

Delta Electricity
Western Region

Construction
Environmental
Management Plan

December 2011

Report ref:
**Kerosene Vale Ash
Repository
Stage 2B
Wallerawang Power
Station**

Rev 05



Kerosene Vale Ash Repository Stage 2

Construction Environmental Management Plan

Construction Environmental Management Plan

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EXECUTIVE SUMMARY

Conneq Industrial Infrastructure (Australia) Pty Ltd has developed this document in consultation with Delta Electricity with the approval of the nominated Environmental Representative as part of the ongoing management requirements for the Kerosene Vale Ash Repository (KVAR) Stage 2 Department of Planning (DOP) approval.

DOP Conditions of Approval (CoA) for KVAR Stage 2 include provisions for ash placement and its associated operations. Other works approved included construction activities associated with an assessment of coal resources and a proposed realignment of the Sawyers Swamp Creek, with creek realignment being part of necessary stabilisation earthworks to the northern wall of original Kerosene Vale Ash Dam, should coal extraction proceed.

As outlined in the Operation Environmental Management Plan (OEMP) for the project, the original intention was for Centennial Coal to extract resources, which would enable:

1. An excavation area that could be filled with ash
2. Use of overburden to cover the ash repository (as permanent capping)
3. Win material to construct a stabilisation berm.

In consideration of the Department of Planning and Infrastructure's (DoP) Condition of Approval (CoA) 2.2 the intention was that Centennial Coal would develop an area for ash placement through extracting coal (i.e. creating a space in which Delta could dispose of ash) and other materials for use within the repository site. Upon completion of coal extraction, it was intended that Delta would seamlessly begin placing ash into the area Centennial Coal had created in the process of extracting the coal, during which time the stabilisation berm would have been constructed. However, this did not occur- Centennial relinquished the right to extract coal from the 2B area, and therefore did not develop the area by the time that the ash placement area was needed.

The direct result of not taking the coal resource from the area was that:

1. A review was undertaken of the geotechnical aspects associated with placing ash onto an area previously assessed as needing a stabilisation berm and a design was developed that reduced batter slope and therefore allowed a greater setback of the maximum depth of ash. Delta's structural engineers reviewed the ash placement plan and determined that moving the northern boundary 50m from the dam wall, with ash at a depth of no more than 12m, removed the necessity for the stabilisation berm, although some ash placement capacity would be lost.
2. Without works for the stabilization berm there would be no need to realign the creek as previously approved. In this respect a cost /benefit analysis also determined that a realignment of the creek was an undesirable course of action, given a minimal loss of ash placement storage.
3. The ash-placement strategy changed from a three-staged plan: (i) commencing with coal extraction followed by (ii) ash placement into that excavation and then (iii) ash placement onto the Kerosene Vale Ash Dam: to a two-staged approach (Cotterill, 2011 – Figure 1) with (i) ash placement onto the Kerosene Vale Ash Dam as proposed by the new design (Stage 2A) and then (ii) to the former site of coal excavation denoted as Stage 2B. The works within the Stage 2B area are of concern within this document.

We present for the Department of Planning and Infrastructure this Construction Environmental Management Plan (CEMP) for approval, including the detail of earthworks associated with the operation of ash placement at the Kerosene Vale Ash Repository.

We consider that the majority of earthworks as outlined within this plan will be completed in a time frame of 4-9 months with a final completion time-frame for all projects of about 12 months. There is however a critical issue in that the Stage 2A ash storage area will be depleted by February 2012 and to ensure a continuing ash placement operation the Stage 2B scope of works require immediate attention. Ash tonnages recorded indicated that at September 2011 ash placement in KVAR Stage 2A had reached 90.5% of the available storage space.

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This document has been prepared by Conneq Industrial Infrastructure (Australia) Pty Ltd, at the request of and exclusively for the benefit and reliance of its Client Delta Electricity.

