Red Hill Quarry

Environmental Management Plan

Draft

Prepared for
Hanson Construction Materials Pty Ltd
by Strategen

May 2008

Red Hill Quarry

Environmental Management Plan

DRAFT

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Client: Hanson Construction Materials Pty Ltd

Report	Version	Prepared by	Reviewed by	Submitted to Client	
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Draft Report	V4	JN	Client	CD	08/05/08
Final Report					

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1. INTRODUCTION

This Environmental Management Plan (EMP) has been prepared to meet a commitment made in obtaining environmental approval for the Red Hill Quarry Development Proposal. Hanson Construction Materials Pty Ltd (Hanson) operates the Red Hill Quarry and processing facilities, which comprise a quarry pit and supporting infrastructure; including crushers, conveyors, workshop and offices.

Red Hill Quarry

1.1 LOCATION

The Red Hill Quarry is located approximately 25 km north-east of Perth on the Darling Plateau, immediately east of the Darling Scarp (Figure 1). The formal address is Lot 11 Toodyay Road, Red Hill. Lot 11 is owned by Hanson and is approximately 800 ha in area (Figure 2).

1.2 BACKGROUND

Quarrying operations at Herne Hill, approximately 900 m west of the current Quarry, were moved to the Red Hill location to reduce conflicting land use pressures from encroaching residential development (Dames and Moore 1990). The Environmental Protection Authority (EPA) determined that the relocation project warranted a Public Environmental Review (PER) level of assessment. Subsequently, the Minister for the Environment granted approval for the relocation pursuant to Ministerial Statement No. 199 which was released on 5 December 1991. Construction of the Red Hill Quarry commenced in February 1996 and operations commenced in 1998. Modifications to the project as described in the 1990 PER, have been assessed and approved under section 45C *Environmental Protection Act 1986* (EP Act). The conditions were varied under section 46 of the EP Act.

In February 2007, Hanson referred the Red Hill Quarry Development Proposal to the EPA under section 38 of the EP Act. The EPA subsequently set the level of assessment at PER. The proposal will increase the area of hard rock extraction and enable long-term continuation of quarrying operations. The development will also require an extension to the existing stockpile and dispatch area and may relocate and/or upgrade existing crushers and/or add additional crushers to the existing processing plant (which will require the installation of associated support infrastructure as required [e.g. additional conveyors and screens and extension to processing buildings]). The development will increase the disturbance footprint of the operation by approximately 80 ha over the expected life of the project (approximately 100 years). The Red Hill Quarry development will be entirely within the boundary of Lot 11.

Figure 1 Regional location of Red Hill Quarry

Figure 2 General location of Red Hill Quarry

1.3 PURPOSE AND SCOPE OF THE EMP (EMP)

As part of its proposal to continue to develop operations at the Red Hill Quarry, Hanson has committed to the development and implementation of an EMP. The purpose of this EMP is to document the environmental management objectives and strategies in relation to the Red Hill Quarry operation (existing and proposed), including:

- measures to prevent, reduce and mitigate any potential environmental impacts of the proposal
- details of the timing and persons responsible for implementation of these measures
- monitoring and reporting procedures.

The EMP addresses the following factors through a suite of management plans that are detailed in subsequent sections:

- vegetation and habitat protection
- fauna management
- surface water quality management
- noise and vibration management
- dust management
- fire management
- traffic management.

The EMP also details a Conceptual Closure Plan for the operation.

Rehabilitation, weeds and dieback management are addressed separately in the Red Hill Quarry Screening and Rehabilitation Program (see Section 1.5).

1.4 STRUCTURE OF THE EMP

The management plans in this EMP have been prepared in accordance with the Department of Environment and Conservation (DEC) guidelines and each:

- defines management objectives for the environmental factor it addresses
- describes management actions required to achieve the environmental objectives related to the environmental factor
- provides a description of monitoring and performance criteria, as required, for meeting the objectives related to the environmental factor
- describes contingency measures to be implemented in the event of unexpected or unacceptable environmental outcomes
- outlines responsibilities for management actions and timing of implementation.

The Conceptual Closure Plan details:

- purpose and scope

- key environmental considerations for closure
- preliminary closure objectives, targets and indicators
- preliminary closure approach
- consultation.

The EMP also details the overall Red Hill Quarry environmental management framework, including:

- communication and training
- stakeholder consultation
- performance reporting and auditing
- review and revision.

1.5 SCREENING AND REHABILTATION PROGRAM

This EMP should be read in conjunction with the Red Hill Quarry Screening and Rehabilitation Program (Landform Research 2007).

Hanson prepared a Screening and Rehabilitation Program consistent with Condition 4-4 of Ministerial Statement No. 199 (as amended by Condition 2 of Ministerial Statement No. 705). The program was also developed consistent with EPA Guidance Statement No. 6, "*Rehabilitation of Terrestrial Ecosystems*" (EPA 2006), to ensure that rehabilitation of the Red Hill Quarry achieves a stable and functioning landform, consistent with the surrounding landscape and which reduces the visual impacts of quarrying operations from adjacent land.

The Screening and Rehabilitation Program details:

- rehabilitation aims and key directions
- completion criteria for the final land surface
- a Rehabilitation Program, including prescriptions for:
    - vegetation clearing
    - topsoil and overburden removal
    - landform reconstruction and contouring
    - soil reconstruction
    - erosion control
    - vegetation establishment
    - flora species lists for visual management and local community restoration
    - monitoring and review of rehabilitation program
- the Dieback Management Plan
- the Weed Management Plan
- a review of rehabilitation performance.

The Screening and Rehabilitation Program applies to the Red Hill Quarry operations (existing and proposed) and shall be regularly reviewed and updated accordingly.

2. DESCRIPTION OF THE RED HILL QUARRY OPERATION

2.1 ENVIRONMENTAL SETTING

The existing physical, biological and social environment of the Red Hill Quarry and surrounds is detailed in Section 2 of the Public Environmental Review (PER).

2.2 OVERVIEW OF OPERATIONS

The Red Hill Quarry produces aggregate for Perth building and construction industries. The quarry currently produces around 1 000 000 t/yr of granite and diorite/dolerite aggregate (based on 2005/2006 throughput). This production rate fluctuates annually based primarily on market demand for the product. The current reserves are expected to last approximately 18 months based on these production rates. In order to provide long-term access to the resource, Hanson proposes to continue to develop the quarry to the north-west and west of the current pit. The proposal also includes an extension to the existing stockpile and dispatch area and may require the relocation or upgrade of existing crushers or installation of new crushers within the existing processing plant (which will require the installation of associated support infrastructure as required [e.g. additional conveyors and screens and extension to processing buildings]). This proposal is currently subject to a PER level of assessment under the EP Act (Section 1.2).

The layout of the existing and proposed operation is shown in Figure 3.

The proposed development of the pit will increase the quarry pit disturbance footprint by around 75 ha over the expected 100 year life of the project (on average less than 1 ha/yr). Clearing will be progressive as the pit is developed over this time. The development will initially progress in a northerly direction towards Susannah Brook, reaching the northern extent in about the year 2055. Development of the pit in a westerly direction towards the former Herne Hill Quarry is anticipated to commence in about the year 2079 (Figure 4). The existing product stockpile and dispatch area will be increased in area by approximately 5 ha.

Figure 3 Layout of the existing and proposed operations

Figure 4 Indicative staging of proposed quarry pit development

2.3 DESCRIPTION OF OPERATIONS

2.3.1 Quarrying and processing

The four key quarrying processes undertaken at the Red Hill Quarry are:

1. **Topsoil and overburden stripping:** Quarrying is a 'top-down' process which requires clearing some way in front of working faces. Vegetation, topsoil and overburden will be progressively removed by dozers and excavators to expose the hard rock resource. The depth of topsoil and overburden varies with location. Overburden varies between zero and 6 m at the current operations and is expected to be similar in the development area.
2. **Drilling and blasting:** Quarrying will involve drilling and blasting of hard rock to establish the quarry face and enable extraction of rock consistent with existing operations. This drilling and blasting approach develops the typical 'stepped' quarry profile. This profile enables the digging from one bench whilst accessible alternate locations at other levels can be drilled.
3. **Loading and hauling:** Blasted rock will be retrieved from the face and loaded by front end loaders or excavators onto off-highway dump trucks for transport to the primary crusher for processing. Oversize material will be stored in the pit until the volume of material is sufficient to warrant the use of a rock-breaker, thereby minimising the requirement for secondary blasting.
4. **Crushing and screening:** The primary crusher (jaw-type crusher) forms stage one of the aggregate processing plant. The blasted rock will be dumped into the hopper and will be crushed to around 175 mm. The output from the primary crusher will be transported along a covered conveyor system to the secondary and tertiary crushers and screens.

   Initially, the existing crushing and screening plant will remain in its present location; however, there may be a requirement to relocate crushers as the pit extends, upgrade and/or add crushers as throughput or demand for smaller-sized fractions of stone increases (which will require the installation of associated support infrastructure as required [e.g. additional conveyors and screens and extension to processing buildings]).

   The aggregate product is loaded and dispatched from the stockpile and dispatch area. The proposed development of the quarry will require an extension to the product stockpile area by approximately 5 ha (from 10 ha to 15 ha) to allow for greater tonnage storage of products as markets increase.

2.3.2 Product transportation

Entry to, and exit from the Red Hill Quarry (including the offsite transport of aggregate) is via Toodyay Road. Currently, there are about 650 loaded trucks that leave the quarry and around 650 empty truck returns to the quarry per week. The number of truck movements will increase as a result of the proposed development with the number of truck movements increasing proportionately to throughput increase.

