least 100% of the largest storage tank plus 10% of the second largest tank
  - chemical drum storage bund must be able to contain at least 25% of the maximum design storage within the bund
  - bunding to be constructed of impervious materials and, where practicable, roofed
  - providing a collection sump within the floor of the bunded area(s)
  - storing empty drums on concrete hardstand areas with closures securely in place
  - servicing plant and equipment in accordance with a programmed maintenance schedule
  - conducting all major maintenance of equipment off-site, where practicable
  - ensuring periodic maintenance (at least quarterly) of any oil separators onsite, and maintain records of inspection and cleaning in a log book for a minimum of two years
  - inducting all new Employees on the use and handling of chemicals used on-site
  - preparing an accidental spill containment and clean-up protocol (refer to *Appendix D – Spill Protocol*);
  - ensuring Employees are familiar with proper fuelling and spill clean-up procedures
  - secure any chemicals being handled on-site to prevent accidental spillage polluting runoff or land contamination
  - dispose of unused or unwanted substances that have the potential to contaminate the Site in accordance with statutory requirements
  - refuelling of on-site equipment will be conducted within a controlled area
  - using drip pans during refuelling and equipment maintenance where practicable
  - discouraging ‘topping-off’ of fuel tanks
  - recording incidents and identifying the cause and controls to be implemented to improve the management system
- keep records on personnel training, disposal of trackable wastes (e.g. hydrocarbons, oil and water emulsions or containers/filters contaminated with hydrocarbons)
- clean up spills immediately.

3.5.5 Monitoring

- Areas where handling of hydrocarbons and chemicals occur (e.g. refuelling or minor on-site servicing) shall be regularly inspected by the Quarry Manager.
- All Employees will be responsible for the safe day-to-day handling, use and temporary storage of chemicals being used on-site.

3.5.6 Auditing and Review

- The hydrocarbon and chemical management strategies for the Site will be reviewed as required or at least once every three years by the Quarry Manager.

3.5.7 Reporting and Responsibility

- In the case of an incident, the following information shall be recorded as a minimum, kept and reviewed during Site decommissioning:
  - date and time of spill
  - approximate location of the spill
  - substance spilled
  - quantity spilled
  - actions taken to contain and control spill
  - method of disposal
  - person responsible for managing and removing the spill.
- The location, volumes and chemicals involved in major and serious spills will be reported to the administering authority.
- The Quarry Manager shall be responsible for ensuring all Employees and contractors are aware of the requirement of the hydrocarbon and chemical management strategies.
- The Quarry Manager shall be responsible for recording the training of all Employees on the procedure for containing and cleaning up of chemical oil and fuel spills and the handling of other dangerous goods that may be used on-site.

3.5.8 Identification of Incident or Failure to Comply

- Significant hydrocarbon or chemical spill or release to the environment.

3.5.9 Corrective Action

- Spillage and contamination will be immediately contained and a program designed to remediate any contamination shall be implemented in accordance with the on-site Spill Protocol (Refer to Appendix D – Spill Protocol).
- Assess processes to identify any significant changes and if required, modify activities/processes.
3.6 Waste

3.6.1 Purpose

- Unmanaged wastes can detract from the amenity of the Site and locality and can increase operational costs.
- The EP Act, WRR Act and EPP (Waste Management) Regulation provide the statutory basis for waste management for protection of environmental values. The objective of the WRR Act are:
  
  (a) to promote waste avoidance and reduction, and resource recovery and efficiency actions;
  (b) to reduce the consumption of natural resources and minimise the disposal of waste by encouraging waste avoidance and the recovery, re-use and recycling of waste;
  (c) to minimise the overall impact of waste generation and disposal;
  (d) to ensure a shared responsibility between government, business and industry and the community in waste management and resource recovery; and
  (e) to support and implement national frameworks, objectives and priorities for waste management and resource recovery.
- The WRR Act nominates a waste management hierarchy in a preferred order of adoption. The hierarchy is as follows:
  
  (a) AVOID unnecessary resource consumption;
  (b) REDUCE waste generation and disposal;
  (c) RE-USE waste resources without further manufacturing;
  (d) RECYCLE waste resources to make the same or different products;
  (e) RECOVER waste resources, including the recovery of energy;
  (f) TREAT waste before disposal, including reducing the hazardous nature of waste; and
  (g) DISPOSE of waste only if there is no viable alternative.

- The principal wastes from the on-site extractive industry may include, but are not necessary limited to:
  - food scraps, lunch packaging and consumables (e.g. paper and equipment parts)
  - Regulated Wastes such as batteries, oil filters, waste oil/hydrocarbons and containers, oil/water emulsions and tyres
  - steel/used equipment
  - plant debris from clearing.

3.6.2 Operational Policy

- To prevent or minimise the generation of wastes as far as practicable and to contain, control and dispose of waste in accordance with appropriate waste management practices.

3.6.3 Performance Targets

- Implement the WRR Act waste management hierarchy to minimise disposal to landfill.
- Maintain a record of any disposal of trackable wastes in accordance with the EPP (Waste Management) Regulation.
- No unlawful disposal of wastes on or off-site.

3.6.4 Implementation Strategy/Mitigation Measures

- Site wastes will be managed in the following manner:
  - waste stations will be established around the Site, which include all bin types required for appropriate segregation of wastes generated during the activity
  - wastes are to be stored in a neat and orderly manner and clearly signed as waste materials where wastes have to be temporarily stored on-site
  - waste skips are to be emptied prior to reaching the point of overflowing
  - waste skips and bin types that have lids shall be closed at all times
  - waste skips and bin types with no lids will be covered where practicable to prevent any wind blown litter
wastes will be removed from the Site for disposal or recycling by appropriate licensed operator(s)
- no wastes are to be buried or burnt on-site unless by approval of the administering authority.

3.6.5 Monitoring

- The Quarry Manager will undertake a monthly visual inspection to ensure the waste management hierarchy is being effectively implemented.
- All Employees and contractors shall be responsible for ensuring wastes are stored and removed from the Site on a regular basis (e.g. daily or weekly).

3.6.6 Auditing and Review

- The waste management strategies for the quarry operations will be reviewed at least once every three years.

3.6.7 Reporting and Responsibility

- The Quarry Manager shall maintain a manifest of any regulated (trackable) waste and methods of disposal in accordance with the EP (Waste Management) Regulation and any other wastes required by the Environmental Authority.

3.6.8 Identification of Incident or Failure to Comply

- Waste bins or tanks overflowing.
- Litter observed within the on-site operational areas.
- Wastes not correctly disposed of.
- Burning of wastes on-site.
- Re-usable or recyclable wastes not being segregated.
- Disposal records of trackable wastes not being maintained.

3.6.9 Corrective Action

- The Quarry Manager shall investigate the incident and review workplace practices.
- The Quarry Manager shall facilitate the disposal, recycling or reuse of waste materials as deemed appropriate in an approved manner.
3.7 Weeds

3.7.1 Purpose

- A 'weed' is a plant which, because of its characteristics and location, is causing economic, ecological, physical or aesthetic problems.
- Weeds have significant economical, environmental and social impact, directly or indirectly, to all Queenslanders. Weeds can dramatically alter ecosystem function, cause human health problems, reduce primary production and profitability and limit the long-term sustainability of natural and agricultural resources if not appropriately controlled.
- Negative impacts that may occur due to the quarry operations include:
  - areas of exposed earth available for weed colonisation including topsoil stockpiles
  - spread of existing weed infestations due to disturbance and vehicle traffic
  - spread of existing weed infestations due to grazing animals
  - unsuccessful or weed-infested revegetated areas.
- The main legislation governing the management of weeds within Queensland is the Land Protection (Pest and Stock Route Management) Act 2002 (LP Act).
- The LP Act declares plants considered to be serious or potentially serious and imposes a legal responsibility for control of these plants by all landowners or land under management. Three classes of declared plants exist and are targeted for control because they have, or could have serious economic, environmental or social impacts:
  - Class 1 has the potential to become a serious pest and is subject to eradication from the State
  - Class 2 has already spread over Queensland and gaining control is considered to be very important
  - Class 3 is commonly found in Queensland and prevention of the sale of Class 3 declared plants is expected to reduce their spread, especially if land is adjacent to an environmentally significant area. Landowners are not expected to try to control them.
- Declared Class 1 and 2 plants known to be present within the local area include:
  - Annual Ragweed (*Ambrosia artemisiifolia*)
  - Groundsel Bush (*Baccharis halimifolia*)
  - Fireweed (*Senecio madagascariensis*)
  - Lantana Bush (*Lantana camara*)
  - Creeping Lantana (*Lantana montevidensis*).

3.7.2 Operational Policy

- To ensure adequate control measures are implemented to remove and/or control the spread and infestations of declared plants and other environmental weeds within the quarry development area.

3.7.3 Performance Targets

- The following performance targets have been identified for weed management issues:
  - control any existing weed infestations
  - reduce, where practicable, the extent of infestations of established weeds
  - prevent the potential introduction or establishment of new weed species
  - ensure rehabilitated areas are free from noxious weeds.

3.7.4 Implementation Strategy/Mitigation Measures

General

- Identify weeds on-site and in surrounding areas, prioritise weeds and weed management options, and determine the cause.
- Control infestations as soon as possible to prevent further spread of weeds.
- A combination of weed management options to reduce weeds on-site shall be adopted. Depending on the weed types these may include mechanical, chemical, biological, slashing, burning and hand removal practices.
Monitor and evaluate the progress of weed management efforts on-site.

Employees to be able to recognise existing and potential weeds present on-site and within the surrounding area to ensure they are not inadvertently brought in via items contaminated by seed (e.g. vehicles, machinery, hand tools, soil, mulch or livestock).

Use established roads and tracks and avoid weed-infested areas/sites.

If areas containing weeds are encountered, clean all equipment, vehicles and machinery prior to leaving.

Dispose of weed plant material and seed by disposal at the council refuse stations, burning and/or burying at an appropriate depth on-site.

Maintain existing groundcover for as long as possible by restricting/minimising land disturbance at any one time, where practicable.

Restrict vehicular and stock access on-site.

Ensure equipment entering and leaving the Site is free of soil and vegetation, both externally (include tracks/tyres, underbody, engine bay, radiator, buckets, body, chassis, trays, blades) and internally (include cabin, tool boxes, storage compartments).

**Access Roads/Hardstand areas**

All access routes and hard stand areas will be maintained in a weed-free or weed-reduced state to lessen the spread of weed seed by vehicle movements.

**Topsoil Management**

Visual surveys will be undertaken prior to all topsoil stripping operations and, if necessary, control mechanisms will be undertaken to reduce the risk of the contamination of topsoil stockpiles with seed and vegetative weed material.

Weed control mechanisms may include separate stockpiling, herbicide spraying of stripped soils, or disposal as fill of soil materials infested with weeds.

Weed control mechanism strategies will be implemented to control weed infestation if required, both before and after use of top-dressing material in the rehabilitation program.