This report is not a certification, warranty or guarantee. It is a document scoped in accordance with the requirements for environmental management as outlined by State Government project approvals associated with extension of the existing Kerosene Vale Ash Repository Area to permit the continued disposal of ash generated by the Wallerawang Power Station.

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**CONSTRUCTION ENVIRONMENTAL MANAGEMENT PLAN (CEMP)
KEROSENE VALE ASH REPOSITORY (KVAR)
WALLERAWANG POWER STATION (WPS)
2011**

1 INTRODUCTION

1.1 PROJECT SCOPE

This document was prepared for and in consultation with Delta Electricity (Western Region) by Conneq Industrial Infrastructure (Australia) Pty Ltd. The scope is to provide guidance for ash placement operations and construction works as provided by State Government planning approvals and specifically outline the environmental management practices and procedures to be followed during construction. This CEMP also contains a project scope for conformance to the ISO 14001 standard for Environmental Management Systems to cover current site requirements associated with the Kerosene Vale Ash Repository Stage 2, as approved by the Department of Planning.

This Construction Environmental Management Plan (CEMP) was developed in consultation with Delta Electricity as well as the nominated Environmental Representative Environment Manager- Western Nino Di Falco and includes provisions for site details, environmental impacts and management, as well as risk management and mitigation. The revision 03 reflected the detailed correspondence between the Department of Planning and Delta Electricity as noted in Appendix E. This revision 04 provides detail primarily to sections 2.2, 2.3 and 2.4 (traffic, noise, erosion and sediments respectively).

This submission provides information concerning the site, project, changes to the original project specification that are still covered by all approvals, planning and implementation. It presents a reduced scope of the original DoP approval, and primarily covers the requirements of ash placement during the second stage of operations- Stage 2B, which has a large excavation component.

The scope of excavation will achieve an equitable target for the next stage of ash repository storage with about 490,000 m³ of soil material removed. This work can be undertaken with minimal impact and influence upon the existing groundwater flow across this area. We consider that approval conditions for groundwater aspects for ash placement operations will also be met during excavation works. Reporting on these aspects will be incorporated into annual environmental reports for this project.

The scope of works as detailed within this document does not include works associated with coal extraction, a stabilization berm or realignment of the Sawyers Swamp Creek. This CEMP does include:

- A. Excavation of an area within the approved site that will enable ash placement about 490,000 m³.
- B. Management of excavated materials for water management, haulage access and site catchment closure. Set-down locations for the soil materials excavated are allocated and include:

- i. All permanent capping areas of the final form of Stage 2 as approved by DoP (Stages 2A and 2B) (Figure 1);
- ii. The development of a water management area for stormwater (clean water that has not come into contact with ash) that will include processing of water quality through a constructed wetland at a location, as previously dedicated as the Sedimentation Control Area (Figure 2) within the original Operational Environment Management Plan (OEMP);
- iii. Upgrade of an existing access road to the south of the repository as previously approved (in 2002) for KVAR Stage 1.

1.2 ENVIRONMENTAL EFFICIENCY & INTEGRITY

The environmental aspects of the works as specified were developed to align with those pre-defined by the Department of Planning project Conditions of Approval (CoA) for the Kerosene Vale Stage 2 Ash Repository Area (File S07/00001)¹ and Delta Electricity's Environment Protection Licence (EPL) 966. Both documents provide a framework of environmental management objectives to ensure the environmental integrity of continuing disposal of ash generated by the Wallerawang Power Station.

Project approval references specific environmental conditions of ash management (including beneficial uses), noise impacts, Sawyers Swamp Creek Re-alignment, surface water quality, air quality impacts, lighting emissions, construction traffic & transport impacts, heritage impacts and waste management. Requirements for environmental monitoring are included and cover the following:

- Compliance monitoring and tracking;
- Community information and complaints management;
- Environmental management; and
- Environmental reporting.

The works are associated with land generally located with Lot 5, DP 829137 in the Lithgow local government area.