2.3.3 Water supply

The current Red Hill Quarry operation utilises approximately 100 000 kL/year of water (supplied from onsite sources) for processing as well as for dust suppression in summer. Associated with the proposal, this demand for water is expected to increase by approximately 15%, mostly for processing

requirements (e.g. washing of material). Water for use in the quarrying and processing operations and for environmental management is obtained from three onsite supplies: an in-pit sump; and two sedimentation dams. The former Herne Hill Quarry comprises an in-pit sump and is used as an emergency source. No water will be abstracted from Susannah Brook. Potable water is brought on site in bottles or by bulk and stored in tanks as required. No new water sources will be required for the proposed development.

3. VEGETATION AND HABITAT PROTECTION MANAGEMENT PLAN

3.1 DESCRIPTION

3.1.1 Vegetation and flora

The majority of the Hanson Red Hill landholding (Lot 11) is comprised largely of undisturbed native vegetation. The proposed development area comprises three vegetation complexes; Helena 2, Dwellingup 2 and Darling Scarp, all of which have greater than 30% of their pre-European extent remaining. Nine site-vegetation types were mapped in the proposed development area by Mattiske (2007). All site-vegetation types are locally represented elsewhere on Lot 11, in nearby conservation estate and/or State Forest. No Threatened Ecological Communities (TECs) have been recorded in the proposed development area.

The condition of the vegetation varies from degraded to excellent. The degraded areas have resulted from clearing, track establishment, human activities along Susannah Brook, and weed infestations along Susannah Brook originating from upstream catchment areas. Visual observations of vegetation condition have not indicated the presence of *Phytophthora cinnamomi* (Dieback) on Lot 11; however, Hanson is in the process of undertaking a formal dieback assessment of the site. See the Dieback Management Plan contained in the Screening and Rehabilitation Program for more detail.

Of the 23 introduced (weed) taxa recorded onsite, none are listed by the Department of Agriculture and Food Western Australia (2007) as a Declared Plant or a Pest Plant. However, active weed management is required to reduce infestation or further spread of the introduced species. See the Weed Management Plan contained in the Screening and Rehabilitation Program for more detail.

No Declared Rare Flora (DRF) have been recorded within the proposed development area, however, three Priority flora species have been recorded:

- *Acacia oncinophylla* subsp. *oncinophylla* (P3)
- *Halgania corymbosa* (P3)
- *Calothamnus ruprestris* (P4).

All three species are known to occur on Lot 11 outside the proposed disturbance footprint, in the adjacent area of the Darling Range Regional Park and are known from other sites in the northern Jarrah forest. Two additional Priority flora species have been recorded historically near the proposed development area:

- *Darwinia pimelioides* (P4)
- *Templetonia drummondii* (P4).

A more detailed description of vegetation and flora is contained in Section 7 of the PER.

3.1.2 Fauna habitat

Harris and Bamford (2007) identified five habitats of significance within the proposed development area:

1. **Granitic outcrops**, particularly where the rock formations have been weathered creating micro-habitats, which provide habitat for species such as Carpet Pythons, Ornate Dragons and potentially Dell's Skink.
2. **Eucalypt woodlands**, especially those that include Wandoo. Eucalypt woodlands provide habitat for some mammals and feeding habitat for significant bird species such as Carnaby's Black-cockatoo, Baudin's Black-cockatoo and the Forest Redtailed Black-cockatoo.
3. **Heaths of gravelly sands** close to areas of exposed granite, important for many reptile, bird and mammal species, and potentially support short-range endemic invertebrates.
4. **Lower slopes of hills** where water is concentrated, creating seasonal pools and dense vegetation. Such areas are important for a number of locally significant bird species.
5. **Temporary creeks** including Susannah Brook, are important breeding grounds for frogs with potential downstream influences.

These habitats are not unique to the proposed development area with extensive areas containing similar habitats conserved in nearby John Forest and Walyungah National Parks and Darling Range Regional Park.

A more detailed description of fauna habitat is contained in Section 8 of the PER.

Ecological corridors

Hanson will continue to retain and enhance the north – south vegetated corridors along the east and west boundaries of Lot 11 and the east – west vegetated corridor along Susannah Brook in order to maintain vegetative linkages for faunal movement between John Forrest National Park, Darling Range Regional Park, Susannah Brook and vegetated areas in the north of Lot 11.

The north – south vegetated corridor on the western side of Lot 11 is approximately 700 m wide and comprises remnant vegetation and an area of approximately 28 ha undergoing rehabilitation. The north – south vegetated corridor on the eastern side of Lot 11 is about 100 m wide. Hanson will also retain a buffer between Susannah Brook and quarrying operations. This will protect the riparian vegetation and the ecological linkage between the eastern and western parts of the Darling Plateau, including the Darling Range Regional Park.

3.2 ENVIRONMENTAL ASPECTS TO BE MANAGED

The following aspects of the Red Hill Quarry operation have been identified as requiring management to ensure protection of vegetation and habitat values:

- **clearing of vegetation** for the quarry pit area, product stockpiles and associated infrastructure will lead to direct disturbance of vegetation and possibly significant flora species and habitat fragmentation
- **vehicle movements and unauthorised access** to Lot 11 has the potential to introduce and/or spread dieback and weeds

- **dust generation** may smother vegetation in proximity to dust sources (e.g. unsealed roads, stockpile areas), which may affect plant growth
- **human and vehicle activity** in the area may increase the risk of fire.

The management of weeds and dieback is addressed in the Weed and Dieback Management Plans contained in the Screening and Rehabilitation Program. Dust and fire are addressed in Sections 7 and 8 respectively of this EMP.

3.3 ENVIRONMENTAL OBJECTIVES, TARGETS AND INDICATORS

The environmental objectives, targets and key performance indicators are detailed in Table 1.

Table 1 Environmental objectives, targets and indicators for vegetation and habitat protection

Objective	Target	Key performance indicator
To ensure that any clearing undertaken is approved and kept within the approved quarry footprint.	No clearing or disturbance outside of pre-defined boundaries (as indicated in Schedule 1 of the Ministerial Statement for the proposal) throughout the duration of the proposal.	Visual observations of clearing operations. Recording occurrences of clearing beyond pre-defined boundaries in Environmental Incident Reports.
Minimise the clearing of previously undisturbed vegetation within approved boundaries.	Opportunities to reduce the area of vegetation cleared within approved boundaries are investigated and documented.	Opportunities to reduce the area of vegetation cleared within approved boundaries documented in the Quarry Clearing Plan.
Protect Priority flora not approved for disturbance.	No disturbance to Priority flora species outside pre-defined boundaries (as indicated in Schedule 1 of the Ministerial Statement for the proposal) throughout the duration of the proposal.	Number of reported incidents of disturbance to Priority flora.
Minimise the number of individuals of Priority flora within approved boundaries disturbed.	Opportunities to reduce the number of individuals of Priority flora within approved boundaries disturbed are investigated and documented.	Opportunities to reduce the number of individuals of Priority flora within approved boundaries disturbed documented in the Quarry Clearing Plan.
To maintain and enhance ecological corridors between John Forrest National Park, Darling Range Regional Park and vegetated areas of Lot 11.	Disturbed areas within identified ecological corridors rehabilitated to a condition comparable to the surrounding vegetation.	Rehabilitation monitoring results.

3.4 IMPLEMENTATION STRATEGY AND MANAGEMENT ACTIONS

Specific management actions have been identified to assist in achieving the vegetation and habitat protection management objectives (Table 2).

Table 2 Management actions for vegetation and habitat protection

Parameter	Action	Timing	Responsibility
Induction	1. The induction program shall contain information on: • the requirement to stay within clearing boundaries • location of Priority flora to be protected and the importance of these species • location of ecological corridors and their importance.	Induction	Quarry Manager
Clearing and earthworks	2. The approved clearing footprint shall be documented on quarry plans and made available to persons involved in clearing operations.	Prior to ground disturbance	Operations Manager Quarry Manager
	3. Opportunities to further reduce the clearing of vegetation within approved boundaries shall be investigated and documented on quarry plans. This shall include: • locating infrastructure preferentially in cleared areas rather than in undisturbed areas • using established access tracks and roads as far as practicable. Where new tracks are required, they shall be preferentially located within previously disturbed areas.	Prior to ground disturbance	Operations Manager Quarry Manager
	4. The boundaries of the vegetation to be cleared shall be delineated in the field with pegs and/or flagging tape and access beyond these boundaries shall be prohibited.	Prior to ground disturbance	Quarry Manager
	5. Areas to be cleared that have not been surveyed for conservation significant flora within the last 10 years shall be surveyed by a qualified botanical consultant.	Prior to stage development	Botanical consultant
	6. Where clearing of Priority flora is unavoidable, the following shall be undertaken: • the impact of removal of the plants on the conservation status of the species shall be assessed at a local and regional scale by a qualified botanical consultant • options for transplanting individual plants or salvage of biological material for later propagation shall be assessed by a qualified botanical consultant.	Prior to stage development	Botanical consultant
	7. Cleared vegetative products shall be utilised in rehabilitation areas to provide habitat and to provide a seed source, where practical, in accordance with the Screening and Rehabilitation Program.	Throughout clearing	Quarry Manager Rehabilitation Consultant
Ecological corridors	8. Disturbed areas within the identified corridors not required for operations or safety (e.g. firebreaks/access) shall be rehabilitated to enhance the ecological corridor values. Rehabilitation of the ecological corridors shall be undertaken in accordance with the Rehabilitation and Screening Program.	Ongoing	Operations Manager Quarry Manager Rehabilitation consultant
Remnant vegetation	9. The Lot 11 perimeter fence shall be regularly inspected and repaired as required and appropriate signage advising of access restrictions shall be installed along the fence line as required	Ongoing	Quarry Manager
	10. Access to non-operational areas shall be restricted to authorised personnel and only on designated access roads.	Ongoing	Quarry Manager
Adjacent conservation reserves	11. A minimum 100 m vegetated buffer shall be maintained between quarry operations and the Lot 11 boundary with the Darling Range Regional Park.	Ongoing	Quarry Manager

3.5 MONITORING ACTIONS

Table 3 provides monitoring actions to enable an assessment of the effectiveness of the vegetation and habitat protection management actions in place. Monitoring is, for the most part, the responsibility of the site Quarry Manager.