All topsoil stockpiles will be regularly monitored and managed for weed infestation.

**Rehabilitation**

Rehabilitate disturbed areas as soon as practical following extraction.

Bringing topsoil onto the Site should be avoided.

Prior to the establishment of vegetation:
- a spraying campaign may be required to prevent migration or establishment of weed species into the area under rehabilitation; or
- using alternative methods for controlling both grasses and weeds including manual weeding, burning, slashing, weed matting and mulching, where practicable.

**Weed Control Methods**

As a guide to assist in planning weed control, a summary of weed control options that can be implemented are presented in **Table 15 – General Weed Control Options**.
Table 15 – General Weed Control Options

<table>
<thead>
<tr>
<th>Infestation Level</th>
<th>Biological</th>
<th>Chemical</th>
<th>Mechanical</th>
<th>Physical</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low (Canopy cover between 1% and 10%)</td>
<td>Not suitable.</td>
<td>Spot-spraying by hand with a registered herbicide.</td>
<td>Not suitable.</td>
<td>Hand grubbing.</td>
</tr>
<tr>
<td>Medium (Canopy cover between 11% and 50%)</td>
<td>Release of biological control agents.</td>
<td>Spot-spraying by hand with a registered herbicide.</td>
<td>Chaining, rolling, raking or back-ploughing.</td>
<td>Follow up control of seedlings – could include physical removal.</td>
</tr>
<tr>
<td>High (Over 50% canopy cover)</td>
<td>Inspect infestation to see if, and what, bio-control agents are already present. If necessary, release biological control agents and monitor their progress.</td>
<td>Aerial spraying with a registered herbicide.</td>
<td>Attach with chaining, rolling or raking. Use fire to kill any regrowth and break seed dormancy.</td>
<td>Follow up control of seedlings – could include physical removal.</td>
</tr>
</tbody>
</table>

- Department of Agriculture, Fisheries and Forestry (DAFF) provides an A to Z listing of weeds including plants declared under the LP Act. This listing can be found at: [http://www.daff.qld.gov.au](http://www.daff.qld.gov.au). Detailed information on controlling individual species is also provided in the A-Z listing along with fact sheets and information sheets.

- Weed control options for declared weeds occurring within the Site and/or surrounds are presented in Table 16 to Table 19. It should be noted that no control option for Creeping Lantana was available from DAFF at the time of preparing this document, and therefore no specific treatment option has been provided.

Table 16 – Weed Control Option for Ambrosia artemisiifolia

| OPTIMUM TREATMENT TIMES | | | | | |
|-------------------------|---|---|---|---|
| JAN | FEB | MAR | APR | MAY | JUN |
| JUL | AUG | SEP | OCT | NOV | DEC |

- Chemical and concentration
  - Dicamba: 22L/ha, 1.5L/100L, 330mL/10-15L/150m²
  - Bromacil (800g/kg): 3.5-6.5 kg/ha
  - Bromacil + diuron: 4.5-6.5 kg/ha

- Situation, method and comment
  - Boom Spray
  - Spot Spray
  - Knapsack
  - Can be utilised for commercial / industrial land, and right of way areas.
  - Boom Spray
  - Can be utilised for commercial / industrial land, and right of way areas.
  - Boom Spray
  - Can be utilised for commercial / industrial land, and right of way areas.

Notes: Rates are given to water unless otherwise stated.
### Table 17 – Weed Control Option for Baccharis halimifolia

**Groundsel bush – Baccharis halimifolia**  
(Declared status Class 2)

#### OPTIMUM TREATMENT TIMES

Darker colour indicates preferred treatment times

<table>
<thead>
<tr>
<th>JAN</th>
<th>FEB</th>
<th>MAR</th>
<th>APR</th>
<th>MAY</th>
<th>JUN</th>
</tr>
</thead>
<tbody>
<tr>
<td>JUL</td>
<td>AUG</td>
<td>SEP</td>
<td>OCT</td>
<td>NOV</td>
<td>DEC</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Chemical and concentration</th>
<th>Rate</th>
<th>Situation, method and comment</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>2,4-D amine 500 g/L</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Various trade names</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.6–5.5 L/ha</td>
<td></td>
<td>Air application – requires higher rate for bushes</td>
</tr>
<tr>
<td>0.4 L/100 L</td>
<td></td>
<td>High Volume for foliar spray</td>
</tr>
<tr>
<td>300 mL/15 L</td>
<td></td>
<td>Cut Stump</td>
</tr>
<tr>
<td>1.2 L/15 L</td>
<td></td>
<td>Misting</td>
</tr>
<tr>
<td>Pastures and rights of way situated on non-agricultural land (i.e. industrial, commercial).</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>2,4-D acid</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Various trade names</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10 L/ha</td>
<td></td>
<td>Helicopter spraying</td>
</tr>
<tr>
<td>33 mL/1 L kerosene or turps</td>
<td></td>
<td>Basal bark or cut stump</td>
</tr>
<tr>
<td>100 mL/10 L</td>
<td></td>
<td>Knapsack foliar spray</td>
</tr>
<tr>
<td>1 L/10 L · 0.37 L/ha</td>
<td></td>
<td>Sprinkler spray—1 L/100 m 2</td>
</tr>
<tr>
<td>1 L/40 L diesel</td>
<td></td>
<td>Basal bark or cut stump</td>
</tr>
<tr>
<td>Non-agricultural pastures.</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>2,4-D sodium</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Various trade names</td>
<td></td>
<td></td>
</tr>
<tr>
<td>0.275 kg/100 L</td>
<td></td>
<td>Spot Spray</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Commercial and industrial land including non-agricultural pastures and rights of way.</td>
</tr>
<tr>
<td><strong>Glyphosate</strong> (i.e. IPA 360 g/L)**</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Various trade names</td>
<td></td>
<td></td>
</tr>
<tr>
<td>0.7–1 L/100 L</td>
<td></td>
<td>Handheld spray gun—higher rate in winter</td>
</tr>
<tr>
<td>100–150 mL/15 L</td>
<td></td>
<td>Foliar spray knapsack</td>
</tr>
<tr>
<td>1:9 (2 x 2 mL dose per 0.5 m bush height)</td>
<td></td>
<td>Splatter gun foliage</td>
</tr>
<tr>
<td>Non-discriminatory product - will kill pastures. Suitable for irrigation channels and banks; non-agricultural commercial and industrial land, unwanted pasture, rights of way, forest areas.</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Picrotopram + triclopyr (premix)</strong> (e.g. Grazon DS ®)</td>
<td></td>
<td>Handheld spray gun - foliage</td>
</tr>
<tr>
<td>Various trade names</td>
<td></td>
<td>Misting foliage</td>
</tr>
<tr>
<td>0.25–0.35 L/100 L</td>
<td></td>
<td>Foliar spray knapsack</td>
</tr>
<tr>
<td>2.5 L/100 L</td>
<td></td>
<td></td>
</tr>
<tr>
<td>30 mL/15 L</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Picloram + triclopyr (premix) (e.g. Grazon DS ®)</td>
<td></td>
<td>Handheld spray gun - foliage</td>
</tr>
<tr>
<td>(e.g. Defender Chemspray, Garden King)</td>
<td></td>
<td>Misting foliage</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Foliar spray knapsack</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Triclopyr 600 g/L (e.g.カルオン 600 ®)</td>
<td></td>
<td>Handheld spray gun - foliage</td>
</tr>
<tr>
<td>Home garden packs (骨干防除剤) (e.g. Defender Chemspray, Garden King)</td>
<td></td>
<td>Misting foliage</td>
</tr>
<tr>
<td>0.16–0.32 L/100 L water</td>
<td></td>
<td>Overall spray foliage</td>
</tr>
<tr>
<td>25–50 mL/15 L</td>
<td></td>
<td>Basal bark or cut stump</td>
</tr>
<tr>
<td>50 g/L</td>
<td></td>
<td>Overall spray foliage</td>
</tr>
<tr>
<td>120 g/L</td>
<td></td>
<td>Basal bark or cut stump</td>
</tr>
<tr>
<td>0.1–0.2 L/5 L water</td>
<td></td>
<td>Knapsack foliage</td>
</tr>
<tr>
<td>0.1 L/0.5 L kerosene</td>
<td></td>
<td>Basal bark or cut stump</td>
</tr>
<tr>
<td>Triclopyr 600 g/L (e.g.カルオン 600 ®)</td>
<td></td>
<td>Suitable for recreational areas, and commercial and industrial land. Can be applied to pastures, Rights of way and forests.</td>
</tr>
<tr>
<td>Home garden packs (骨干防除剤) (e.g. Defender Chemspray, Garden King)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.8–4 L/ha</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dicamba + MCPA (premix)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Table 18 - Weed Control Option for Senecio madagascariensis

**Fireweed – Senecio madagascariensis**  
(Declared status – Class 2)

#### OPTIMUM TREATMENT TIMES

Darker colour indicates preferred treatment times.

<table>
<thead>
<tr>
<th>JAN</th>
<th>FEB</th>
<th>MAR</th>
<th>APR</th>
<th>MAY</th>
<th>JUN</th>
<th>JUL</th>
<th>AUG</th>
<th>SEP</th>
<th>OCT</th>
<th>NOV</th>
<th>DEC</th>
</tr>
</thead>
</table>

#### Chemical and concentration

<table>
<thead>
<tr>
<th>Chemical and concentration</th>
<th>Rate</th>
<th>Situation, method and comment</th>
</tr>
</thead>
</table>
| 2,4-D (625 g/L) | 300 ml/100 L water or 3 L/ha | Spot Spray only. Permit 11463  
Agricultural non-crop land, bushland, forests, wetlands, coastal and adjacent areas |
| Aminopyralid (10 g/L) + fluroxypyr (333 g/L) | 500 ml/100 L water | Registered herbicide. Apply as a high-volume or spot spray to flowering plants up to 30 cm tall.  
Agricultural non-crop land, commercial and industrial land, forests, pastures and right-of-way areas |
| Triclopyr (300 g/L) + picloram (100 g/L) + aminopyralid (10 g/L) | 350 ml/100 L water | Registered herbicide. Apply as a high-volume or spot spray when the plant is flowering.  
Agricultural non-crop land, commercial and industrial land, forests, pastures and right-of-way areas. |
| 2,4-D (300 g/L) | 700 ml/100 L water | Registered herbicide. Apply as a high-volume spray when the plant is actively growing.  
Agricultural non-crop land and pastures |
| Bromoxynil (200 g/L) | 1.4 L/ha seedling control, 2.8 L/ha for early flowering plants | Registered herbicide. Apply during the autumn–winter period when plants are young and actively growing. Not effective on mature plants.  
Pastures and improved pastures (containing clover and/or lucerne) |
| Bromoxynil (250 g/L) + diflufenican (25 g/L) | 500 ml/ha | Registered herbicide. Seedling control up to the four leaf stage.  
Improved pastures (containing clover and/or lucerne) |
| MCPA (250 g/L) + diflufenican (25 g/L) | 1 L/ha | Registered herbicide. Seedling control up to the four leaf stage.  
Improved pastures (containing clover) |

