



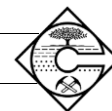
Appendix E

Analysis of Environmental Risk

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E.1 Introduction

Risk is the chance of something happening that will have an impact upon the objectives or the task which, in this case, is the environmentally responsible extraction operation within the Project Area within the Albion Park Quarry. Risk is measured in terms of consequence (severity) and likelihood (probability) of an event happening. The allocation of a qualitative consequence ranking of the potential impact(s) occurring for each risk source was based on the definitions defined **Table E.1** whilst the qualitative likelihood or probability ranking for each risk source was defined in accordance with **Table E.2**. The risk ranking was then established based upon the matrix presented in **Table E.3**. These tables have been developed generally in accordance with Standards Australia “HB 203:2012 Managing environment-related risk”.

Table E.1
Qualitative Consequence Ratings

Level	Descriptor	Description
1	Catastrophic	The potential to cause regional environmental impact/ecosystem damage with impacts causing quarry or business closure, e.g. major off-site release of a contaminant with long-term detrimental effects.
2	Major	The potential to cause substantial regional/local environmental damage which could result in major financial loss and/or prosecution, e.g. off-site release of a contaminant resulting in local ecosystem damage.
3	Moderate	The potential to cause substantial temporary or minor long-term damage, e.g. a minor water or large hydrocarbon off-site release with outside clean-up assistance required. May potentially result in a legal non-compliance.
4	Minor	The potential for a temporary or minor spill. No legal breach but may be non-compliant with internal environmental target, e.g. minor hydrocarbon spill.
5	Insignificant	No detrimental effect, negligible environmental impact.

Table E.2
Qualitative Likelihood Ranking

Level	Descriptor	Description
A	Almost Certain	Is expected to occur in most circumstances
B	Likely	Will probably occur in most circumstances
C	Possible	Could occur
D	Unlikely	Could occur but not expected
E	Rare	Occurs only in exceptional circumstances

Table E.3
Risk Rankings

		Likelihood				
		A - Certain	B - Likely	C - Possible	D – Unlikely	E - Rare
Consequence	1 – Catastrophic	25	24	22	19	15
	2 – Major	23	21	18	14	10
	3 – Moderate	20	17	13	9	6
	4 – Minor	16	12	8	5	3
	5 – Insignificant	11	7	4	2	1





 Low	 Medium	 High	 Extreme
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Table E.4 presents the identified risk sources associated with the Project and the potential consequences of the identified risk and the risk rankings assuming adoption of the proposed management and control measures identified within Section 6 of the EIS. The noise-related consequences at the “Figtree Hill” residences are nominated assuming the adoption of the additional mitigation and management measures or with a negotiated agreement in place.

The implications of the impacts of the four risk rankings are defined as follows.

- Extreme (E): Residual impacts could preclude development of a project in the manner proposed – it could proceed with substantial amendments.
- High (H): Residual impacts would require careful management to enable a project to proceed in the manner proposed.
- Medium (M): Residual impacts are unlikely to preclude the development of a project but could require minor amendments in order to proceed.
- Low (L): Residual impacts are unlikely to have any noticeable impact on the local environment or stakeholders.

Table E.4
Analysis of Environmental Risks

Risk Source	Consequence / Hazard	Risk with Standard Control Measures	Proposed Control Measures EIS Section Ref.
AIR QUALITY			
Emissions of TSP / PM ₁₀ / PM _{2.5} / deposited dust from extraction and processing operations	Health impacts to occupants within the “Figtree Hill” residences.	8 (C4)	6.2.7
	Health and / or amenity impacts on occupants within other surrounding privately-owned residences.	5 (D4)	
Emissions of TSP / PM ₁₀ / PM _{2.5} / deposited dust from transportation of extracted and/or processed rock within the extraction area.	Health impacts to occupants within the “Figtree Hill” residences.	8 (C4)	
	Health and / or amenity impacts on occupants within other surrounding privately-owned residences.	5 (D4)	
Generation of gaseous emissions and blasting fumes.	Health and / or amenity impacts on occupants within the surrounding privately-owned residences.	5 (D4)	
GREENHOUSE GAS			
Scope 1 – on-site generation of Greenhouse Gas (GHG) emissions.	Climate change impacts from the Project, locally, regionally, and worldwide.	7 (B5)	6.2.9
Scope 2 – off-site generation of GHG emissions.	Climate change impacts from the Project, locally, regionally, and worldwide.	7 (B5)	
Scope 3 – off-site impacts of GHG emissions.	Climate change impacts from the Project, locally, regionally, and worldwide.	7 (B5)	
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Table E.4 (Cont'd)
Analysis of Environmental Risks