Table 3 Monitoring actions for vegetation and habitat protection

Purpose	Parameter	Frequency	Location
To ensure that operations are not adversely affecting the integrity of remnant vegetation.	General vegetation condition via visual observations.	Monthly during operations at Red Hill Quarry.	Remnant vegetation adjacent to the operational footprint.
To ensure that clearing boundaries are clearly marked.	Clearing lines and markings.	Weekly throughout duration of ground-disturbance to undisturbed areas.	Along clearing boundaries.
To ensure no unauthorised clearing/access beyond clearing boundaries.	Clearing lines and markings.	Weekly throughout duration of ground-disturbance to undisturbed areas.	Along clearing boundaries.

3.6 CONTINGENCY ACTIONS

Table 4 identifies the appropriate contingency actions to be initiated in the event that the objectives for vegetation and habitat protection are not met.

Table 4 Contingency actions for vegetation and habitat protection

Trigger	Action
Unauthorised access beyond, or breach of clearing boundaries.	1. Investigate cause. 2. Redefine boundaries if due to inadequate boundary marking. 3. Reinform all personnel of access restrictions beyond clearing boundaries. 4. If disturbance to vegetation resulted requiring mitigation then the area disturbed shall be rehabilitated in accordance with the Screening and Rehabilitation Program. 5. An Environmental Incident Report shall be completed.
Decline in vegetation condition along clearing boundary.	1. Investigate cause. 2. Undertake remediation of affected vegetation. 3. Modify procedures e.g. dust control, as required.
Population(s) of conservation significant flora species not previously recorded are found within the operational area.	1. Investigate opportunities to prevent or minimise the impact to the newly recorded flora. 2. Document results of (1) above in the Quarry Clearing Plan. 3. Indicate individual plants to be protected in the Quarry Clearing Plan. 4. If the flora is classified as DRF, an application to take DRF shall be prepared and submitted to DEC for approval by the Minister for the Environment in accordance with the Wildlife Conservation Act 1950. All conditions of the permit shall be followed.

4. FAUNA MANAGEMENT PLAN

4.1 DESCRIPTION

The vertebrate assemblage of the project area includes a wide range of species due to the presence of Swan Coastal Plain species that are at the inland limit of their range in valleys of the western scarp, several species that are virtually restricted to the scarp and several species that are at the western limit of their range (Harris and Bamford 2007). There are also a number of invertebrates recorded from the site.

Several conservation significant vertebrate species are likely to be present on Lot 11, including:

- *Morelia spilota imbricata* (South-west Carpet Python)
- *Ctenotus delli* (Dell's Skink)
- *Calyptorhynchus banksii naso* (Red-tailed Black-cockatoo)
- *Calyptorhynchus latirostris* (Carnaby's Black-cockatoo)
- *Calyptorhynchus baudini* (Baudin's Black-cockatoo)
- *Dasyurus geoffroii* (Chuditch).

A species of scorpion-fly (*Austromerope poultonii*) and millipede (*Dinocambala igens*) recorded from the site are also of conservation significance.

A more detailed description of the terrestrial fauna of the Red Hill Quarry is included in Section 8 of the PER.

4.2 ENVIRONMENTAL ASPECTS TO BE MANAGED

The following aspects of the Red Hill Quarry operation have been identified as requiring management to ensure protection of fauna values:

- **vegetation clearing** will directly disturb terrestrial fauna habitat and may fragment habitat
- **vehicle movements** have the potential for mortality of individual fauna, especially less-mobile species
- **human activity** could affect fauna behaviour and distribution, and could create conditions favourable for feral fauna.

The management of vegetation/habitat clearing and the maintenance of vegetated ecological linkages are addressed in Section 3 of this EMP.

4.3 ENVIRONMENTAL OBJECTIVES, TARGETS AND INDICATORS

The environmental objectives, targets and key performance indicators are detailed in Table 5.

Table 5 Environmental objectives, targets and indicators for fauna protection

Objective	Target	Key performance indicator
Minimise the effect of feral animals on native terrestrial fauna.	No statistically significant increase in feral animal abundance in the vicinity of the proposed development area throughout the duration of the proposal.	Number of feral animals recorded during trapping exercises recorded for duration of proposal.
Minimise impacts to local terrestrial fauna populations.	No clearing or disturbance of habitat outside pre-defined boundaries (as indicated in Schedule 1 of the Ministerial Statement for the proposal) throughout the duration of the proposal.	Visual observations of clearing operations. Recording occurrences of clearing beyond pre-defined boundaries in Environmental Incident Reports.

4.4 IMPLEMENTATION STRATEGY AND MANAGEMENT ACTIONS

Specific management actions have been identified to assist in achieving the fauna protection management objectives (Table 2).

Table 6 Management actions for fauna protection

Parameter	Action	Timing	Responsibility
Induction	1. The induction program shall contain information on: • potential for quarry activities to affect fauna and fauna habitat • fauna encounter procedures • important fauna habitat, such as large trees with hollows.	Induction	Quarry Manager
Native fauna protection	2. All tall trees, should they be present in areas designated to be cleared, shall be inspected to identify the presence of possible Black-cockatoo nests.	Prior to clearing	Quarry Manager
	3. The feeding of fauna, hunting, or keeping of firearms or pets onsite shall be prohibited.	Ongoing	All personnel
	4. All vehicles shall remain on designated roads and shall not be permitted off designated roads unless in the case of emergency.	Ongoing	All personnel
	5. All personnel shall observe onsite vehicle speed limits to prevent the likelihood of road kill.	Ongoing	All personnel
Native fauna encounter	6. Native animals encountered onsite shall be given the opportunity to move on if there is no threat to personnel safety in doing so.	Ongoing	All personnel
	7. If sick or injured animals are encountered, the nominated carer or Wildlife Hotline shall be called to rescue the animal. The site Quarry Manager shall escort the rescuer on and off the site and ensure they are complying with the site safety controls.	As required	Quarry Manager

Parameter	Action	Timing	Responsibility
Feral animal species	8. Feral animal control measures shall be implemented, including: • prohibiting the feeding of animals • food scraps and other waste shall be appropriately disposed of to onsite waste disposal bins • assisting with trapping and eradication programs, undertaken by DEC, in adjacent conservation reserves.	Ongoing	Operations Manager Quarry Manager All personnel

4.5 MONITORING ACTIONS

Table 7 provides monitoring actions to enable an assessment of the effectiveness of the fauna protection management actions in place. Monitoring is, for the most part, the responsibility of the site Quarry Manager.

Table 7 Monitoring actions for vegetation and habitat protection

Purpose	Parameter	Frequency	Location
To ensure no native animals are caught in traps and to ensure any trapped feral animals are removed from traps and humanely eradicated as soon as possible.	Feral animal traps.	Daily during trapping operations at Red Hill Quarry.	Location of traps to be determined in consultation with DEC.

4.6 CONTINGENCY ACTIONS

Table 4 identifies the appropriate contingency actions to be initiated in the event that the objectives for vegetation and habitat protection are not met.

Table 8 Contingency actions for fauna protection

Trigger	Action
Unauthorised access beyond, or breach of clearing boundaries.	1. Investigate cause. 2. Redefine boundaries if breach due to inadequate boundary marking. 3. Reinform all personnel of access restrictions beyond clearing boundaries. 4. If disturbance to habitat resulted requiring mitigation then the area disturbed shall be rehabilitated in accordance with the Screening and Rehabilitation Program. 5. An Environmental Incident Report shall be completed.
Clearing significant habitat trees with nesting hollows.	1. A fauna expert shall be consulted to determine whether the hollow is being actively used by Black-cockatoos. 2. If the hollow is actively being used, a nest box shall be installed in a nearby tree.

5. SURFACE WATER QUALITY MANAGEMENT PLAN

5.1 DESCRIPTION

5.1.1 Susannah and Strelley Brooks

The main surface water drainage feature on Lot 11 is Susannah Brook, which flows east-west across Lot 11 to its confluence with the Swan River, near Herne Hill. Most of the Red Hill Quarry operational area is located on the north facing valley of Susannah Brook which is part of the Susannah Brook catchment area. There are several well-defined drainage lines that originate on Lot 11 and drain into Susannah Brook. One of these drainage lines forms part of the storm water management system for the existing operation.

A small portion of the existing Red Hill Quarry operational area is within the catchment of Strelley Brook, which is to the south of the catchment divide with Susannah Brook. Strelley Brook flows from its origin on Lot 11, in a south-westerly direction to its confluence with Jane Brook.

Operations (existing and proposed) will remain to the south of Susannah Brook, and to the north of Strelley Brook.

A more detailed description of the hydrology of Susannah and Strelley brooks is included in Section 10 of the PER.

5.1.2 Surface water quality

All surface water runoff from operational areas is directed to either of the two onsite sedimentation dams or to the in-pit sump. Some of this runoff will pass through silt traps before entering these basins which will facilitate settlement of the remaining suspended particles.

Hanson monitors the following water quality parameters monthly at six locations during times of stream flow:

- pH: a measure of the alkalinity or acidity
- total dissolved solids (TDS): a measure of salinity
- total suspended solids (TSS): a measure of sediments and other suspended particles
- chloride: a measure of a major component of salinity
- oil and grease: potential pollutants.

Water quality monitoring results from the existing quarry operation indicate that to date, quarrying operations have had no effect on water quality in Susannah and Strelley Brooks. Results indicate that TSS, TDS and chlorides are below ANZECC guideline levels, pH is within the ANZECC guideline range, and oil and grease levels are consistently below 5 mg/L (detectable limit).