Notes: Non-chemical applications: Physical removal. Rates are given to water unless otherwise stated.
### Table 19 - Weed Control Option for Lantana camara

Common Lantana – *Lantana camara*
(Declared status – Class 3)

#### OPTIMUM TREATMENT TIMES
Darker colour indicates preferred treatment times

<table>
<thead>
<tr>
<th></th>
<th>Rate</th>
<th>Situation, method and comment</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Fluroxypyr 200 g/L</strong>&lt;br&gt;Various trade names</td>
<td>500 mL – 1 L /100 L or 3 L/ha (boom)</td>
<td>Seedling or adult (individuals or infestation): Foliar spray – use higher rate on plants over 1.2 m, apply when actively growing</td>
</tr>
<tr>
<td><strong>Triclopyr 300 g/L and Picloram 100g/L</strong>&lt;br&gt;Various trade names</td>
<td>350-500 mL /100 L or 3 L/ha (boom)</td>
<td>Seedling (individuals and infestation): Foliar spray – use higher rate on plants &gt;1 m (highest for harder to kill varieties); apply when actively growing, need non-ionic wetting agent</td>
</tr>
<tr>
<td><strong>Triclopyr 240 g/L and Picloram 120 g/L</strong>&lt;br&gt;Access®</td>
<td>1 L / 60 L (diesel)</td>
<td>Seedling (individuals): Basal bark &lt;15 cm stem diameter&lt;br&gt;Adult (individuals or infestations): Cut stump &gt;15 cm stem diameter</td>
</tr>
<tr>
<td><strong>Triclopyr 600 g/L</strong>&lt;br&gt;Garlon® 600</td>
<td>1 L / 60 L (diesel)</td>
<td>Seedling (individuals): Basal bark &lt;5 cm stem diameter&lt;br&gt;Adult (individuals or infestations): Cut stump &gt;5 cm stem diameter</td>
</tr>
<tr>
<td><strong>Grazon</strong></td>
<td>500 mL / 100 L</td>
<td>Seedling or adult (individuals or infestation): Foliar spray – use higher rate on plants over 1.2 m, apply when actively growing</td>
</tr>
<tr>
<td><strong>Wetting Agent – Hasten</strong></td>
<td>500 mL /100 L</td>
<td></td>
</tr>
</tbody>
</table>

Notes: Non-chemical applications: Physical removal. Rates are given to water unless otherwise stated.

#### 3.7.5 Monitoring

- All Employees on-site shall carry out general daily visual surveillance for weeds within the quarry and ensure that vehicles leaving Site are free of soil and vegetation.
- The Quarry Manager shall conduct weekly inspections of all access routes on-site to ensure they are maintained weed free or in a reduced state to lessen the spread of weed seed by vehicle movements.
- The Quarry Manager shall conduct inspection of any areas and treat any weed infestations prior to topsoil removal.
- The Quarry Manager shall carry out at least four thorough inspections per year of the quarry to identify:
  - effectiveness of weed control measures implemented and whether an amendment is required
  - new areas where weed control is required
  - infestations of new weed species
  - areas where rehabilitation should be carried out.
- **Note**: The frequency of Site inspections will vary depending on the identified weed species on-site and what management requirements are necessary for those species.

#### 3.7.6 Audit and Review

- The list of declared and environmental weed species should be reviewed as required (at least yearly) to ensure that the correct control options are applied for each weed listed.
- The efforts and progress of the weed management will be reviewed annually and a summary report prepared that includes:
  - a summary of the weed control work undertaken
  - suggested works program for the following year
  - amendments to control methodologies
  - updates on the infestation of new weed species, in particular Declared Plants
- any reduction in spread of weed species across the Site which may be shown by preparing a Weed Distribution Map of the Site.

- The effectiveness of the weed management strategies shall be reviewed as necessary and at least once every three years.

3.7.7 Reporting and Responsibility

- The Quarry Manager will ensure appropriate weed management strategies are selected and implemented.
- The Quarry Manager will ensure monitoring of weed infestations occur across the Site.

3.7.8 Identification of Incident or Failure to Comply

- Spread of existing weed infestations.
- New infestations are established on-site.
- Infestations on topsoil stockpiles occur.
- Declared plants or other environmental noxious weeds established within rehabilitated areas.

3.7.9 Corrective Action

- If a weed infestation occurs as a result of on-site activities, an investigation will be conducted and action taken to resolve the issue to the furthest practicable extent.
- Restrict access to the infested area.
- Identify and apply appropriate control option to control weed infestation.
3.8 Bushfire

3.8.1 Purpose

- While the extractive industry operations area is situated within a pre-cleared area of low bushfire risk, it is bounded by Eucalypt open forests and is therefore prone to wildfires entering the operational areas during adverse weather conditions. The surrounding vegetation has a Bushfire Hazard Rating of Medium to High in accordance with the Gold Coast City Planning Scheme Overlay Map (OM10), see Figure 7 – Bushfire Hazard Map.

3.8.2 Operational Policy

- To prevent and assist in the control of bushfires in the surrounding locality, wherever possible.

3.8.3 Performance Targets

- To ensure that potential sources of fire from the quarry activities are properly managed, mitigated or controlled and that a network of tracks and water sources are accessible throughout the Site to help control fire that might occur external to or enter the extractive industry operations area.
- Quarry operations to comply with legal obligations for the prevention and control of fires, as required in the Fire and Rescue Services Act 1990 and Regulation.

3.8.4 Implementation Strategy/Mitigation Measures

- Management procedures for protection against fire will include:
  - consulting with landowners and fire services for implementing fire control management on-site with district/area fire control plans
  - maintaining cleared surrounds and/or managed fuel loads for a buffer area adjacent to the quarry operations
  - ensuring all staff on-site and other personnel are aware of evacuation procedures and the location and the use of fire fighting equipment
  - keeping relevant agencies contact numbers in the event of a fire, namely Queensland Fire Rescue Services
  - ensuring that extinguishers, fire hoses, fire blankets, sand buckets and other such equipment is regularly inspected and maintained in accordance with Australian Standard AS 1851, Maintenance of Fire Protection Equipment
  - providing ready access to water storages on-site for use in the fighting of fire
  - providing fire breaks around, quarry operations and in particular fuel storages and workshop areas on-site
  - ensuring welding and other hot works is undertaken in controlled areas where potential for starting a fire is minimised.

3.8.5 Monitoring

- All Employees will be responsible for the identification and raising the alarm for fires on-site or adjacent bush fires off-site.
- Quarry Manager to undertake a visual assessment annually to assess adequacy of the bushfire control measures implemented.

3.8.6 Audit and Review

- The scope and effectiveness of the fire management strategies will be reviewed within 30 days of responding to a fire emergency or at least once every three years.

3.8.7 Reporting and Responsibility

- All Employees will be responsible for notifying the Quarry Manager of any fire on-site or approaching the Site, or any foreseeable hazard or risk that could contribute to a fire.
• Quarry Manager or delegate will be responsible for notifying the relevant agencies or emergency services of any bush fires on-site.

• Shift supervisor will ensure that a register of all fire control equipment is regularly maintained.

• Quarry Management will be responsible for organising and conducting training programs for employees on fire control.

3.8.8 Identification of Incident or Failure to Comply

• Quarry operation not meeting performance target(s).

3.8.9 Corrective Action

• Quarry Manager will take appropriate action to rectify any identified deficiencies in fire fighting Site infrastructure, maintenance or management practices.
3.9 Rehabilitation

3.9.1 Purpose

- Land degradation and its management are recognised as important environmental issues in Australia. Extractive industry operations, by their very nature, cause land disturbance and modification of the landscape. This land disturbance and modification has the potential to result in land degradation and impact on the visual amenity.
- Land disturbance and modification as a result of a change to the landscape or use of the land has the potential to result in:
  - fragmentation and/or reduction of ecosystem
  - reduction of habitat
  - reduction of biodiversity.
- Impacts as a result of extractive industry include:
  - soil erosion
  - sedimentation
  - increase in nutrient loads
  - introduction of weeds
  - potential degradation of protected vegetation
  - potential loss of habitat and biodiversity.
- Extractive industry is a temporary land use. Design and implementation of rehabilitation works is therefore an important element of extractive industry operations. Integration of rehabilitation works and extractive operations may assist in cost control as well as minimising potential environmental impacts.
- Under the EP Act, the administering authority can impose conditions which cover the requirements to rehabilitate disturbed land.
- Rehabilitation works are to be guided by the proposed post-extraction land use, however quarrying is likely to create a gently sloping, free draining pasture area surrounded by batters of varying slopes, depending on the geotechnical properties of the substrate. Water filled voids for stock watering may also be included within the final landform. Benches and batters will be replanted with regional ecosystem species where possible to restore the native ecosystem, see Figure 8– Conceptual Post Quarrying Layout. Refer to Figure 9 – Rehabilitation Staging for the anticipate order of rehabilitation works.
- A leading practice example of quarry bench rehabilitation using natural regeneration can be seen at the Wolffdene Quarry. The results of previous rehabilitation works on-site were recognised at the 2011 Queensland Cement Concrete and Aggregates Australia (CCAA) Environmental Health and Safety Awards, where Hanson received the Environmental Award for innovation. These leading practice methods will be utilised in future at the Site to ensure the success of on-site rehabilitation works.

3.9.2 Operational Policy

- To return the land to a stable, non-polluting and self-sustaining state, safe to humans and wildlife, suitable for the desired long-term land use (e.g. grazing, native ecosystem, and so on) at the cessation of the quarrying operations.

3.9.3 Performance Targets

- Performance targets nominated for the quarry development are to:
  - protect the general amenity of the surrounding area
  - prevent the degradation of non-operational areas
  - limit land disturbance to that which is necessary
  - ensure the Site is safe, stable and non-polluting
  - identify any land contamination and implement appropriate remediation or management where necessary
  - minimise potential long term Site maintenance costs
  - select regional ecosystem plant species
  - ensure progressive rehabilitation is carried out during the progression of quarry activities where practicable
  - commence progressive rehabilitation following operational areas becoming available
  - reinstate a stable drainage pattern
- prevent the introduction or spread of declared or environmental weeds
- ensure the post-extraction landform is stable and suitable for the desired long-term land use (e.g. grazing, native ecosystem, and so on).

3.9.4 Implementation Strategy/Mitigation Measures

**Land Use**

- Quarry operations will extend over a time period beyond most landuse and policy planning frameworks. Landuses are dynamic and respond to changing needs. Land is rarely used for a singular purpose, and post-extraction landuses will consider:
  - possibility for multiple and sequential landuses for the Site
  - economical feasibility of the potential landuses
  - environmental acceptability of the landuses
  - compatibility with the adjacent landuses and planning policies.