Risk Source	Consequence / Hazard	Risk with Standard Control Measures	Proposed Control Measures EIS Section Ref.				
NOISE							
Construction of amenity barriers, vegetation mulching and soil stripping.	Noise emissions potentially resulting in amenity impacts at the "Figtree Hill" residences that exceed those identified in the negotiated agreement with the owners of "Figtree Hill".	13 (C3))	6.3.6.2				
	Noise emissions potentially resulting in amenity impacts at other surrounding privately-owned residences.	5 (D4)					
Drilling and extraction operations near the land surface.	Noise emissions potentially resulting in amenity impacts at the "Figtree Hill" residences that exceed those identified in the negotiated agreement with the owners of "Figtree Hill".	8 (C4)					
	Noise emissions potentially resulting in amenity impacts at other surrounding privately-owned residences.	5 (D4)					
Drilling and extraction operations below the original land surface.	Noise emissions potentially resulting in amenity impacts at the "Figtree Hill" residences that exceed those identified in the negotiated agreement with the owners of "Figtree Hill".	8 (C4)					
	Noise emissions potentially resulting in amenity impacts at other surrounding privately-owned residences.	3 (E4)					
Primary and secondary processing operations.	Noise emissions potentially resulting in amenity impacts at the "Figtree Hill" residences that exceed those identified in the negotiated agreement with the owners of "Figtree Hill".	8 (C4)					
	Noise emissions potentially resulting in amenity impacts at other surrounding privately-owned residences.	5 (D4)					
Transportation of extracted and/or processed rock within the extraction area.	Noise emissions potentially resulting in amenity impacts at the "Figtree Hill" residences that exceed those identified in the negotiated agreement with the owners of "Figtree Hill".	8 (C4)					
	Noise emissions potentially resulting in amenity impacts at other surrounding privately-owned residences.	3 (E4)					
BLASTING							
Ground vibration and airblast from blasting.	Amenity impacts on surrounding privately owned residences.	12 (B4)	6.3.6.3				
Ground vibration and airblast from blasting.	Damage to nearby privately owned residences, buildings infrastructure, or stock.	6 (E3)					
Rock propelled outside the designed blast envelope (i.e. flyrock).	Damage to nearby privately owned residences, buildings, infrastructure or stock.	10 (E2)					
	Injury or death.	10 (E2)					
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 Low	 Medium	 High	 Extreme				



Table E.4 (Cont'd)
Analysis of Environmental Risks

Risk Source	Consequence / Hazard	Risk with Standard Control Measures	Proposed Control Measures EIS Section Ref.
TERRESTRIAL ECOLOGY			
Clearing of native vegetation within the Project Area.	Significant impacts upon habitat for terrestrial fauna species, threatened or rare native vegetation or vegetation communities and biodiversity values.	16 (A4)	6.5.4
	Injuries to native fauna during clearing / earthworks.	8 (C4)	
Extraction operations.	Indirect impacts to fauna communities due to noise / blasting etc.	5 (D4)	6.5.4
Transportation of extracted and/or processed rock within the extraction area.	Injury or death to wildlife crossing the internal haul road.	3 (E4)	
Inappropriate maintenance/management of weeds and pest species.	Weeds and/or pests impede successful rehabilitation.	13 (C3)	
	Weeds and/or pests propagating from the Project Area impact the productivity of surrounding agricultural land or the biodiversity values of retained native vegetation communities.	5 (D4)	
ABORIGINAL CULTURAL HERITAGE			
Removal or destruction of currently unidentified Aboriginal sites and/or artefacts.	Loss of Aboriginal cultural heritage values and reduction of in situ archaeological record.	6 (E3)	6.6.6
HISTORIC HERITAGE			
Authorised removal of known locally significant historic heritage sites.	Loss of heritage items relating to the "Belmont" residence and related structures.	20 (A3)	6.7.7
Impact of extractive activities to the visual catchment of "The Hill Farm Complex" heritage item.	Reduction to heritage values for "The Hill Farm Complex" as a result of changes to the visual landscape associated with the removal of the "Belmont" residence and quarrying activities.	11 (A5)	
VISIBILITY			
Construction of amenity barriers – predominantly at the start of Stage 7a	Amenity impacts arising from the planned change in content and composition of views from the "Figtree Hill" residences that exceed those identified in the negotiated agreement with the owners of "Figtree Hill".	8 (C4)	6.4.4
	Amenity impacts arising from the minor change in content and composition of views from privately-owned residences 1.1km to 2.4km east of the Project Area.	4 (C5)	
Operations within the extraction area.	Amenity impacts through the planned change in content and composition of views from the "Figtree Hill" residences that exceed those identified in the negotiated agreement with the owners of "Figtree Hill".	8 (C4)	