Vehicle fuel will be the only significant source of potential hydrocarbon contamination at the Red Hill Quarry. Minor sources include various oils and lubricants required in the general operation and maintenance of vehicles and machinery. The storage and use of these hydrocarbons must be managed

in accordance with relevant regulations and standards to avoid accidental spillages and leaks, which have the potential to cause contamination of surface water runoff.

A more detailed description of the water quality of Susannah and Strelley brooks both up and downstream of the Red Hill Quarry is included in Section 10 of the PER.

5.2 ENVIRONMENTAL ASPECTS TO BE MANAGED

The following aspects of the Red Hill Quarry operation have been identified as requiring management to ensure protection of surface water values in Susannah and Strelley Brooks:

- **stormwater runoff from operational areas** potentially affecting sedimentation and erosion of dam overflow and runoff from disturbed land (e.g. excavated areas, stockpiles and haul roads)
- **spillage of potentially hazardous substances**, potentially affecting the quality of stormwater runoff; sources include hydrocarbons from workshop, plant and machinery.

5.3 ENVIRONMENTAL OBJECTIVES, TARGETS AND INDICATORS

The environmental objectives, targets and key performance indicators (KPI) are detailed in Table 9 below.

Table 9 Environmental objectives, targets and indicators for surface water quality

Objective	Target	KPI
To prevent contamination of Susannah and Strelley brooks downstream of quarry operations.	No recorded instances of non-compliance with ANZECC/ARMCANZ surface water quality guidelines or DEC licence limits.	Results from water quality monitoring program.
	Compliance with: • Dangerous Goods Safety (Storage and Handling of Non-explosives) Regulations 2007 • Australian Standard 1940: The storage and handling of flammable and combustible liquids.	Non-compliances with Dangerous Goods Safety Regulations or AS 1940 recorded in Environmental Incident Reports.

5.4 IMPLEMENTATION STRATEGY AND MANAGEMENT ACTIONS

Specific management actions have been identified to assist in achieving the surface water quality management objectives (Table 10).

Table 10 Management actions for surface water quality

Parameter	Action	Timing	Responsibility
Induction	1. The induction shall include information on: • the onsite drainage and stormwater management system • hydrocarbon storage, handling and disposal procedures.	Induction	Quarry Manager

Parameter	Action	Timing	Responsibility
Stormwater management	2. All stormwater runoff from disturbed areas shall be diverted to either of the two onsite sedimentation dams or the in-pit sump.	Ongoing	Quarry Manager
	3. Diversion structures shall include bunds or other stable drainage structures. Earthen diversion structures shall be revegetated where practicable for erosion control.	Ongoing	Quarry Manager
	4. Maintenance, including removal of debris, shall be undertaken to ensure drainage structures remain effective.	Ongoing	Quarry Manager
	5. Sedimentation dams shall be cleaned when their capacity has been reduced by 30 – 40%.	Ongoing	Quarry Manager
	6. Internally-draining dishes shall be constructed in stockpiles.	Ongoing	Quarry Manager
	7. Grease and oil traps shall be cleaned every three months by licensed contractors. The oil and grease that is collected shall be transported offsite to be recycled.	Ongoing	Quarry Manager
Rehabilitation	8. Disturbed areas no longer required for operational use shall be rehabilitated to reduce erosion potential. Rehabilitation shall be undertaken in accordance with the Screening and Rehabilitation Program.	As necessary	Quarry Manager
Hydrocarbon storage, handling and disposal	9. All hydrocarbons shall be stored and handled in accordance with the following: • Water Quality Protection Guideline No. 10: Above Ground Chemical and Fuel Storage • Dangerous Goods Safety (Storage and Handling of Non-explosives) Regulations 2007 • Australian Standard AS 1940-1993: The Storage and Handling of Flammable and Combustible Liquids.	Ongoing	Quarry Manager
	10. Waste hydrocarbons shall be stored in bunded, marked drums near the workshop area. Marked drums shall be collected and disposed of by licensed contractors.	As required	Quarry Manager
Hydrocarbon spills	11. Appropriate spill response equipment shall be located such that it is available for immediate use in all hydrocarbon storage and refuelling areas and maintenance areas.	Ongoing	Quarry Manager
	12. Any soil contaminated with hydrocarbons shall be stockpiled on a sealed area near the workshop area. Contaminated soil shall be disposed of by a licensed contractor.	As required	Quarry Manager

5.5 MONITORING ACTIONS

Table 11 provides monitoring actions to enable an assessment of the effectiveness of the surface water quality management actions in place. Monitoring is, for the most part, the responsibility of the site Quarry Manager.

Table 11 Monitoring actions for surface water quality

Purpose	Parameter	Frequency	Location
To ensure that quarry operations are not adversely affecting surface water quality in Susannah and Strelley brooks.	pH, TDS, TSS, Cl, oils/grease	Monthly during times of stream flow.	At six locations around the project area on Susannah and Strelley brooks.
To assess whether the two onsite sedimentation dams require cleaning.	Sediment accumulation in onsite sedimentation dams.	Every 10 years, as a minimum.	Two onsite sedimentation dams.
To determine if oil and grease traps are operating effectively and whether cleaning of traps is required.	Condition of oil and grease traps.	Monthly and opportunistically after heavy rainfall events.	All oil and grease traps onsite.
To ensure that the condition of storage facilities complies with the relevant legislation.	Condition of hydrocarbon storage facilities.	Monthly	Hydrocarbon storage facilities.
To ensure adequate spill response equipment and materials are present and fully operational.	Spill response equipment and materials.	Monthly	Where spill kits are located.

5.6 CONTINGENCY ACTIONS

Table 12 identifies the appropriate contingency actions to be initiated in the event that the objectives for water quality are not met.

Table 12 Contingency actions for surface water quality

Trigger	Action
Surface water quality monitoring results indicate a non-compliance with ANZECC/ARMCANZ guidelines and/or DEC licence limits.	1. Investigate the cause. 2. If the cause stems from quarrying operations on Lot 11, the problem shall be rectified. 3. Conduct a review of procedures and/or implement further education of staff/contractors to ensure that all possible steps are taken to prevent any reoccurrence. 4. Amend the management procedures/plan accordingly. 5. An Environmental Incident Report shall be completed.
Hydrocarbon spill.	1. Prevent further loss of material by either addressing the process control problem or undertaking repair of faulty components. 2. Immediately contain spillages by constructing earthen bunds or using other containment methods. 3. Remove ponded material as soon as practicable by pumping into an appropriate storage facility, or withdrawing with an absorbent material. 4. Remove contaminated soil or material to a sealed area near the workshop area. 5. Contaminated soil will be removed by a licensed contractor and disposed of in an approved landfill facility. 6. Conduct a review of procedures and/or implement further education of staff/contractors to ensure that all possible steps are taken to prevent any reoccurrence. 7. An Environmental Incident Report shall be completed.

Trigger	Action
Non-compliance with hydrocarbon storage and handling regulations.	1. Investigate cause. 2. Repair or improve storage facilities as required. 3. Re-inform all personnel of hydrocarbon handling responsibilities as required. 4. An Environmental Incident Report shall be completed.

6. NOISE AND VIBRATION MANAGEMENT PLAN

6.1 DESCRIPTION

Noise and vibration can be a potential nuisance to nearby residents. The closest residence to the existing operation is approximately 2 km to the north. Once the proposed pit extends to its full northward extent (assuming surrounding land uses remain unchanged), the closest residence to the proposed operation will be approximately 1 km; this is not expected to occur until approximately the year 2055.

Noise and vibration associated with quarrying activities include drilling and blasting, crushing and screening, and loading and transport of product. Noise from these activities at sensitive receptors can be further exacerbated by certain meteorological conditions, such as atmospheric temperature inversions and the speed and direction of wind. The level of noise and ground vibration associated with blasting is also variably dependent on the local geology. The proposed quarry development will remove some natural barriers to noise (e.g. hills and ridges) which may marginally increase operational noise levels at noise-sensitive premises around the quarry.

Predicted noise levels indicate that most stages of the proposed development will be in compliance with the Environmental (Noise) Regulations 1997 (Noise Regulations) and confirms that current noise emissions are in compliance with the Noise Regulations. Predicted noise levels will be within 5 dB of the assigned noise levels between 0600 and 0700 hours at one monitoring location (located to the north-west of operations at Daniel Place) during stages 5 – 8 (years 2032 – 2055). If monitoring reveals the assigned noise level was exceeded, Hanson may be deemed to have significantly contributed to this exceedance if its predicted noise level was less than 5 dB below the assigned noise level.

Hanson monitors all blasts for blast overpressure and ground-borne vibrations. Continuous improvements in blasting techniques and design have reduced the number of required blasts, and have also reduced the levels of air blast overpressure and ground vibration. Monitoring results indicate that current blasting activities are in compliance with the Noise Regulations.

6.2 ENVIRONMENTAL ASPECTS TO BE MANAGED

The following aspects of the Red Hill Quarry operation have been identified as requiring management to ensure noise and vibration emissions from the quarry do not affect the amenity of nearby noise-sensitive premises:

- **drilling and blasting** using drilling rigs and explosives producing noise and vibration
- **crushing and screening** of unprocessed rock at the crushing and screening plant, producing noise emissions
- **loading and transport** of rock from the pit to processing facilities and stockpiles; as well as the transport of processed rock offsite, leading to noise emissions.

Offsite transport of product is addressed in Section 9 of this EMP.

6.3 ENVIRONMENTAL OBJECTIVES, TARGETS AND INDICATORS

The environmental objectives, targets and key performance indicators are detailed in Table 13 below.