- Rehabilitation works are to be carried out in accordance with the staging plans for the Site, which will ensure the land is progressively stabilised, revegetated and suitable for the post extraction land uses.

- The Site is located in the Yatala Enterprise Area and it is envisaged that in the long term the majority of the Site will be used for industry purposes post extraction, however due to the longevity of the proposed use, various end use opportunities may be available at the cessation of the use and as such it is not possible to confirm final landuse plans at this point in time.

**Landform**

- The practical and economical constraints, and the requirements imposed by environmental and amenity values shall determine the final landform.

- The landform is anticipated to comprise a gently sloping, free draining landscape surrounded by benches and batters. Once quarry operations are completed, the extraction floor will be contoured to a gentle grade (e.g. less than 5% slope where practicable) to allow free draining to established on-site water storages.

- The benches shall be battered to varying slopes depending on the geotechnical prosperities of the substrate, with a maximum slope of 3:1 (H:V) to ensure the benches are structurally sound and safe for people and wildlife, refer to Figure 10 – Schematic of Quarry Bench Rehabilitation and Figure 11 – Batter Treatments.

- Topsoil and any overburden and/or remaining extracted material on-site will be utilised in the rehabilitation works.

- The following measures shall ensure that the final landform created by extraction activities is stable and married into the surrounding landscape:
  - using earthmoving equipment to progressively shape and trim the workings to the design profiles
  - flattening the gradients of batters to a stable angle of repose on reaching the terminal limits of extraction
  - rounding or marrying the contours into the natural ground surface
  - scaling down loose rock
  - where necessary, spreading planting media over rock benches prior to any required topsoiling, refer to Figure 10 – Schematic of Quarry Bench Rehabilitation
  - shaping topsoil to assist in retaining precipitation and controlling sediment movement
  - providing access to the terminal workings to allow maintenance of rehabilitation areas
  - designing landform and drainage to control erosion for the particular hydrological regime (peak 1-in-10 year storm event).

**Erosion and Drainage Control**

- Rehabilitation is to be carried out in such a manner so as to prevent or minimise the release of wind blown dust and erosion in rehabilitation areas.

- Drainage, erosion and sediment controls will be implemented prior to land disturbance, including establishment of any infrastructure, vegetation clearing and extractive operations, where practicable.

- Overland water flows from disturbed areas will be directed to the extraction pit during extraction operations, while “run on” waters shall be diverted away from workings using perimeter bunds or diversion drains.
Erosion control is an integral component for successfully establishing vegetation cover. Landforming and drainage may also include measures such as gravel and/or organic mulching where necessary.

Details of stormwater management are presented in Section 3.1 of this SBMP.

Control of Vehicle / Extraction Movements

- Access will be restricted to areas awaiting rehabilitation, or undergoing rehabilitation.
- Employees and contractors shall be made aware of the restricted areas through Site inductions.
- Wire fencing, flagging, or other suitable barricades or markers may be installed around areas under rehabilitation to prevent damage.
- Use existing temporary internal access roads where possible.

Fauna and Flora

- Any necessary vegetation and fauna protection measures shall be in place prior to the commencement of any stage of Site excavations and be maintained until the area is fully rehabilitated, and shall include:
  - surveying of area to be cleared to be undertaken by an appropriately qualified person prior to clearing
  - engage a spotter-catcher holding a valid Rehabilitation Permit from the EHP prior to any clearing operations to supervise, minimise risk of injury to fauna and undertake the removal and relocation of fauna where necessary, when recommended by the pre-clearing fauna survey and approved by EHP
  - transplanting any identified species for protection as necessary or practicable
  - install markers, flagging or fencing around protected vegetation/vegetation to be retained zones or areas under rehabilitation
  - implement stormwater, erosion and sediment controls before any excavation works commence for each stage of extraction and are maintained until the area is fully rehabilitated.

Vegetation Clearing

- Prior to the clearing of any vegetation, a Vegetation Clearing Plan shall be prepared in accordance with the following protocols:
  - land disturbance is to be minimised and clearing limited, as far as practical, to the extent necessary for each stage
  - the sequence and direction of vegetation clearing will be designed to ensure fauna have sufficient opportunity to move from the clearing Site without human intervention
  - vegetation clearing shall be carried out in stages using a sequential clearing technique
  - prior to clearing, the limits of the approved area to be cleared shall be clearly marked with markers, flagging or fencing prior to clearing
  - a pre-clearing survey of area(s) to be cleared shall be undertaken by an appropriately qualified person and where fauna is identified on-site appropriate action is to be undertaken to minimise potential harm to fauna
  - trees containing fauna or suspected of containing fauna shall be marked with coloured survey tape which is wrapped several times around the tree trunk at chest height.

Topsoil Management

- Topsoil is the material that supports and promotes plant growth, and contains soil micro-organisms, organic matter and nutrients. Topsoil is defined as the organic-rich and friable layer beneath the natural ground surface.

- The following measures should be implemented for topsoil stripping:
  - topsoil should be stripped at an appropriate moisture content (e.g. when it is too wet or too dry)
  - topsoil when stripped, should be used directly for rehabilitation to the maximum practicable extent or appropriately stockpiled and preserved for later use
  - stockpiling of topsoil not to exceed a height of 2 m, shaped (i.e. batters no greater than 1H:2V) and revegetated to protect the soil from erosion and weed infestation
  - maintain stockpiles in a free draining condition and avoid long-term soil saturation
  - “run on” water should be prevented from flowing across the area to be stripped
  - stripping of topsoil should be limited to the minimum area necessary.

- The following measures should be implemented for topsoil spreading, wherever possible:
  - stripped topsoil should be directly placed on an area undergoing rehabilitation
  - areas to be topsoiled should be re-shaped prior to placing topsoil
- equipment used to spread topsoil should be scheduled to avoid compaction
- before respreading the topsoil, loosen the subsoil to break up any compacted or surface sealing and to enable keying of the two soils
- on slopes less than 3:1 (H:V) loosen compacted subsoil with a tined implement to an appropriate depth, ensuring all ripping operations occur along the contour
- topsoil to be removed from stockpiles in a manner that avoids vehicles travelling over the stockpiles
- topsoil to be re-spread in the reverse sequence to its removal so that the original upper soil layer is returned to the surface to re-establish the entrapped seed content of the soil
- ensure all exposed subsoils are covered
- topsoil be respread over selected batters, contours, bunds and disturbed areas to an appropriate thickness
- after spreading topsoil, ensure the surface is left in a roughened state to assist moisture infiltration and inhibit soil erosion
- prior to any planting, cultivate any compacted or crusted topsoil surfaces
- soil spreading is to be immediately followed by seeding or planting if applicable
- wherever necessary, straw or organic mulch may be spread over the soil to minimise potential soil erosion until the area is revegetated.

- If erosion occurs on treated surfaces, the area should be re-topsoiled and sown with cover grass.

Species Selection

- Species selection for revegetation will depend on the type of vegetation community or ecosystem to be established and will reflect the observations made during the on-site Ecological Assessments conducted which considered the EHP Regional Ecosystems and other identified local native vegetation communities.

- In selecting local indigenous species consideration will be given to selecting pioneer species and species suited to the specific soil conditions, microclimate and aspect of the new landform. Ecological Studies previously carried out provide guidance for rehabilitation planning. Indigenous wetland plant species (e.g. reeds and sedges) will be established in the water storages during quarrying operations (excluding any quarry sumps)

- A preliminary indigenous species list has been prepared which nominates species suitable for the area. Following is a list of suitable plant species for the rehabilitation works:

  Canopy (Trees)
  - Corymbia citriodora ssp. citriodora (Spotted Gum), C. intermedia (Pink Bloodwood),
  - Eucalyptus carnea (Broad-leaved White Mahogany), E. crebra (Ironbark), E. microcorys (Tallowwood), E. propinqua (Grey Gum), E. tereticornis (Forest Red Gum) and Lophostemon confertus (Brush Box) and Angophora leiocarpa (Spotted Gum Apple).

  Mid-stratum (Small Trees)
  - Acacia disparrima (Hickory Wattle), Allocasuarina littoralis (Black She Oak),
  - Alphitonia excelsa (Red Ash), Glochidion sumatranum (Cheese Tree), and Mallotus philippensis (Red Kamala).

  Lower-stratum (Shrubs)
  - Acacia falcata (Sickle-leaf Wattle), A. fimbriata (Brisbane Wattle) and Acalypha nemorum (Southern Acalyphe),
  - Acronychia laevis (Glossy Acronychia), Acrotiche divaricata (Ground-berry),
  - Breynia oblongifolia (Coffee Bush), Bursaria spinosa (Prickly Box),
  - Denhamia celastroides (Denhamia), Dodonaea triquetra (Hop Bush),
  - Hibbertia aspera (Guinea Flower), Indigofera australis (Native Indigo)
  - Jacksonia scoparia (Dogwood), Leucopogon juniperinus (Prickly Heath) and occasional Olearia nemorsti (Bush Daisy), Persoonia sericea (Geebung)
  - Psychotria loniceroides (Hairy Psychotria), Trema tomentosa (Native Peach),
  - Xanthorrhoea macronema (Bottlebrush Grass Tree).

  Groundlayer
  - Imperata cylindrica (Blady Grass), Opismenus aemulus, (Creeping Beard Grass) and
  - Themeda triandra (Kangaroo Grass) with other species (depending on availability) including
  - Brunoniella australis (Blue Trumpet), Bossiaea prostrata, Cheilanthes sieberi (Mulga Fern), Chorizema parviflorum, Chrysocephalum...
The density of these plant species would be sufficient to act as an initial seed source for creating a natural environment over a period of time. Species density of approximately 300 stems per hectare will be aimed for within two years of completing topsoiling, seeding and/or seedling planting.

- A minimum planting diversity of eight canopy trees, five mid and lower stratum species, and two ground cover species per hectare will be preferred.
- The long term goal of the rehabilitation works is to replicate a plant density (number of plants per hectare) similar to which currently exists in the adjacent open forest bushland.

**Revegetation**

**Methods**: There are a range of methods for establishing vegetation including natural regeneration, hydro mulching, seed broadcasting, seedling planting and direct seeding. Natural regeneration by careful management of natural soil clearing on Site will be the preferred method of establishing vegetation. Effective quarry bench rehabilitation at the Site has been achieved as part of normal quarry activities with existing Site conditions providing appropriate foundations for natural regeneration rehabilitation strategy, with well established topsoils containing abundant seed material supported by the regional subtropical climate. Hanson’s leading practice rehabilitation methods through natural regeneration were recognised by the industry during the 2011 Cement Concrete and Aggregates Australia (CCAA) Queensland Environmental Health and Safety Awards where Hanson received the Environmental Award for innovation.