1.3 ABBREVIATIONS AND DEFINITIONS

Delta Electricity (DE)

Kerosene Vale Open Cut Mine (KVOC)

Kerosene Vale Ash Dam (KVAD)

Kerosene Vale Ash Repository (KVAR), Stages 1A, 1B, 2A, 2B

Ash Placement Area (APA)

Conditions of Approval (CoA)

Department of Planning and Infrastructure (DoPI)

Feasible – relates to engineering considerations and what is practical to build.

Reasonable – relates to the application of judgement in arriving at a decision, taking into account mitigation benefits, cost of mitigation versus benefits provided, community views, and nature and extent of potential improvements.

¹Project approval document "Extension of the existing Kerosene Vale Ash Repository area to permit the continued disposal of ash generated by the Wallerawang Power Station". (NSW Government, Department of Planning File No: S07/00001) dated 26 Nov 2008.

1.3.1 Construction and Operational Definitions

Construction is defined in Schedule 2 of the Department's approval and "includes all work in respect of the project *other than* survey, acquisitions, fencing, investigative drilling or excavation, building/road dilapidation surveys, minor clearing (except where threatened species, populations or ecological communities would be affected), establishing ancillary facilities, or other activities determined by the Environmental Representative to have minimal environmental impact (e.g. minor adjustments to utilities)".

Alternatively, operation as defined in Schedule 2 of the Department's approval "means the Operation of the Project, including ash haulage, ash truck movements, ash placement and management, operation of on-site water management systems, landscaping and revegetation/rehabilitation of the site but *does not* include commissioning trials of equipment or temporary use of parts of the project during construction".

Consequently, construction management requirements are relevant to all works other than those associated with ash management operations. The environmental aspects of these activities are being managed and guided by this Construction Environmental Management Plan (Delta Electricity, July, 2011).

1.4 SITE LOCATION AND HISTORY

The site is known as the Kerosene Vale Ash Repository comprising Stage 1 and Stage 2, with Stage 2 denoted by Stage 2A and Stage 2B. The Kerosene Vale Ash Repository (KVAR) is a site located within the Sawyers Swamp Creek Valley about 2.0 km north from the Wallerawang Power Station (Figure 1). Access is via the power station through the private coal haulage road. Upon completion these repository operations within the Sawyers Swamp Creek Valley will cover about 50 ha.

Emplacement of ash in the repository has been conducted in stages - initially upon commission of the power station in 1957 the ash was managed by a wet placement to the Kerosene Vale Ash Dam (KVAD), and then later, by 1980, to the Sawyers Swamp Creek Ash Dam (SSCAD). Upon completion of coal extraction from Kerosene Vale Open Cut (KVOC) mine (circa 1950), the ash dam (Kerosene Vale Ash Dam or KVAD) was created by the placement of wet ash into the mined area to the north east of Wallerawang Power Station. Due to space restrictions, the Ash Dam was later drained and capped (c1990) in a movement toward 'dry' ash placement. Upon completion of operations, KVAD had a Relative Level (RL) of 918m with the dam wall standing at 920m RL. Dry ash storage to the footprint of the KVAD commenced after 2003 and has continued as Stages 1A, 1B and Stage 2 as Stage 2A over the capped ash dam footprint.

The KVAR Stage 2 approved area for ash placement, is located over the footprint of the former Kerosene Vale Ash Dam, and an area of natural terrain located to the south east, as shown in Figure 1 (Source: Figure 2-1 of the Kerosene Vale Stage 2 Ash Repository Operation Environmental Management Plan, April 2009). Figure 1 describes the area intended for Stage 2 ash placement operations. It is proposed that Stage 2B is conducted in line with the current staged placement strategy, and is as such divided into two operational footprints known as Stage 2A and Stage 2B. This includes the proposed sedimentation control area (Figure 2). A final form design for the Stage 2 ash repository at the completion of ashing operations has been developed and is provided as Figure 3.