Table 13 Environmental objectives, targets and indicators for noise and vibration

Objective	Target	Key performance indicator
To minimise the impact of noise and vibration emissions from the quarry operation on noise-sensitive premises.	No public complaints relating to noise and vibration.	Number of noise-related public complaints received. Environmental Incident Report.
To ensure noise and vibration levels associated with quarrying operations comply with the Noise Regulations.	No recorded instances of non-compliance with the Noise Regulations.	Results from blast monitoring program. Site noise inspections/audits.

6.4 IMPLEMENTATION STRATEGY AND MANAGEMENT ACTIONS

Specific management actions have been identified to assist in achieving the noise and vibration management objectives (Table 14).

Table 14 Management actions for noise and vibration

Parameter	Action	Timing	Responsibility
Induction	1. The induction shall include information on: • the potential nuisance to neighbours of noise and vibration • management measures to reduce noise and vibration nuisance.	Induction	Quarry Manager
Public complaints	2. Public complaints received relating to noise and/or vibration shall be recorded in the Public Complaints Register.	Ongoing	Person taking complaint
Quarrying operations	3. Quarrying operations shall be restricted to between 0600 and 1800 hours Monday to Saturday, unless otherwise approved.	Ongoing	Quarry Manager
	4. The appropriate stakeholders shall be advised of blasting times and working schedules.	Prior to blasting	Quarry Manager
	5. Noise control measures for vehicles and other equipment shall be implemented, including fitting mobile and stationary equipment with effective exhaust mufflers.	Ongoing	Quarry Manager
	6. All noise control equipment shall be regularly inspected and maintained (where required) to ensure good working order.	Ongoing	Quarry Manager
Blasting	7. Blasting shall be designed to minimise noise and vibration emissions.	Ongoing	Blasting contractor
	8. Shots shall only be permitted to be fired between the hours of 0900 and 1800 hours (unless otherwise approved) to minimise noise impacts at sensitive receptors.	Ongoing	Blasting contractor
	9. Investigating opportunities to improve blast design and reduce the number of blasts shall be ongoing and implemented where practicable.	Ongoing	Blasting contractor

Parameter	Action	Timing	Responsibility
Crushing and screening	10. New infrastructure shall be fitted with best practice noise suppression features.	As required	Operations Manager Quarry Manager
Vehicle movements	11. Onsite speed limits shall be limited to 40 km/hr on haul roads and 20 km/hr in the stockpile and processing area.	Ongoing	All personnel

6.5 MONITORING ACTIONS

Table 15 provides monitoring actions to enable an assessment of the effectiveness of the noise and vibration management actions in place. Monitoring is, for the most part, the responsibility of the site Quarry Manager.

Table 15 Monitoring actions for noise and vibration

Purpose	Parameter	Frequency	Location
To ensure blast overpressure and air-borne vibration levels generated by blasting activities comply with the Noise Regulations.	Blast vibration levels.	All blasts.	At the William Street control site and other surrounding sites as required.
To ensure vehicle and machinery noise control measures are in good working order.	Integrity of noise control equipment.	Monthly.	Vehicles and machinery fitted with noise control equipment.
To ensure noise levels at the Daniel Place monitoring site are in compliance with Noise Regulations throughout the development of stages 5 -8 (years 2032 – 2055).	Noise emissions at Daniel Place monitoring site.	Every five years during development of stages 5 – 8.	Daniel Place monitoring site to north-west of quarry operations.

6.6 CONTINGENCY ACTIONS

Table 16 identifies the appropriate contingency actions to be initiated in the event that the objectives for noise and vibration are not met.

Table 16 Contingency actions for noise and vibration

Trigger	Action
Monitoring results indicate noise and/or vibration levels exceed levels prescribed in the Noise Regulations.	1. Investigate to determine the cause of non-compliance. 2. Take preventative actions to prevent further non-compliance, including as appropriate: • not operating parts of the mobile fleet • not operating some of the equipment and machinery • increasing the number of sound barriers • changing sound barrier locations • locating and using machinery with lower noise emissions • changing timing of offending activities. 3. Initiate a feedback loop to review management measures and/or further educate staff/contractors to ensure that all possible steps are taken to prevent any reoccurrence. 4. An Environmental Incident Report shall be completed.
Valid public complaint received relating to blasting vibration from the quarry. Valid public complaint received relating to noise emissions from the quarry operation.	1. The complaint shall be recorded in the Public Complaints Register and managed in accordance with the Public Complaint Resolution procedures (Section 11.3).

7. DUST MANAGEMENT PLAN

7.1 DESCRIPTION

Dust may be generated by quarrying activities such as drilling and blasting, crushing and screening, vehicle movements on unsealed surfaces, and also by strong winds over unsealed surfaces/stockpiles. The potential for dust generation increases over the summer months dry soil is less cohesive.

There are also a number of land uses surrounding the project area that have the potential to generate dust and affect ambient air quality, including:

- Midland Brick extractive clay pits to the immediate east
- Red Hill Waste Management Facility to the south-east
- cropping and grazing farms to the north and further east
- hobby farms to the north, north-west and west.

Dust has the potential to smother vegetation close to the dust source (e.g. vegetation adjacent to haul roads) and to create nuisance at nearby residences. The closest residence to the existing operation is approximately 2 km to the north. Once the proposed pit extends to its full northward extent (assuming surrounding land uses remain unchanged), the closest residence to the proposed operation will be approximately 1 km; this is not expected to occur until approximately the year 2055.

Hanson implements a number of dust suppression techniques, such as application of water to dust prone surfaces and installation of bag-houses and water sprays on the processing plant. The effectiveness of dust suppression is monitored monthly by four permanent static and directional dust sampling stations around the perimeter of the currently developed operational area. Results from the ongoing dust monitoring program indicate dust levels were similar between 2002 – 2005, and that dust levels during 2006 were lower than previous years, despite an increase in throughput. As expected, dust levels drop significantly in the wetter months.

7.2 ENVIRONMENTAL ASPECTS TO BE MANAGED

The following aspects of the Red Hill Quarry operation have been identified as requiring management to ensure dust emissions from the quarry do not affect the amenity of nearby dust-sensitive premises:

- **physical disturbance of the land surface** during clearing, and, topsoil and overburden removal
- **drilling and blasting** of rock to establish the quarry face and enable extraction of rock
- **vehicle movement** on unsealed roads and movement of heavy vehicles with uncovered loads
- **crushing and screening** to grade aggregate
- **wind erosion** of dry exposed surfaces such as open pit areas, stockpiles and unsealed roads.

The movement of trucks offsite is addressed in Section 9 of this EMP.

7.3 ENVIRONMENTAL OBJECTIVES, TARGETS AND INDICATORS

The environmental objectives, targets and key performance indicators (KPI) are detailed in Table 17 below.

Table 17 Environmental objectives, targets and indicators for dust

Objective	Target	KPI
To minimise dust generated associated with quarrying operations to ensure the nuisance to nearby residents is minimised.	No observation of sustained dust from quarrying operations. No public complaints relating to dust generated from quarrying operations. No obvious and unacceptable deposition observed offsite.	Number of dust-related public complaints received. Visual observations of dust generation. Dust monitoring stations.
Minimise the effect of dust on vegetation adjacent to dust sources on Lot 11.	No dust-related impact to vegetation that has not been approved to be disturbed throughout the duration of the proposal.	Vegetation monitoring.

7.4 IMPLEMENTATION STRATEGY AND MANAGEMENT ACTIONS

Specific management actions have been identified to assist in achieving the dust management objectives (Table 18).

Table 18 Management actions for dust

Parameter	Action	Timing	Responsibility
Induction	1. The induction shall include information on: • dust management measures implemented onsite • vehicle speed limits enforced onsite • potential for dust to affect vegetation and be nuisance to nearby residences.	Induction	Quarry Manager
Public complaints	2. Public complaints relating to dust shall be recorded in the Public Complaints Register.	Ongoing	Person taking complaint
Dust suppression measures	3. A water cart shall be used to wet down dust-prone unsealed surfaces such as haul and access roads, and the quarry face.	Ongoing	Quarry Manager
	4. An automatic tower-mounted sprinkler system shall be operated in the stockpile area for wetting down stockpiles.	Ongoing	Quarry Manager
	5. Automatic water sprayers shall be operated on the crushers to wet the crusher feed.	Ongoing	Quarry Manager
	6. The conveyors and screening and crushing plants shall be enclosed.	Ongoing	Quarry Manager
	7. The screens shall be fitted with a fixed plant dust extraction system (bag-houses).	Ongoing	Quarry Manager
Drilling and blasting	8. Scheduling of drilling and blasting shall consider geological and meteorological conditions to minimise dust generation.	Prior to blasting	Blasting contractor
Vehicle movement	9. All personnel shall observe onsite vehicle speed limits to reduce dust lift-off from unsealed roads.	Ongoing	All personnel

Parameter	Action	Timing	Responsibility
	10. The access road, entrance and cross-over at Toodyay Road shall be swept monthly in summer months (as a minimum) to remove dust deposited from vehicles leaving the Quarry.	As required	Quarry Manager
Minimise soil exposure and ground disturbance	11. Vegetated areas shall be retained until required ahead of quarry development in order to minimise the area of soil exposed at any one time.	Ongoing	Quarry Manager
	12. Progressive rehabilitation shall be undertaken in accordance with the Screening and Rehabilitation Program to minimise the total area of exposed soil.	Ongoing	Rehabilitation consultant

7.5 MONITORING ACTIONS

Table 19 provides monitoring actions to enable an assessment of the effectiveness of the dust management actions in place. Monitoring is, for the most part, the responsibility of the site Quarry Manager.

Table 19 Monitoring actions for dust

Purpose	Parameter	Frequency / Duration	Location
To determine if dust suppression is required.	Visual observations of dust generation.	Daily and when undertaking dust generating activities.	Unsealed surfaces prone to dust generation (e.g. haul roads, stockpiles, quarry face).
To monitor the effectiveness of dust suppression measures.	Airborne dust concentrations as measured by the onsite dust sampling stations.	Monthly.	Four onsite directional dust monitoring stations.
To ensure the correct functioning of dust suppression equipment (e.g. automatic water sprayers, bag-houses).	Dust suppression equipment.	Weekly and opportunistically.	At location of equipment within the processing plant and stockpile area.