During the process of stripping overlying soils from the rock resource, topsoil and overburden is removed separately and immediately transported and relocated against terminal quarry faces. Overburden is placed at a minimum depth of one metre against terminal quarry faces (as wide as the terminal bench) before the terminal bench width is reached.

Topsoil (containing an abundant natural seed bank) is then placed on top of the overburden to a minimum depth of 5cm. By placing both the overburden and topsoil against the quarry terminal face before the terminal bench width is achieved, the rehabilitation material can be safely and effectively positioned without being track rolled by quarry machinery on narrow benches. This enables a less compacted growing medium and far higher germination rates from the natural seed bank. Planting media has also been shaped to assist in retaining precipitation and controlling sediment movement.

Because topsoil is sourced from the immediate area, the species that germinate are best suited for the rehabilitated area. This ensures the best possible rate of survival for the rehabilitated flora. In addition, as the rehabilitated flora is consistent with the surrounding ecosystem, native fauna can quickly inhabit the rehabilitated area as it develops. As the process forms part of the normal quarrying activities, it is efficient, effective and allows for true progressive and sustainable rehabilitation.

As an alternative, seedling planting and direct seeding may be used in the event that natural regeneration is not successful. The following methods relate to establishing seedlings.

The following general planting methodology will be used on-site:

- In areas where planting is required, tubestock will be used.
- Plants should be true to the scheduled nomenclature, healthy, well formed, not root bound, sun hardened and sourced pest and disease free.
- Plants shall be container grown in soil with the root system firmly established, but with no large roots growing out of the container nor shall there be any indication of the plants being restricted or damaged at any time. Trees and shrubs shall have been grown in their final containers.
- If required, planting sites will be sprayed with glyphosate or a suitable alternative non-residual herbicide at least two weeks prior to planting.
- A shallow basin will be constructed when planting to encourage water to enter the plant root area.
- Tubestock will be watered in with a minimum of two litres of water.
- Maintenance and monitoring will be carried out on planted areas for at least 12 months from the time of planting.
• Regular weed control campaigns will be used and, where necessary, mulch will be periodically replaced and topped up as the mulch breaks down.

Ground surfaces including the quarry floor will be grass seeded in accordance with the conceptual final land use. Where seed is required for the rehabilitation works, they will preferably be supplied with information on the source and if possible should be certified for viability.

**Staging:** Initially, rehabilitation will focus on rehabilitating terminal batters once final limits are reached and batters of sediment basin(s) and any clean water catchment diversion channels and/or diversion banks are finalised. Rehabilitation of the quarry floor will commence following terminal batter formation, subject to meeting safety expectations and once areas become available following the cessation of quarrying activities. The timing of rehabilitation will also depend on market and general economic and climatic conditions. Refer to Figure 9 – Rehabilitation Staging for the anticipate order of rehabilitation works.

**Ground Preparation:** For the quarry floor, where necessary topsoil is to be placed on areas to be re-vegetated, with any compacted areas ripped prior to placement of topsoil. For quarry batters and benches, topsoil will be applied where necessary. Any fresh-to-moderately weathered rock should be fragmented prior to topsoil placement.

**Watering:** Direct seeding is best carried out prior to good rainfall or following soaking rain. Following seeding or planting, areas should be watered as required to ensure soil moisture is retained during establishment.

**Weed and Pest Control**

• Any materials (e.g. earth, soil, mulch and straw) brought onto the Site for rehabilitation shall be inspected to ensure the materials are free from weeds and pests.

• Prior to the establishment of vegetation, a spraying campaign may be required to control weeds to prevent migration of weed species into areas under rehabilitation.

• Weeds shall be controlled by environmentally acceptable methods but primarily using a non-residual glyphosphate herbicide (e.g. Roundup Bi-active) in any of its registered formulœ at the recommended maximum rate.

• Herbicide applications shall be applied throughout the course of the works as necessary and only during fine weather.

• Measures shall be taken to protect seedlings from spray drift.

• Alternative methods for controlling both grass and weeds include manual weeding, slashing, weed matting and mulching.

• Predation (e.g. grazing animals, birds, kangaroos, hares, and insects) are risks for revegetation. Depending on the situation, specific measures (e.g. fencing) may be required to protect the works from predation.

**Demobilisation**

• All temporary infrastructure and materials (including flagging tape and survey pegs) associated with the quarry activities are to be removed.

• Any sumps or other temporary installations are to be backfilled, unless they have been incorporated within the final land use rehabilitation plan.

• Batter angles shall be such that slopes are stable, safe and will not exacerbate erosion issues.

**Landcare and Community Group Involvement**

• The community as a whole benefits from Landcare through prevention and control of land degradation and restoring Australian landscapes. Wherever practicable, Landcare and/or community groups may be engaged to assist with rehabilitation projects on-site.

**3.9.5 Monitoring**

• Rehabilitation works will require time to establish, during which, monitoring will be required to assess the quality and success of early rehabilitation.

• Periodic visual surveillance of the rehabilitation areas will be undertaken to ensure successful establishment of plant species and identify any required remedial actions such as weed removal or damage repairs to ensure long term success of the rehabilitation areas.

• Periodic monitoring of the rehabilitation areas may assist with identification of the following potential issues:
- Wellbeing and overall general health of the plants
- Checking for any signs of pests and disease
- Checking for signs of fire damage
- Ensuring plants receive appropriate nutrient level
- Checking for weed infestations
- Identifying any washout or erosion issues.

- The Quarry Manager shall conduct regular inspections to plan timely maintenance works. Maintenance works shall be required for fertilising, watering, repairs to barriers, guards and stakes and plant replacement (refer to Table 20 – Maintenance Schedule – Vegetation Works).

**Table 20 – Maintenance Schedule – Vegetation Works**

<table>
<thead>
<tr>
<th>Item</th>
<th>Activity</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Weed Control</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Site Preparation (where necessary)</td>
<td>Application of herbicide and/or slashing</td>
<td>One treatment at least two weeks prior to seeding / planting</td>
</tr>
<tr>
<td>General Weed Management</td>
<td>Application of herbicide</td>
<td>Biannually</td>
</tr>
<tr>
<td>Supplementary Weeding</td>
<td>Application of herbicide</td>
<td>As required</td>
</tr>
<tr>
<td><strong>Re-vegetation Management</strong></td>
<td>Monitor performance and conduct any necessary maintenance</td>
<td>1 month after seeding / seedling planting; 3 months after seeding / seedling planting; 6 months after seeding / seedling planting; 12 months after seeding / seedling planting; or following significant rainfall events (e.g. &gt;25mm)</td>
</tr>
<tr>
<td></td>
<td>Apply mulch (if available)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Replace diseased or dead plants</td>
<td>As necessary following maintenance inspections</td>
</tr>
<tr>
<td></td>
<td>Fertilise (if applicable)</td>
<td>Two months after topsoil spreading or seeding</td>
</tr>
<tr>
<td></td>
<td>Apply mulch (if available)</td>
<td>One-off around tubestock plantings</td>
</tr>
<tr>
<td><strong>Pasture Management</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Grass Height</td>
<td>Slashing</td>
<td>Biannually until established</td>
</tr>
<tr>
<td>Grass Vigour</td>
<td>Fertilise</td>
<td>Annually (if necessary)</td>
</tr>
</tbody>
</table>

3.9.6 **Auditing and Review**

- The Quarry Manager shall review rehabilitation management strategies as required and at least once every three years.

3.9.7 **Reporting and Responsibility**

- The Quarry Manager will record the results of any Site inspections and any control or corrective measures undertaken.
- Once on-site rehabilitation has commenced, the Quarry Manager shall prepare an annual Rehabilitation Progress Report.
- Records of rehabilitation measures implemented on-site shall be kept for the duration of the Site operations.

3.9.8 **Identification of Incident or Failure to Comply**

- Weed or pest infestation.
- Excessive erosion.
- Surrounding waterways impacted by sediment.
- No demarcation of protected vegetated areas undergoing rehabilitation.
- Rehabilitation works not meeting performance targets.
3.9.9 Corrective Action

- Appropriate action shall be undertaken within a reasonable and practicable timeframe to rectify any problems or identified deficiencies in the rehabilitation program implemented within the quarry area. This may include, but shall not be limited to:
  - undertaking additional weed spraying campaigns where necessary;
  - installing additional sediment and erosion controls as required;
  - reseeding and/or hydro-mulching within areas failing to meet the specified performance targets; or
  - delineate/demarcate areas undergoing rehabilitation to prevent accidental damage.
3.10 Cultural Heritage

3.10.1 Purpose

- In Queensland, Aboriginal cultural heritage is protected whether or not it has been identified or listed. Aboriginal cultural heritage can exist on an area of land regardless of the land tenure.

- Under section 23 of the Aboriginal Cultural Heritage Act (ACHA) 2003, a person who carries out an activity must take all reasonable and practicable measures to ensure the activity does not harm Aboriginal cultural heritage (the “cultural heritage duty of care”).

- The ACHA also states “A person must not harm Aboriginal cultural heritage if the person knows or sought reasonably to know that it is Aboriginal Cultural Heritage”.

- Exceptions are listed under subsection (2) of Section 24 of the ACHA.

- Substantial penalties exist for unlawfully harming Aboriginal cultural heritage.

- The purpose of the ACHA is to provide effective recognition, protection and conservation of Aboriginal cultural heritage. Requirements include:
  - recognising Aboriginal ownership of Aboriginal human remains
  - recognising Aboriginal ownership of Aboriginal cultural heritage of a secret or sacred nature held in State collections
  - recognising Aboriginal ownership of Aboriginal cultural heritage that is lawfully taken away from an area by an Aboriginal party for the area
  - establishing a duty of care for activities that may harm Aboriginal cultural heritage
  - establishing powers of protection, investigation and enforcement
  - establishing a database and a register for recording Aboriginal cultural heritage
  - ensuring Aboriginal people are involved in processes managing the recognition, protection and conservation of aboriginal cultural heritage
  - establishing a process for the comprehensive study of Aboriginal cultural heritage
  - establishing processes for the timely and efficient management of activities to avoid or minimise harm to aboriginal cultural heritage.

- Aboriginal cultural heritage artefacts including any significant Aboriginal areas in Queensland; or a significant Aboriginal object; or evidence, of archaeological or historic significance, of Aboriginal occupation are protected under the ACHA.

- No indigenous cultural heritage sites are known to be located within the Site. However, it is possible that archaeological material may exist which is presently not visible and could be uncovered during excavations. This plan has been prepared in response to those contingencies.

3.10.2 Operational Policy

- To identify and manage any potential undiscovered archaeological relics, artefacts or objects within the Quarry disturbance area.

3.10.3 Performance Targets

- To meet the legal requirements in relation to ACHA that may be discovered.