	Low		Medium		High		Extreme
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Table E.4 (Cont'd)
Analysis of Environmental Risks





Risk Source	Consequence / Hazard	Risk with Standard Control Measures	Proposed Control Measures EIS Section Ref.
VISIBILITY (Cont'd)			
Operations within the extraction area. (Cont'd)	Amenity impacts through the change in content and composition of views from privately-owned residences 1.1km to 2.4km east of the Project Area.	11 (A5)	6.4.4
	Visibility of earthmoving equipment operating within the Project Area.	8 (C4)	
SOIL AND LAND CAPABILITY			
Inappropriate soil management.	Inadequate soil available for rehabilitation purposes leading to less successful rehabilitation and increased rehabilitation costs and maintenance.	5 (D4)	6.8.6
	Degradation of soil in stockpiles leading to less successful rehabilitation and increased rehabilitation costs and maintenance.	3 (E4)	
	Erosion and loss of materials from soil stockpiles.	5 (D4)	
Changes to land uses impacting soil and land resources.	Reduction of the land and soil capability class within the Project Area.	11 (A5)	
SURFACE WATER			
Construction of amenity barriers.	Reduction in water quality in local watercourses within the Rocklow Creek catchment.	8 (C4)	6.9.4
Topsoil and subsoil stripping.	Reduction in water quality in local watercourses within the Rocklow Creek catchment.	8 (C4)	
Capture of surface water catchments.	Reduction in flows in surrounding watercourses.	11 (A5)	
Spillage/release of diesel.	Water quality impacts, if not contained within the Project Area.	6 (E3)	
Climate change.	Increased intensity of rainfall events.	7 (B5)	
GROUNDWATER			
Interception of groundwater table by extraction operations.	Reduced groundwater levels and availability of groundwater for existing groundwater users.	5 (D4)	6.10.4
	Reduced baseflow contribution to local watercourses within the Rocklow Creek catchment.	8 (C4)	
Extraction Operations.	Reduced flows in surrounding springs	2 (D5)	
Reduced baseflow contribution to nearby groundwater dependent ecosystems.	Impacts to groundwater dependent ecosystems.	3 (E4)	

	Low		Medium		High		Extreme
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Table E.4 (Cont'd)
Analysis of Environmental Risks

Risk Source	Consequence / Hazard	Risk with Standard Control Measures	Proposed Control Measures EIS Section Ref.
HAZARDS AND HAZARDOUS GOODS			
Fire initiated on site.	Off-site vegetation burnt and/or property or infrastructure damage or destruction.	10 (E2)	6.11
Fire initiated off site.	On-site vegetation burnt and/or equipment damage or destruction.	10 (E2)	6.11
Transportation of explosives,	Potential for accident on site or off site.	10 (E2)	6.11.3
On-site storage of explosives.	No explosives would be stored on site.	Not Applicable	6.11.3
On-site storage of flammable liquids.	No flammable liquids would be stored on site.	Not Applicable	3.6.5
TRAFFIC AND TRANSPORT			
Operational traffic on the public road network.	Additional operational traffic results in increased safety risks for motorists.	6 (E3)	6.12
	Additional operational traffic results in increased travel time for motorists.	3 (E4)	6.12
	Deterioration of road condition and serviceability as a result of increased traffic.	3 (E4)	6.12
ECONOMIC			
Amenity impacts from extraction operations.	Localised impacts negatively affect property prices.	5 (D4)	6.13.4
	Restriction of business opportunities for surrounding rural landowners	8 (C4)	
SOCIAL			
Extraction operations.	Changes to existing visual amenity for residents within surrounding properties.	11 (A5)	6.14.3
	Creation of noise, vibration and dust that reduces social amenity.	8 (C4)	
	Anxiety created by changes within Project Area.	8 (C4)	

 Low	 Medium	 High	 Extreme
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