7.6 CONTINGENCY ACTIONS

Table 20 identifies the appropriate contingency actions to be initiated in the event that the objectives for dust are not met.

Table 20 Contingency actions for dust

Trigger	Action
Visual observations indicate dust emissions are potentially at unacceptable levels at sensitive premises.	1. Investigate cause. 2. Confirm operations are being undertaken in accordance with the dust management actions. 3. If operations are found to differ from the dust management actions, make necessary changes to operations. 4. If operations are being undertaken in accordance with the dust management actions and reasonable dust nuisance persists, investigate possible cause and implement preventative measures to reduce nuisance. 5. An Environmental Incident Report shall be completed.
Valid public complaint is received relating to dust generation from quarry operations.	1. The complaint shall be recorded in the Public Complaint Register and managed in accordance with the Public Complaint Resolution procedures (Section 11.3).
Excessive amount of dust accumulated on vegetation adjacent to areas of ground disturbance.	2. Investigate cause. 3. Undertake remedial action, including hosing or dusting off vegetation. 4. An Environmental Incident Report shall be completed.

8. FIRE MANAGAMENT PLAN

8.1 DESCRIPTION

Most Australian ecosystems survive and some even benefit from the occasional fire event, however frequent or extreme fires can have detrimental ecological effects. Uncontrolled fires are especially of concern in fragmented landscapes where there is poor connectivity for animals to seek refuge and for recolonisation. Fires also pose a threat to the safety of people and property.

In late 2006, a bushfire spread from Toodyay Road and entered the south-west of Lot 11, burning a large area of remnant vegetation. There is also further historical evidence of bushfires within Lot 11, particularly to the west and south-west of the current operational area.

All areas of vegetation not required for quarry operations will be retained. These areas include vegetation corridors along the east and west boundaries of Lot 11, a vegetative corridor along Susannah Brook and large tracts of vegetation to the north of Susannah Brook and to the west and south-west of the existing quarry. Large areas of vegetation also adjoin Lot 11; John Forrest National Park (to the south) and Darling Range Regional Park (to the north-west). Hanson will also rehabilitate areas of disturbance no longer required for operational use. Effective management procedures are required to prevent any outbreak of fire in the first instance and to control and extinguish any fires that occur.

8.2 ENVIRONMENTAL ASPECTS TO BE MANAGED

The following aspects of the Red Hill Quarry operation have been identified as requiring management to minimise fire risk:

- **vegetation** within, and adjacent to Lot 11 provides a source of fire fuel
- **storage and use of flammable material onsite** may increase the potential risk of fire outbreak
- **onsite machinery** may increase the risk of fire through the use of fuels and by providing ignition sources.

The storage and handling of hydrocarbons is addressed in Section 5 of this EMP.

8.3 ENVIRONMENTAL OBJECTIVES, TARGETS AND INDICATORS

The environmental objectives, targets and key performance indicators are detailed in Table 21 below.

Table 21 Environmental objectives, targets and indicators for vegetation and habitat protection

Objective	Target	Key performance indicator
To prevent fire ignition on Lot 11 related to quarrying activities.	No instances of fire ignition on Lot 11.	Visual observation. Environmental Incident Reporting.
To prevent fire spreading from Lot 11 to adjacent land and vice-versa.	No instances of the spread of fire from Lot 11 to adjacent land and vice-versa.	Visual observation. Environmental Incident Reporting.

8.4 IMPLEMENTATION STRATEGY AND MANAGEMENT ACTIONS

Specific management actions have been identified to assist in achieving the fire management objectives (Table 22).

Table 22 Management actions for fire

Parameter	Action	Timing	Responsibility
Induction	1. Inductions shall include information on: • onsite fire prohibitions • fire response procedures.	Induction	Quarry Manager
Fire prevention	2. All open fires shall be prohibited on Lot 11.	At all times	Quarry Manager
	3. No burning of vegetation (cleared or intact) shall occur.	At all times	Quarry Manager
	4. Appropriate fire and emergency access shall be maintained in all areas on Lot 11 (e.g. firebreaks) to City of Swan requirements.	Ongoing	Quarry Manager
	5. If deemed necessary, strategically designated areas shall be subject to controlled back-burning at the discretion of Hanson and in consultation with the East Swan Volunteer Fire Brigade, the Fire Protection Officer at the City of Swan and the regional DEC Fire Officer.	As required	Quarry Manager
Fire response	6. All onsite vehicles shall be fitted with dry chemical extinguishers (light vehicles with 1 kg units, trucks etc. with 9 kg units).	Ongoing	Quarry Manager
	7. A designated number of onsite personnel shall comprise an emergency response team with first aid and fire fighting capabilities.	Ongoing	Quarry Manager
	8. Regular liaison shall be maintained with the East Swan Volunteer Fire Brigade, Fire Protection Officer at the City of Swan and the regional DEC Fire Officer.	Ongoing	Quarry Manager
	9. The onsite water cart shall be readily accessible for fire fighting requirements.	Ongoing	Quarry Manager

8.5 MONITORING ACTIONS

Table 23 provides monitoring actions to enable an assessment of the effectiveness of the fire management actions in place. Monitoring is, for the most part, the responsibility of the site Quarry Manager.

Table 23 Monitoring actions for fire

Purpose	Parameter	Frequency	Location
To ensure that the firebreaks are maintained to the City of Swan requirements.	Condition of the fire breaks.	Monthly during summer months, as a minimum.	All firebreaks on Lot 11.
To identify potential onsite fire risks.	Hydrocarbon storage areas and other ignition sources (e.g. machinery).	Monthly	Hydrocarbon storage areas and location of machinery.

8.6 CONTINGENCY ACTIONS

Table 24 identifies the appropriate contingency actions to be initiated in the event the objectives for fire are not met, or in the event of fire.

Table 24 Contingency actions for fire

Trigger	Action
Fire incident	1. Respond to fire in accordance with fire response procedures. 2. Investigate cause of the fire. 3. If fire was a result of quarrying operations, confirm operations are being undertaken in accordance with the fire management actions. 4. If operations are found to differ from the fire management actions, make necessary changes to operations. 5. If operations are being undertaken in accordance with the fire management actions, investigate and implement preventative measures to reduce future fire risk. 6. An Environmental Incident Report shall be completed. 7. The East Swan Volunteer Fire Brigade, the Fire Protection Officer at the City of Swan and the regional DEC Fire Officer shall be notified of the fire incident.
Unauthorised burning onsite	1. Immediately extinguish fire. 2. Investigate to identify responsible person(s). 3. Reinform person(s) of the onsite fire prohibitions. 4. Reinform all onsite personnel of the onsite fire prohibitions via internal communications procedures (Section 11.1.1).

9. TRAFFIC MANAGEMENT PLAN

9.1 DESCRIPTION

Heavy haulage vehicles are used to transport aggregate from the Red Hill Quarry to the customer and to provide necessary consumables (e.g. hydrocarbons and explosives) to the operations. These trucks are combination the of both Hanson-owned vehicles and privately/contractor-owned vehicles. The Quarry has one site entrance, which is from Toodyay Road. The current frequency of truck movements is dependent on demand for the aggregate product, however approximately 650 loaded trucks leave the Quarry and around 650 empty trucks return to the Quarry per week. It is expected that this number will increase proportionately to any throughput increases that may result from the proposed development. Signage is maintained on Toodyay Road, informing road users of the heavy vehicle entry/exit point to the Quarry.

Toodyay Road is a heavy haulage route, providing heavy vehicle access to a number of sites including the Red Hill Quarry, Midland Brick Quarry and the Red Hill Waste Management Facility. Toodyay Road is identified as a primary freight route under Main Roads WA jurisdiction in 'Statement of Planning Policy: Metropolitan Freight Network (draft)', and has also been identified as forming part of the proposed Perth-Adelaide National Highway route (WAPC 2005).

Movement of heavy vehicles on public roads can pose a road safety risk to the public.

Lot 11 has well defined internal access and haulage roads that are regularly maintained. A 40 km/hr speed limit applies to the internal haul roads and a 20 km/hr speed limit applies to the processing and stockpile areas.

9.2 ENVIRONMENTAL ASPECTS TO BE MANAGED

The key operational aspect that may generate a potential road safety risk to the public is:

- **offsite movement of heavy haulage vehicles** on public roads which has the potential to increase the risk of accidents and create public inconvenience (e.g. debris on roads, movement of heavy vehicles on minor public roads).

Other potential impacts of onsite and offsite traffic movement are addressed in the Noise and Vibration Management Plan (Section 6) and Dust Management Plan (Section 7) contained in this EMP.

9.3 ENVIRONMENTAL OBJECTIVES, TARGETS AND INDICATORS

The environmental objectives, targets and key performance indicators are detailed in Table 25 below.

Table 25 Environmental objectives, targets and indicators for traffic

Objective	Target	Key Performance Indicators
To prevent public inconvenience related to traffic movements on public roads associated with the quarry operation.	No public complaints.	Public complaint system.
To minimise public risk as a result of vehicle movements on public roads associated with the quarry operation.	No accidents between vehicles associated with the quarry operations and private vehicles. No public complaints.	Road accident reports. Public complaint system.

9.4 IMPLEMENTATION STRATEGY AND MANAGEMENT ACTIONS

Specific management actions have been identified to assist in achieving the traffic management objectives (Table 26).