3.10.4 Implementation Strategy/Mitigation Measures

- Management procedures for the protection of cultural heritage issues shall ensure that Aboriginal relics or objects are protected. Reasonable and practicable control measures may include but are not limited to:
  - undertaking further surveys on Site suitably qualified and endorsed persons to undertake additional surveys prior to any land disturbance activities
  - implementing any recommendations from detailed surveys of Aboriginal cultural heritage on the Site
- inducting all Employees on-site on cultural heritage prior to commencement of any future quarry development
- ensuring any identified items of cultural or heritage significance, which may be disturbed by extractive industry operations, are evaluated and assessed by a suitably qualified and endorsed person prior to any disturbance
- ensuring all Site personnel are informed about the identification and significance of archaeological items (bone materials, shaped stones etc.)
- maintaining contact details of relevant agencies/groups in the event of a find or suspected discovery, namely:
  - notifying the Cultural Heritage Coordination Unit and/or local Aboriginal groups of all finds on the Site
  - stopping work in the vicinity of areas where items of possible cultural/heritage significance are found until such time that liaison with EHP and/or the local Aboriginal groups has been undertaken
  - restricting the removal or disturbance of items of possible cultural/heritage significance until an approval has been issued.

3.10.5 Monitoring

- Ongoing general surveillance of work areas (particularly during vegetation and topsoil stripping) under the supervision of the local Aboriginal group shall be conducted to ensure that Aboriginal cultural heritage relics and objects are not damaged and/or disturbed.

3.10.6 Auditing and Review

- The Quarry Manager shall review the Cultural Heritage management strategy as required and at least once every three years.

3.10.7 Reporting and Responsibility

- The Quarry Manager shall report any discovery of archaeological relics, artefacts or objects to the Cultural Heritage Coordination Unit:

  Cultural Heritage Coordination Unit
  Department of Aboriginal and Torres Strait Islander and Multicultural Affairs
  PO Box 15397
  CITY EAST QLD 4002
  Phone: (07) 3405 3050
  Email: cultural.heritage@datsima.qld.gov.au

3.10.8 Identification of Incident or Failure to Comply

- Failure to meet the legal requirements in relation to ACHA if any archaeological relics, artefacts or objects are discovered.

3.10.9 Corrective Action

- The Quarry Manager to assess processes to identify any significant changes and if required, modify activities/process.
3.11 Emergency and Incident

3.11.1 Purpose

- The notification of emergencies and incidences will be conducted according to this emergency and incident management strategy. This strategy also addresses the record of all environmental events and other events likely to have an adverse effect on the environmental performance of the development.
- Contingency plans provide a guide to the formalisation of emergency procedures so that in the event of a cyclone, fire or other emergency occurring, personnel are familiar with the correct action to take.

3.11.2 Operational Policy

- Minimise environmental harm through the preparedness of appropriate response(s) in the event of an emergency or incident.

3.11.3 Performance Targets

- All incidents or emergencies to be reported immediately for action to the Quarry Manager.
- All incidents/emergencies shall be documented on an incident/accident form and registered in an incident/accident register.
- The Quarry Manager will notify the administering authority of incidents (e.g. the release of contaminants to the environment that are likely to cause serious environmental harm) in writing within 24 hours.
- Correct implementation of an emergency/incident response plan.

3.11.4 Implementation Strategy/Mitigation Measures

Emergency Telephone Procedures

*Fire Emergency:*  
- Telephone the Fire and Rescue Service – Dial 000 and when connected advise the Fire Brigade:
  - organisation name
  - exact address
  - point of entry
  - type of fire if known
  - company contact
  - then let Fire and Rescue Service hang up first.
- Then do the following:
  - dispatch responsible person to point of entry to direct Fire and Rescue Service
  - disconnect all outside calls
  - report fire to senior company officer
  - initiate evacuation if necessary.

*Environmental Spill:*  
- If the spill is hazardous or posses a risk to personnel or plant/equipment, call Fire and Rescue Service – Dial 000 and when connected advise the Fire Brigade
- Telephone EHP – Dial 1300 368 326 and then advise:
  - organisation name
  - exact address
  - point of entry
  - nature of spill
  - then let EHP hang up first.
Immediate Emergency Response

- Stop work.
- Shut down equipment, plant, power and vehicles as required.
- Assist anyone in need of help.
- Consider evacuating the area.
- Contact the Quarry Manager to report:
  - the location and time of the spill/incident/threat
  - nature and extent of the spill/incident/threat
  - if spill/incident has been contained or not
  - if any persons, installations or property could be in immediate danger
  - quickest and safest way for emergency services to approach the spill/incident site
  - any other information that will assist to quickly contain the spill/incident/threat or minimise further release of contaminant and environmental damage.
- The Quarry Manager to notify relevant administering authorities.

Subsequent Response

- After taking the initial actions, subsequent response actions to assess the situation, organisation of the Dangerous Goods clean-up/fire-fighting operations and co-ordination of the response with involved parties shall be undertaken. Actions that may be taken include:

  **Response to unauthorised release of contaminants to waters:**
  - Determine cause of discharge and contaminant type.
  - Contact EHP.
  - Attempt to contain release of contaminant/s to waters.
  - Contact additional personnel to assist with containment.
  - Engage consultant to undertake an environmental assessment to determine the level and impact of environmental harm.
  - Recover any contaminants for treatment or disposal where practical.
  - Engage consultant for Site assessment, remediation and validation.

  **Response that may be taken if fire incidents have been detected:**
  - Activate Fire Protection System and Emergency Shut-Down devices where applicable.
  - Notify neighbouring residents and others that may be affected.
  - Evacuate non-essential personnel from scene of incident.
  - Clear access to scene for emergency fire-fighting vehicles and assign a person to direct fire-fighters to the scene and prevent entry by unauthorised persons.
  - Conduct a head count at the emergency assembly point to ensure no one is missing.
  - Establish communications by use of portable radios, phones or other means of communication to field personnel and emergency responders.
  - Assemble available fire-fighting materials/pollution control equipment and stand by to advise and/or assist Fire and Rescue Service to prevent any fuel storage rupture by cooling.
  - Make sure emergency exit routes are kept unobstructed at all times.
  - Cover any dangerous goods spill (i.e. diesel) with foam to prevent fumes from travelling to an ignition source.
  - Maintain safe distance and monitor area to prevent anyone other than Emergency Personnel from entering emergency area.
Disposal of any contaminated material shall be handled by Fire and Rescue Service personnel.

Engage consultants for Site remediation and validation, if required.

**Response that may be taken in the event of a solid spill:**

- Contact the emergency services or regulatory authority if applicable.
- Contain the spilled material and isolate the area.
- Clean and reload material if possible.
- Dispose of remaining material as appropriate.

**Response that may be taken in the event of a Cyclone/Storm and/or Flood**

**General:**

- Undertake a check and general clean-up of the Site.
- In open areas, remove and dispose of all litter and waste material and ensure drains and sumps are clean.
- Remove all portable material and equipment that might become airborne to a suitable building.
- Remove all portable material and equipment that may be inundated by flooding to high ground.
- All non-portable materials and equipment to be secured and protected, as necessary.

**Cyclone / Storm Watch (Distant Cyclone)** – Cyclone / Storm centre is more than 24 hours predicted travelling time from area:

- Company operations continue as normal.
- The Quarry Manager to monitor the location and severity of cyclone / Storm and notify all staff of any relevant warnings.
- Check inspection of quarry area(s) and initiate further clean-up as required.

**Cyclone / Storm Warning (Close Cyclone / Storm)** – Cyclone / Storm centre is within 24 hours predicted travelling time from the area:

- Closely monitor location and severity of cyclone / Storm.
- Ensure battery operated radio is available on the premises to monitor reports.
- Check that all doors and windows in all buildings are securely closed.
- Fill any emergency generators with fuel.
- Monitor progress of Site clean-up.
- Relocate any moveable items indoors.

**Cyclone / Storm Imminent** – Cyclone / Storm centre is within 12 hours travel of the area:

- Monitor the situation and decide appropriate time to commence shut down of operations.
- Clean-up completed and final inspection undertaken.
- Ensure First Aid is accessible.
- Non-essential personnel at their own request may leave the Site after a time designated by the Quarry Manager.
- Before vacating offices, all loose papers are to be placed in filing cabinets or draws.
- Computer screens to be unplugged and placed on the floor facing an internal wall.
- Computer equipment to be covered with plastic to prevent water damage.
- Assess the situation and consider the need for any personnel to remain at the Site for the duration of the emergency. If this is judged to be essential, a minimum of two responsible persons shall remain. Adequate provisions and an emergency communications system shall be provided.
Cyclone / Storm Passed:

- At the cessation of the emergency, the Quarry Manager shall carry out a physical inspection of the buildings to ascertain the extent of any danger and to initiate actions necessary to make safe any dangerous conditions and/or return to normal activities.
- The Quarry Manager shall complete a damage assessment and report and notify Operations Manager/Management.

Flood:

- The Quarry Manager to monitor Bureau of Meteorology to identify possibility of prolonged or heavy rainfall events and check for flood warnings.
- The Quarry Manager to cease operations in the event of a prolonged or heavy rainfall event/flood warning and evacuate the Site, when deemed necessary.
- The Quarry Manager to re-open the Site once water recedes and access is regained.
- Clean-up of any debris and repair to creek crossings, access roads if necessary etc.
- Operations to recommence.

Clean-up:

- Clean-up and salvage operations shall not be attempted until it is declared safe to do so. The advice of suppliers will be sought regarding handling of any fire damaged products. Material Safety Data Sheets of all products used on-site will be kept on-site.

3.11.5 Monitoring

- The Employee(s) involved with the incident will complete an incident report with the Quarry Manager and issue to management and, if applicable, the administering authority.
- The Quarry Manager will investigate the cause of the emergency/incident and:
  - identify any problems in the emergency response plan or actions
  - identify any environmental damage and, where necessary, ensure relevant environmental monitoring and remediation is undertaken as soon as practicable
  - determine any action(s) to prevent emergency/incident recurrence.

3.11.6 Auditing and Review

- Incident forms shall be checked by Management within two weeks following incident to ensure follow-up action (including reporting where required) is undertaken.
- The Quarry Manager shall review the emergency/incident management strategy as required, or at least once every three years.

3.11.7 Reporting and Responsibility

- Report to relevant authorities:
  - EHP (if there is risk of environmental harm)
  - fire and rescue service (if there is danger of fire to persons and/or property)
  - police (if there is danger to persons and property)
  - ambulance (if there are persons injured).
- Prepare initial incident report and a written list of facts concerning the incident.
- An Incident/Emergency Register shall be maintained on-site to record any emergency/incidents or events likely to have adversely affected the environmental performance of the Site. The Incident/Emergency Register will include, but not be limited to, the following details:
  - time, date, nature and extent of the incident/emergency
  - response and investigation undertaken to deal with the incident/emergency
  - name of the person(s) responsible for investigating the incident/emergency
  - actions taken as a result of the emergency/incident investigation and signature of responsible person at completion.
- Prepare initial incident report and a written list of facts concerning the incident.
- Incident/Emergency Register will be made available on request to any authorised person.

- All incident/emergency will be reported to the Quarry Manager who, in the event of environmental harm, will in turn notify the administering authority within 14 days or 10 working days, following the initial notification. The following information should be included in the notification:
  - holder of the environmental development permit
  - location of the incident/emergency
  - name and telephone number of the designated contact person
  - time of the incident/emergency
  - time the ERA holder became aware of the emergency/incident
  - suspected cause of the emergency/incident
  - actions taken to prevent further release and mitigate any environmental harm and/or nuisance caused by the incident/emergency.

- Any results of environmental monitoring performed in relation to the emergency/incident that pose environmental harm will be reported to the administering authority as soon as practicable.

### 3.11.8 Identification of Incident or Failure to Comply

- Identification of Failure to Comply include, but are not be limited to, the following:
  - incident/emergency not reported internally
  - incident/emergency not documented
  - incident/emergency not investigated or followed up with corrective measures
  - administering authority not notified of an emergency/incident
  - written notification and/or follow up monitoring results not supplied to administering authority within regulatory time frames
  - recurrence of similar incident/emergency.

### 3.11.9 Corrective Action

- Corrective action may include:
  - providing additional training for all staff on incident/emergency reporting procedures
  - reviewing incident/emergency procedures
  - reviewing and implement relevant remedial actions
  - providing information required to the administering authority as soon as practicable
  - initiating review of procedures at similar facilities to prevent event/issue recurrence at other sites.
Figure 1 - Site Location Plan

Wolffdene Quarry

Hanson Construction Materials Pty Ltd

1:200,000

4km

South Stradbroke Island

Gold Coast

Springwood

Logan

Beefleigh
Figure 4.4 - Conceptual Quarry Development - Long Term

Hanson Construction Materials Pty Ltd

Legend:
- Quarry Access Road
- 1 ha Buffer
- Minimum 40m Wide Buffer
- Approved Quarry Area - PN131878/01/DA2
- Proposed Quarry Extension (Extraction Area)
- Proposed Quarry Extension (Buffer Lands)

Quarry Access Road
8 ha Buffer
Minimum 40m Wide Buffer
Approved Quarry Area - PN131878/01/DA2
Proposed Quarry Extension (Extraction Area)
Proposed Quarry Extension (Buffer Lands)

Wolffden Quarry
1. The peak runoff from a 24 hour, 1 in 10 year rainfall event will be captured and treated within an appropriately sized sump as shown and the quarry pit/void floor.

2. Proposed stormwater management and ESC structures subject to approval by a suitably qualified person.

3. Plans and all calculations have been conducted in accordance with the International Erosion Control Association (IECA) Best Practice Erosion and Sediment Control Guidelines, November 2008.

4. All sediment control devices must be de-silted and made fully operational as soon as reasonably and practicable following a storm event if the device's sediment retention capacity falls below 75% of its design capacity.

5. All temporary and/or permanent stormwater management and sediment treatment features must be appropriately protected from the adverse effects of sediment runoff.

6. Sump location and configuration is conceptual only and not to scale. Treatment capacity may be provided in stages as disturbed areas are developed.

7. This plan has been prepared based on the assumption that the treated waters from the sump can be discharged to the surrounding environment. This plan may need to be suitably updated to the conditions of approval.

8. When printed on A3 - Scale: 1:10,000 - Stage 1

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Figure 5.1 - Conceptual Stormwater Management Plan - Stage 1

Wolfedene Quarry

Easement Boundary
Cadastral Boundary - Watercourse
Existing Culvert
Sump or Water Storage
Proposed Diversion Bund
Existing Engineered Rock Filter Bund
to detain clean water runoff

Legend:

1. The peak runoff from a 24 hour, 1 in 10 year rainfall event will be captured and treated within an appropriately sized sump as shown and the quarry pit/void floor.
2. Proposed stormwater management and ESC structures subject to approval by a suitably qualified person.
3. Plans and all calculations have been conducted in accordance with the International Erosion Control Association (IECA) Best Practice Erosion and Sediment Control Guidelines, November 2008.
4. All sediment control devices must be de-silted and made fully operational as soon as reasonably and practicable following a storm event if the device's sediment retention capacity falls below 75% of its design capacity.
5. All temporary and/or permanent stormwater management and sediment treatment features must be appropriately protected from the adverse effects of sediment runoff.
6. Sump location and configuration is conceptual only and not to scale. Treatment capacity may be provided in stages as disturbed areas are developed.
7. This plan has been prepared based on the assumption that the treated waters from the sump can be discharged to the surrounding environment. This plan may need to be suitably updated to the conditions of approval.

8. When printed on A3 - Scale: 1:10,000 - Stage 1

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Hanson Construction Materials Pty Ltd

Figure 5.1 - Conceptual Stormwater Management Plan - Stage 1

Wolfedene Quarry

Easement Boundary
Cadastral Boundary - Watercourse
Existing Culvert
Sump or Water Storage
Proposed Diversion Bund
Existing Engineered Rock Filter Bund
to detain clean water runoff

Legend:

1. The peak runoff from a 24 hour, 1 in 10 year rainfall event will be captured and treated within an appropriately sized sump as shown and the quarry pit/void floor.
2. Proposed stormwater management and ESC structures subject to approval by a suitably qualified person.
3. Plans and all calculations have been conducted in accordance with the International Erosion Control Association (IECA) Best Practice Erosion and Sediment Control Guidelines, November 2008.
4. All sediment control devices must be de-silted and made fully operational as soon as reasonably and practicable following a storm event if the device's sediment retention capacity falls below 75% of its design capacity.
5. All temporary and/or permanent stormwater management and sediment treatment features must be appropriately protected from the adverse effects of sediment runoff.
6. Sump location and configuration is conceptual only and not to scale. Treatment capacity may be provided in stages as disturbed areas are developed.
7. This plan has been prepared based on the assumption that the treated waters from the sump can be discharged to the surrounding environment. This plan may need to be suitably updated to the conditions of approval.

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Hanson Construction Materials Pty Ltd

Figure 5.1 - Conceptual Stormwater Management Plan - Stage 1

Wolfedene Quarry

Easement Boundary
Cadastral Boundary - Watercourse
Existing Culvert
Sump or Water Storage
Proposed Diversion Bund
Existing Engineered Rock Filter Bund
to detain clean water runoff

Legend:
1. The peak runoff from a 24 hour, 1 in 10 year rainfall event will be captured and treated within an appropriately sized sump as shown and the quarry pit/vale floor.

2. Proposed stormwater management and ESC structures subject to approval by a suitably qualified person.

3. Plans and all calculations have been conducted in accordance with the International Erosion Control Association (IECA) Best Practice Erosion and Sediment Control Guidelines, November 2008.

4. All temporary and/or permanent stormwater management and sediment treatment features must be appropriately protected from the adverse effects of sediment runoff.

5. Sump location and configuration is conceptual only and not to scale. Treatment capacity may be provided in stages as disturbed areas are developed.

6. This plan has been prepared based on the assumption that the treated waters from the sump can be discharged to the surrounding environment. This plan may need to be amended/updated pursuant to the conditions of approval.

7. This plan has been prepared based on the assumption that the treated waters from the sump can be discharged to the surrounding environment. This plan may need to be amended/updated pursuant to the conditions of approval.
1. The peak runoff from a 24 hour, 1 in 10 year rainfall event will be captured and treated within an appropriately sized sump as shown and the quarry pit/void floor.

2. Proposed stormwater management and ESC structures subject to approval by a suitably qualified person.

3. Plans and all calculations have been conducted in accordance with the International Erosion Control Association (IECA) Best Practice Erosion and Sediment Control Guidelines, November 2008.

4. All sediment control devices must be de-silted and made fully operational as soon as practicable following a storm event if the device’s sediment retention capacity falls below 75% of its design capacity.

5. All temporary and/or permanent stormwater management and sediment treatment features must be appropriately protected from the adverse effects of sediment runoff.

6. Sump location and configuration is conceptual only and not to scale. Treatment capacity may be provided in stages as disturbed areas are developed.

7. This plan has been prepared based on the assumption that the treated waters from the sump can be discharged to the surrounding environment. This plan may need to be amended/updated pursuant to the conditions of approval.
Notes:
1. The peak runoff from a 24 hour, 1 in 10 year rainfall event will be captured and treated within an appropriately sized sump as shown and the quarry pit/void floor.
2. Proposed stormwater management and ESC structures subject to approval by a suitably qualified person.
3. Plans and all calculations have been conducted in accordance with the International Erosion Control Association (IECA) Best Practice Erosion and Sediment Control Guidelines, November 2008.
4. All sediment control devices must be de-silted and made fully operational as soon as reasonable and practicable following a storm event if the device’s sediment retention capacity falls below 75% of its design capacity.
5. All temporary and/or permanent stormwater management and sediment treatment features must be appropriately protected from the adverse effects of sediment runoff.
6. Sump location and configuration is conceptual only and not to scale. Treatment capacity may be provided in stages as disturbed areas are developed.
7. This plan has been prepared based on the assumption that the treated waters from the sump can be discharged to the surrounding environment. This plan may need to be amended/updated pursuant to the conditions of approval.

Legend:
- Site Boundary
- Cadastral Boundary
- Easement Boundary
- Cadastral Boundary - Watercourse
- Catchment Area
- Existing Culvert
- Engineered Drainage Channel

Figure 5.4 - Conceptual Stormwater Management Plan - Long Term

Hanson Construction Materials Pty Ltd

Wolfdene Quarry
Figure 6.2 - Discharge, Emission and Monitoring Location Plan - Stage 2

Hanson Construction Materials Pty Ltd

Wolffdene Quarry

Legend:
- Site Boundary
- Cadastral Boundary
- Easement Boundary
- Cadastral Boundary - Watercourse
- Watercourse
- Existing Culvert
- Setting Pond, Sump or Water Storage
- Water Monitoring Point
- Dust Emission Source
- Light Emission Source
- Noise Emission Source
- Blasting Emission Source
- Water Release Point

Client:
PROJECT:
TITLE:
DRAWING NUMBER:
SCALE:
DRAWN:
0 When Printed On A3
DATUM: HORIZONTAL / VERTICAL / ZONE
REVISION:
CHECKED:
Photography:
Topography:
Cadastre:
Ecosystem:
Other:

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5 June 2013
CREATED:
DATE:
PRINTED:
10 October 2013
10 October 2013

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FILE NAME:
JOB SUB #:
1001.231

LT
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200
MGA
AHD
56
Figure 6.3 - Discharge, Emission and Monitoring Location Plan - Stage 3

Landair Surveys. 2012-10-31

Legend:
- Site Boundary
- Cadastral Boundary
- Easement Boundary
- Cadastral Boundary - Watercourse
- Watercourse
- Existing Culvert
- Setting Pond, Sump or Water Storage
- Water Monitoring Point
- Dust Emission Source
- Light Emission Source
- Noise Emission Source
- Blasting Emission Source
- Water Release Point