Table 26 Management actions for traffic

Parameter	Action	Timing	Responsibility
Induction	1. Inductions shall include information on: • driver responsibilities relating to use of public roads • requirements for covering/wetting down loads before leaving site.	Induction	Transport Manager
	2. This information shall also be made available to drivers in the form of an 'information note' that shall be regularly revised and re-issued.	As information note is revised or as required	Transport Manager
Public complaints	3. Public complaints relating to traffic shall be recorded in the Public Complaints Register.	Ongoing	Person taking complaint
Onsite truck movements	4. All internal trucks shall travel to material stockpile as recorded on two-way radio screen. If no delivery is detailed on radio screen, drivers shall park-up in prescribed area and await delivery instructions.	Ongoing	All internal truck drivers
	5. All non-authorised trucks shall report to the weighbridge to receive load-card signifying material to be loaded. On collection of this card, truck shall proceed to prescribed stockpile for loading.	Upon entering Quarry	All non-authorised truck drivers
	6. Trucks shall proceed to weighbridge to be weighed to ensure legal loading limits are not exceeded and to obtain delivery ticket with delivery instructions.	Prior to leaving the site	All truck drivers
	7. Truck drivers shall confirm location of delivery and determine route. On occasions, route maps are provided as an attachment for tipping points in remote locations.	Prior to delivery	All truck drivers
Offsite truck movements	8. Neuman Rd (Herne Hill) shall not be permitted to be used to access Campersic or Toodyay Roads at any time by heavy vehicles accessing/leaving the Red Hill Quarry.	Ongoing	All truck drivers
	9. Local roads shall only be accessed when deliveries are being made specifically to any of these local areas.	Ongoing	All truck drivers
	10. Trucks entering and departing the Quarry shall use the main arterial roads in the immediate Quarry vicinity (e.g. access to Great Northern Highway from the Red Hill Quarry is to be via Toodyay Road and Roe Highway).	Upon entering or exiting the Quarry Site	All truck drivers
	11. Hanson shall obtain and manage appropriate permits from Main Roads WA to enable travel on routes required to service the market.	Prior to delivery	Operations Manager Quarry Manager

Parameter	Action	Timing	Responsibility
	12. Regular internal memorandums shall be forwarded to the Quarry site to ensure any amendments to routes (as per permits) or traffic matters are communicated to site personnel and distributed to truck drivers.	As required	Operations Manager Quarry Manager
	13. A site notice board shall be maintained for the purpose of displaying amendments to routes or traffic matters and any other pertinent information.	Ongoing (display as required)	Quarry Manager
	14. Signs shall be maintained along Toodyay Road to inform road users of truck entry/exit from the Quarry.	Ongoing	Quarry Manager (in consultation with Main Roads WA)
	15. Truck drivers shall observe local road rules and drive to prevailing road/weather conditions at all times.	At all times	All truck drivers
Debris on roads	16. Drivers shall check load for integrity and take necessary actions to make load stable if deemed to be insecure (e.g. cover load, wet-down load, remove excess product).	Prior to leaving site	All truck drivers
	17. Fine materials (<5mm) loads shall be covered with a dust-cover.	Prior to leaving site	All truck drivers
	18. Trucks shall proceed through the auto-deluge sprays to wet down the load.	Whilst en-route to the quarry or after leaving the quarry	All truck drivers
	19. The access road, entrance and cross-over at Toodyay Road shall be regularly swept.	As required	Quarry Manager

9.5 MONITORING ACTIONS

Table 27 provides monitoring actions to enable an assessment of the effectiveness of the traffic management actions in place. Monitoring is, for the most part, the responsibility of the site Quarry Manager.

Table 27 Monitoring actions for traffic

Purpose	Parameter	Frequency / Duration	Location
To assess requirement to undertake road sweeping and to consider alternative means to mitigate the deposition of residual materials in this vicinity.	Dust/debris on road	Daily and opportunistically.	Exit/entry to Quarry from Toodyay Road.
To ensure the auto-deluge system is working. To ensure that drivers are proceeding through at recommended speed.	Load dust suppression measures.	Weekly.	Auto-deluge system.
To ensure drivers are covering necessary loads and securing any loose materials from trailers.	Loaded trucks leaving site	Opportunistic/random truck checks.	Onsite prior to trucks leaving site.

9.6 CONTINGENCY ACTIONS

Table 27 identifies the appropriate contingency actions to be initiated in the event that the objectives for traffic are not met. Traffic-related accidents will be dealt with in accordance with relevant road safety legislation and the requirements of the police.

Table 28 Contingency actions for traffic

Trigger	Action
Public complaint relating to heavy vehicles utilising minor public roads (e.g. Neuman Road).	1. The complaint shall be recorded in the Public Complaint Register and managed in accordance with the Public Complaint Resolution procedures (Section 11.3).
Public complaint relating to excessive quantity of debris on Toodyay Road at Quarry entry/exit point.	1. The complaint shall be recorded in the Public Complaint Register and managed in accordance with the Public Complaint Resolution procedures (Section 11.3). 2. Organise for road to be swept as soon as possible. 3. Re-inform all drivers of responsibilities relating to securing loads prior to leaving site (e.g. issue memorandum to drivers) and post memorandum on site notice board. 4. Assess adequacy of traffic management actions and amend the management actions if necessary.
Excessive quantity of debris on Toodyay Road at Quarry entry/exit point.	1. Organise for road to be swept as soon as possible. 2. Re-inform all drivers of responsibilities relating to securing loads prior to leaving site (e.g. issue memorandum to drivers) and post memorandum on site notice board. 3. Assess adequacy of traffic management actions and amend the management actions if necessary.

10. CONCEPTUAL CLOSURE PLAN

10.1 DESCRIPTION

The proposed development (referred to the EPA in 2007) will allow the Red Hill Quarry to continue operation for approximately 100 years. Consequently, planning for closure at this stage remains conceptual and flexible so that technological and societal changes that may ensue can be incorporated into the final closure plan.

Effective closure planning is required to ensure that the areas in which the company operates are left in a condition that minimises adverse impacts to the human and natural environment and that a legacy remains that makes a positive contribution to sustainable development.

Purpose and scope

The purpose of the Conceptual Closure Plan is to:

- consider legislative requirements, corporate standards and appropriate industry guidelines
- identify preliminary closure objectives, targets and indicators
- describe the short and long-term closure planning process
- outline the possible closure approach.

The Conceptual Closure Plan applies to the whole of the Hanson Red Hill Quarry operations (e.g. all operations contained on Lot 11).

Relevant industry guidelines

Regulatory agencies and industry bodies have established guidelines (industry best-practice) to assist quarrying companies to achieve acceptable standards of quarry closure and rehabilitation.

Whilst there is no legislative requirement to adhere to these guidelines, Hanson subscribe to the intent and advice of such guidelines. Industry best-practice guidelines include the following key documents:

- Department of Minerals and Energy (1994), 'Environmental Management of Quarries: Development, Operation and Rehabilitation Guidelines'
- Australian and New Zealand Minerals and Energy Council (ANZMEC) and Mineral Council of Australia (MCA) (2000), 'Strategic Framework for Mine Closure'
- Chamber of Minerals and Energy (2000), 'Mine Closure Guidelines for Mineral Operations in Western Australia'.

10.2 KEY ENVIRONMENTAL CONSIDERATIONS

The key environmental considerations associated with closure of the Red Hill Quarry include:

- dealing with the presence of infrastructure (e.g. plant, other structures and roads)
- ensuring the long-term safety of the site

- restoring conservation values through rehabilitation of the quarry pit and other disturbed areas
- ensuring ongoing protection of Susannah and Strelley brooks from pollution, in particular sediments
- rectifying any contamination of the land (e.g. hydrocarbons).

10.3 PRELIMINARY OBJECTIVES, TARGETS AND INDICATORS

The preliminary closure objective is to appropriately decommission the Red Hill Quarry operation in accordance with regulatory requirements and accepted best practice environmental management in order to relinquish to the community of a tidy, safe and uncontaminated site. This will be achieved through:

1. Construction of landforms that are stable, free-draining, non-polluting and aesthetically compatible with the surrounding landscape.
2. Establishment of sustainable endemic vegetation communities that are consistent with reconstructed landforms and surrounding vegetation and are suitable for the intended post-closure land use of the site.

Table 29 details preliminary targets to achieve the preliminary closure objective. Preliminary performance indicators are also provided to assist in assessing the achievements of these targets.

Table 29 Preliminary environmental objective, targets and indicators for closure

Preliminary closure objective	Preliminary target	Preliminary key performance indicator
To appropriately decommission the Red Hill Quarry operation in accordance with regulatory requirements and accepted best practice environmental management in order to relinquish to the community of a tidy, safe and uncontaminated site.	To decommission the operation in a manner to render it safe, in accordance with appropriate regulatory requirements.	Compliance with relevant safety regulatory requirements in currency at time of proposed closure.
	To re-establish vegetation and habitat on disturbance areas (other than quarry pit) consistent with the surrounding landscape.	Compliance with relevant environmental regulatory requirements in currency at time of proposed closure. Rehabilitation completion criteria.
	To create a stable landform of the pit area and to re-establish vegetation and habitat suitable to this landform that is as consistent with the surrounding landscape as far as practicable.	Compliance with relevant environmental and safety regulatory requirements in currency at time of proposed closure. Rehabilitation completion criteria
	To protect Susannah and Strelley brooks from sedimentation arising from the decommissioned site.	Compliance with relevant water quality sedimentation parameters in currency at time of proposed closure.

10.4 CLOSURE PLANNING

The closure planning process is dynamic and will require regular review and further development throughout the expected 100 year life of the operation. This will be necessary to allow for changes to legal obligations, corporate requirements, community expectations, costs and the development of more detailed knowledge relating to technical issues.

Hanson's closure planning process will be ongoing with the ultimate aim of developing a Closure Management Plan. The closure planning process will include the following key tasks:

- reviewing and assessing available documentation and undertaking consultation to determine:
  - the existing environment
  - legal/regulatory requirements relevant to closure
  - existing and future environmental impacts relevant to closure
  - stakeholder expectations for closure
- undertaking comprehensive stakeholder consultation, which will be imparted via the Red Hill Quarry Stakeholder Reference Group that Hanson is in the process of establishing
- ensuring the likely cost of closure and other resources required to implement the closure plan are financially provided for
- determining accountability and responsibilities for closure
- developing acceptable completion criteria and indicators to measure the success of closure
- ensuring the community is not left with a liability.

Although the post-closure land use for the Red Hill Quarry has not yet been determined, there are several key scenarios that could apply:

- the quarry is left empty
- the quarry is used as a water catchment and storage area (with possible recreational uses)
- the quarry is filled with non-putrescible waste material such as rubble and waste rock.

These possible scenarios will be assessed throughout the development of the Closure Management Plan for the site.

Hanson recognises that one of the keys to achieving acceptable closure outcomes is the successful integration of closure concepts into ongoing and long-term quarry planning activities. The following considerations have been included in the current planning for the existing operation and proposed development to mitigate potential impacts of closure:

1. Progressive backfilling of the quarry void to improve post-quarrying landform; however, backfilling will be only partial due to limited quantities of backfill material available.
2. Identification of ecological linkages and:
   - avoiding direct and indirect impacts to these linkages
   - enhancing the ecological values of these linkages.
3. Retaining a vegetative buffer along Susannah Brook.
4. Progressive rehabilitation of disturbed areas no longer required for operations.
5. Establishment of rapid rehabilitation on terminal benches to reduce visual impacts.
6. Establishment of stormwater drainage structures to:
   - minimise erosion impacts on quarrying operations
   - provide protection of post-quarrying landforms from erosion.

10.5 PRELIMINARY CLOSURE APPROACH

The following preliminary closure approach incorporates, in broad terms, the anticipated elements that may need to be undertaken. The approach does not take into consideration the final land-use, to be determined in consultation with key stakeholders, and may therefore change dependent on the final land-use determined.

10.5.1 Removing structures and roads

All unwanted above-ground infrastructure, and their foundations, will be removed (unless required for the final land-use determined). Above-ground infrastructure includes crushing and screening plant, conveyors, office buildings and weighbridge. Removal of infrastructure will be undertaken in such a manner that the site is left in a condition that does not pose a risk to public safety. All removed infrastructure will be reused or recycled where practicable, or disposed of in accordance with relevant legislation and guidelines. All redundant roads will be removed (where sealed) and made ready for rehabilitation (e.g. scarified).

10.5.2 Rectifying any contaminated land

The key potential source of on site soil contamination is hydrocarbons. Areas prone to contamination (i.e. refuelling areas, workshop areas) will be investigated to determine the presence and/or level of contamination. Any soils that are determined to be hydrocarbon contaminated will be remediated in accordance with the relevant requirements at time of remediation.

10.5.3 Bulk earthworks

Major earthworks may be required to form the base of the desired final landform. This final landform will be dependent on the final land-use determined for the site but may include shaping pit slopes and backfilling of some portion of the pit void. Earthworks may also require the placement of sub-soil and topsoil on areas to be rehabilitated.

10.5.4 Hydrologic design

The final landform will be designed so as to ensure an appropriate and acceptable on site hydrological regime. Key hydrological considerations will be ponding of water, erosion and transport of sediments to Susannah and Strelley brooks.

10.5.5 Rehabilitating disturbed areas

The aim of rehabilitating areas of disturbance (other than the pit area) is to reinstate a landscape consistent with the surrounding landscape. The aim of rehabilitating the pit is to reinstate vegetation suitable to the final land form that is as consistent with the surrounding landscape as far as practicable. Any rehabilitation will be undertaken in accordance with the Screening and Rehabilitation Program.

10.5.6 Public access and safety

Post-closure public access to the site will be determined as part of the closure planning process and development of the Closure Management Plan. Perimeter fencing (and signage) may be required to be installed around areas deemed to pose a risk to public safety.

10.5.7 Post-closure monitoring

Post-closure monitoring will be required to monitor achievement of closure objectives and rehabilitation completion criteria. Results from monitoring will be used to determine the need for follow-up works (e.g. erosion control, in-fill planting etc.). The duration of monitoring will be determined as part of the closure planning process.

10.6 CONSULTATION

Stakeholder consultation will be undertaken during all stages of closure, including:

- planning for closure
- implementing closure activities
- post-closure monitoring.

The aim of consultation will be to ensure stakeholders have sufficient information and that any concerns are addressed.

11. MANAGEMENT FRAMEWORK

11.1 COMMUNICATIONS AND TRAINING

11.1.1 Internal communications

Internal communications methods may include the following, as applicable:

- meetings
- project reports
- performance assessments reports
- notice boards
- onsite personnel inductions, training and toolbox sessions (as required)
- sub-contractor coordination meetings.

These mechanisms will be used to address concerns and questions raised by quarry personnel and any incidents (environmental and general) that may have occurred. In addition, these mechanisms will be used to communicate any new environmental management procedures or information to ensure effective implementation.

11.1.2 External communications

External communications may include the following, as applicable:

- meetings and correspondence with appropriate regulatory authorities and stakeholders
- discussions and consultation with adjoining landowners
- handling of, and responding to, complaints or requests (Section 11.3).

See also Section 11.2 relating to the Red Hill Quarry Community Consultative Group.

11.1.3 Inductions and training

All employees shall receive suitable environmental training, to ensure they are aware of their responsibilities and are competent to carry out their work in an environmentally acceptable manner. Environmental requirements shall be explained to all onsite personnel during a site induction. Ongoing instruction shall be provided via toolbox meetings etc. Inductions and ongoing instruction shall be recorded.

The environmental induction will include the following items:

- explanation of the purpose and objectives of the EMP
- roles and functions of personnel onsite in relation to environmental management
- brief explanation of their responsibilities under the environmental management procedures contained within this EMP

- potential consequences of departure from procedures
- emergency procedures and responses
- identification of their legal obligations.

11.2 STAKEHOLDER CONSULTATION

Hanson has undertaken a program to identify and consult stakeholders (including local residents and community groups, Government agencies and non-government organisations) to inform them of ongoing operations at the quarry and the proposed development. Hanson will continue to consult with the wider community regarding operations and the proposal by providing information on their website and through regular newsletters. Hanson is also progressing the formation of the Red Hill Quarry Community Consultative Group. The purpose of the group will be to:

- provide for open and accurate communication between Hanson and the local community
- develop a relationship between Hanson and the community based on trust, fairness and mutual benefit
- contribute to addressing environmental, social and economic issues in a pro-active, timely and open manner.

11.3 PUBLIC COMPLAINT RESOLUTION

A Public Complaint Register System will be operated to maintain a system of records that provide full documentation of complaint handling.

The following will be recorded in the event that a valid public complaint is received:

- the date and time of the complaint
- the name of the person who received/recorded the complaint
- the method by which the complaint was made (e.g. phone, letter)
- personal details of the complainant
- the nature of the complaint
- the action to be taken in relation to the complaint and the person/s responsible for taking that action
- potential for Environmental Incident.

Following investigation of the complaint, the Public Complaints Register will be updated to include:

- an outline of the investigations undertaken
- the action taken in relation to the complaint (including supplementary monitoring and corrective actions)
- the reason for any decisions of inaction
- time and date of follow-up contact and resolution with the complainant
- the nature of, and outcomes from, follow-up contact with the complainant

- Environmental Incident Report number (if applicable)
- any other details relevant to the complaint.

If the investigation of a complaint justifies its inclusion as an Environmental Incident, it will be promptly acted on according to the procedure outlined in Section 11.4.

11.4 ENVIRONMENTAL INCIDENT REPORTING

Environmental Incidents are events or occurrences that result in, or have the potential to result in, unacceptable impacts to the environment, for example:

- unauthorised clearing of vegetation
- spill of hydrocarbons
- monitoring results higher than prescribed limits.

All incidents will be reported on an Environmental Incident Report form and/or registered in an electronic database. Incidents will be tracked to ensure that the appropriate corrective actions and measures are taken to prevent the incident from reoccurring. Environmental Incidents will be reviewed on a monthly and annual basis to determine incident trends. This will enable targeting of areas that require further management and will assist in preventing future incidents.

All incidents will be reviewed immediately to determine if they require reporting to the appropriate authority. If reporting is required, it will be carried out in writing to the appropriate authority within 24 hours of the incident occurring.

An Emergency Response Plan will be implemented to deal with any major environmental incidents.

11.5 PERFORMANCE REPORTING AND AUDITING

Performance reporting will be implemented to produce systematic, comprehensive and informative reports on the environmental management and monitoring activities at the Red Hill Quarry. Hanson will also undertake annual internal audits of compliance with environmental management commitments and conditions required as part of the proposal.

Environmental performance and compliance with commitments and conditions will be reported in Annual Environmental Summary Reports to be submitted to EPA, DEC and City of Swan.

Where auditing finds environmental management actions are not being effective, the audits may recommend changes to procedures. Furthermore, the DEC Audit Branch is likely to undertake regular audits to assess compliance with all relevant conditions and commitments.

11.6 REVIEW AND REVISION

This EMP shall be reviewed as required throughout the duration of the proposal. Upon review, the document shall be revised and re-issued where appropriate. In addition, continued improvement of the plan will occur in response to environmental incident resolutions, audit findings, monitoring results, continuous improvement and changes in regulatory and corporate requirements.

DEC will be advised of any minor changes to the plan and provided with the revised document. Major changes will not be undertaken without consultation with DEC.

12. REFERENCES

Dames & Moore 1990, *Public Environmental Review: Herne Hill Quarry Relocation*, report prepared for Pioneer Concrete (WA) Pty Ltd.

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