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Wolffdene Quarry
Legend:
- Site Boundary
- Cadastral Boundary
- Quarry Extent - Long Term
- High Potential Bushfire Hazard
- Medium Potential Bushfire Hazard
- Low Potential Bushfire Hazard
Figure 9 - Rehabilitation Staging

Hanson Construction Materials Pty Ltd

Legend:
- Site Boundary
- Cadastral Boundary
- Easement Boundary
- Cadastral Boundary - Watercourse
- 2 ha Buffer
- Minimum 40m Wide Buffer

Wolffdene Quarry

Stage 1 Rehabilitation
Stage 2 Rehabilitation
Stage 3 Rehabilitation
Stage 4 Rehabilitation

When Printed On A3

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FILE NAME: 1001.235

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6 June 2013
CREATED:

Photography:
Topography:
Cadastre:
Ecosystem:
Other:
/
/

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6 June 2013
CREATED:
All loose material removed and bench rounded 1m to 4m (Varies)

Barrier formed from minus 100mm/plus 50mm screened rock, shot rock, overburden or boulders to satisfaction of Quarry Safety Officer (maximum)

Minimum 500mm thick plant rooting medium (preferably >1.0m thick)

Rill approx 600mm height above cell floor formed with plant rooting medium and top soil (refer plan view and long section)

Minimum 500mm thick plant rooting medium (preferably >1.0m thick)

Scale loose material on face

Alternate Barrier Detail

Concept Plan

Scale loose material on face

Rip-Rapped Inter-cell spillway

Concept Cross Elevation

Scale loose material on face

Rip-Rapped Inter-cell spillway

Concept Long Elevation

Figure 10 - Schematic of Quarry Bench Rehabilitation

Hanson Construction Materials Pty Ltd

Wolffdene Quarry
Figure 11 - Batter Treatments

**Legend:**
1. Rock shattered to allow root penetration
2. Planting media returned to plant site to a depth of 0.3 to 1.2 metre
3. Tree and shrub seedlings planted
4. Loose Rock Dislodged
5. Edge rounded with hydraulic rock

**Highly to Moderately Weathered Rock Treatment**

- Typical batter slope 30° to 45°
- Pre-seedling treatment
- 10m to 15m

**Completely Weathered Rock**

- Typical batter slope 15° to 27°
- Pre-seedling treatment
- 6m to 9m

**Fresh Rock Treatment**

- Typical batter slope 70° - 80°
- Pre-seedling treatment
- 10m to 15m

**Client:** Wolfdene Quarry
**Project:** Hanson Construction Materials Pty Ltd

**DATE:** 6 June 2013
**Ph:** +61 7 3871 0411
**www.groundwork.com.au**
Appendix A

Environmental Policy
ENVIRONMENTAL POLICY

Hanson accepts the responsibility for environmental protection which is integral to the conduct of its commercial operations.

Hanson is committed to:

- **Operating practices** which seek to minimise impacts, prevent pollution and minimise the likelihood of environmental harm through work and management practices, continual improvement, training and the use of new technology;
- **Compliance** with all applicable environmental laws and regulations and Codes of Practice in existing operations, new developments and upgrades;
- **Management review** of environmental objectives and targets;
- **Waste management** to minimise wastes, develop viable recycling opportunities, and ensure proper handling and disposal methods;
- **Product development** which seeks to combine commercial viability and efficient use and conservation of resources;
- **Environmental assessment** of new projects, asset purchases, sales and existing operations;
- **Environmental Incident Response** – contingency plans to minimise health, safety and environmental risks;
- **Rehabilitation** of areas affected by business operations;
- **Communication** of the Hanson environmental policy to employees and contractors

- Striving to meet **Community Expectations** through consultation within Hanson and with other relevant bodies, community groups and neighbours about environmental matters of common concern.
- **Water Management** is integral to achieving sustainability, balancing today's needs with those of the future. *(Refer to Water Policy for more information)* and:
- **Energy management** is integral to managing greenhouse gas emissions from our operations and thus abate the impact of our business on the climate. *(Refer to Energy Management Policy for more information)*

Hanson will encourage concern and respect for the environment and will emphasise every employee's responsibility for environmental performance.

Kevin Giuskie  
Chief Executive  
1 April 2009  
Replaces version 1/7/2004
Appendix B

Initial Notification Form
(example only)
This form is to be completed when notifying the Department of Environmental and Heritage Protection (EHP) of any emergency or incident, which has or may cause environmental harm. The EHP is to be contacted by telephone or facsimile (of this form) within 24 hours after becoming aware of the emergency or incident.

Date ..............................................................................................................................................................................

Holder of Approval ......................................................................................................................................................

Operators Name ...........................................................................................................................................................

Your Name ...................................................................................................................................................................

Site Location ...................................................................................................................................................................

Location of emergency or incident within site ............................................................................................................

Environmental Authority (EA) Number ........................................................................................................................

Name and telephone number of Contact Person ........................................................................................................

Time of the emergency of incident ..............................................................................................................................

Time that operators became aware of the incident .....................................................................................................

The suspected cause of the emergency / incident ....................................................................................................

The environmental harm caused, threatened, or suspected to be caused by the incident

Actions taken to prevent further environmental harm and mitigate any environmental harm caused by the incident

.................................................................
Appendix C

Further Notification Form
(example only)
EMERGENCY AND INCIDENT

Department of Environment and Heritage Protection Further Notification Form

Not more than 14 days following the initial notification of an emergency or incident, the holder of the Environmental Authority must provide the following written advice along with the initial notification form.

This record must be kept for a period of five (5) years.

Environmental Authority (EA) Number ............................................................................................................................

Designated Contact Person ..............................................................................................................................................

Date of Release: ……/……/…… Time of Release: ……………. am/pm

Proposed Action to prevent a recurrence of the Emergency or Incident
............................................................................................................................................................................................
............................................................................................................................................................................................
............................................................................................................................................................................................

Outcomes of Actions taken at the time to prevent or minimise Environmental Harm and / or Environmental Nuisance
............................................................................................................................................................................................
............................................................................................................................................................................................
............................................................................................................................................................................................

Results of any Environmental Monitoring performed
............................................................................................................................................................................................
............................................................................................................................................................................................
............................................................................................................................................................................................

Further comments
............................................................................................................................................................................................
............................................................................................................................................................................................
............................................................................................................................................................................................
............................................................................................................................................................................................
............................................................................................................................................................................................

Name: .................................................. Signature: .....................................................
Appendix D

Spill Protocol
SPILL PROTOCOL

1. Introduction

Fuel and hazardous substance spills can occur during the operation, servicing or repair of plant and equipment. These spills could be minor (i.e. less than 5 litres), major (i.e. 5 to 20 litres) or severe (i.e. greater than 20 litres).

If spills are not managed appropriately, they may pose a serious risk, or threat to, the environment and safety of personnel. Spills can result in water and land contamination, and in some instances, may potentially result in the death of terrestrial and aquatic fauna and flora.

Under the *Environmental Protection Act 1994* (EP Act), an organisation or individual may be fined (or even face imprisonment) if it is proven that a spill resulting in water and / or land contamination could have been prevented. Therefore, all necessary preventative measures should be implemented to prevent spills. In the event a spill does occur, it should be contained, removed and disposed of properly and efficiently.

2. Hazardous substances used

Fuels and hazardous substances used include, but may not be limited to:

- distillate in above ground storage tanks and in vehicle / machine fuel tanks
- oils and greases in various parts of the plant, in the service area, and in other plant and equipment
- solvents and cleaning agents
- paints and other miscellaneous chemicals used for general housekeeping and cleaning activities

Any of the above substances may have the potential to cause water and / or land contamination, however if appropriate spill prevention measures are implemented, the potential for spills can be significantly reduced.

3. Spill Prevention

Spills should be prevented by the implementation of appropriate control measures. However, accidental spills may occur from time to time. Preventative measures include:

- ensuring appropriate, and well stocked, Spill Response Kits are readily accessible at all times, especially in high risk areas such as workshops, chemical storage areas, on plant and equipment, and so on
- reviewing Material Safety Data Sheets (MSDS) for substances used and becoming familiar with the spill clean-up procedure nominated on the MSDS
- using fuels and hazardous substances for the intended purpose only (i.e. as nominated in the MSDS)
- wherever possible, conducting maintenance activities on designated sealed areas such as concrete hardstand
- supervising refuelling of plant and equipment to ensure that overfilling does not occur
- using emergency shut off valves to prevent spills
- checking plant and equipment daily for fuel, oil or chemical leaks
- servicing plant and equipment in accordance with the maintenance schedule and inspecting fuel or oil lines for wear or faults
- ensuring refuelling, lubricating, and repair and maintenance activities occur in designated areas
• shutting down plant or equipment if the plant or equipment is the source of the spill. The shut down of plant or equipment will reduce the risk of further spills.

4. **Spill Management**

When preventative controls have been implemented and an accidental spill occurs, the following steps should be followed to prevent further spillage and to contain and clean-up the spill:

**DO NOT USE WATER OR OTHER LIQUIDS TO WASH THE SPILL AREA UNTIL THE SPILL HAS BEEN COMPLETELY AND APPROPRIATELY REMOVED**

- stop the spill (where necessary, shutdown equipment or push emergency stop). Do not move equipment associated with a spill until it is safe to do so
- identify the spilled substance (e.g. distillate, oil, grease, solvent, paints, cleaning agents, and so on)
- contain the spill using an appropriate Spill Response Kit / bunding. Spill Response Kits typically include absorbent materials such as clay, absorbent pads, rags or other suitable materials to contain and soak up the spill, place absorbent materials over the spill to minimise infiltration to the underlying soil or substrate
- secure the spill area by evacuating any persons within the immediate area, extinguish all smoking or flame producing materials using the correct fire extinguisher (ensure the extinguisher is suitable for the purpose and not expired) and, wherever safe to do so, shutdown operating equipment in proximity to the spill
- notify managers immediately. All spills must be reported to management, irrespective of the size of the spill
- repair equipment at the spill location where possible if the plant / equipment is the source of the spill. The movement of unrepaired plant / equipment has the potential to spread the spill and contaminate other areas
- once safe to do so, relocate any plant / equipment to allow the clean up of the spill
- remove the spill by using shovels and / or earthmoving equipment and contain the contaminated material in an acceptable manner for disposal off-site, where necessary by a licenced contractor. Contaminated materials are to be disposed of off-site at an approved, licenced waste disposal facility (under no circumstances should materials containing the spill be disposed of on-site).
- in the event of a major spill, EHP should be notified as soon as possible following the incident. Where necessary, professional advice / assistance should be sought regarding clean up operations

5. **Reporting**

All spills should be reported to management immediately. The following information must be reported at a minimum:

- date and time of the spill
- approximate location of spill
- substance spilled
- quantity spilled
- actions taken to contain and control spill
- method of disposal
- person responsible for managing and removing the spill