The area, now known as Stage 2B is a site of natural ground with a topographic elevation difference of 20m, from RL 920 m to RL 940 m. This location was previously assessed for its potential as a coal resource, though Centennial Coal has declined to extract from the area. The RL of 940 m marks the highest point of the south-east corner of the site (Figure 2). The lowest elevation of the ash placement area is RL 920 m. This is the area from which soil materials need to be excavated.

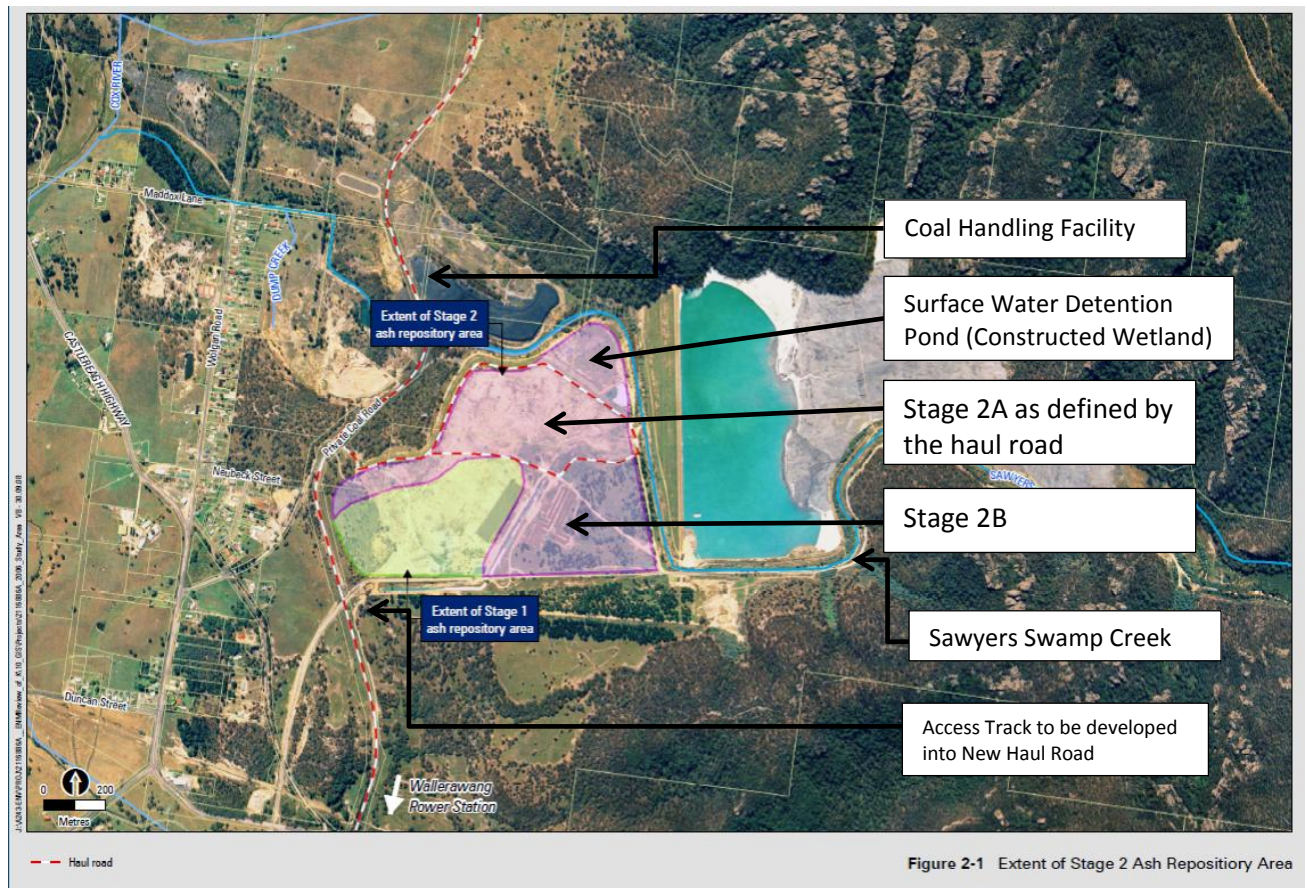


Figure 2-1 Extent of Stage 2 Ash Repository Area

Figure 1 Extent of Stage 2 Ash Repository Area

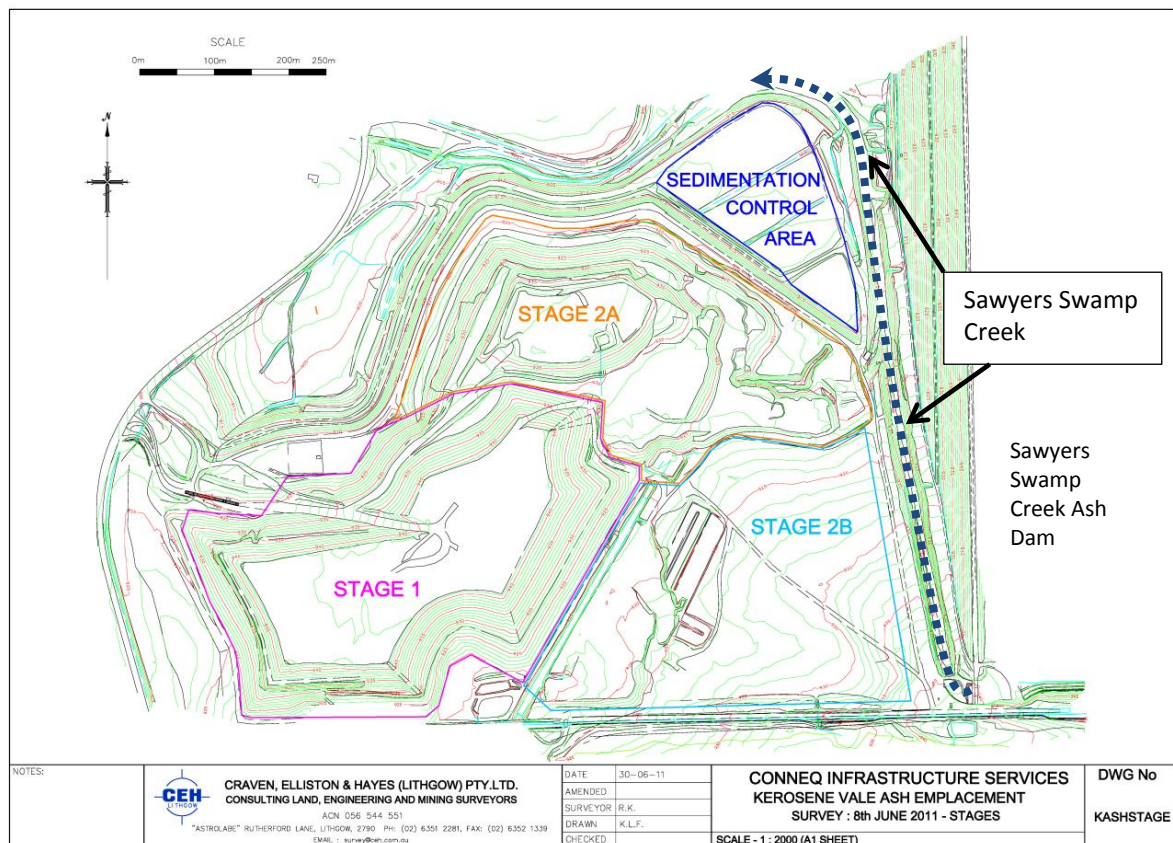


Figure 2 KVAR Stages 1 and Stage 2 (A and B)

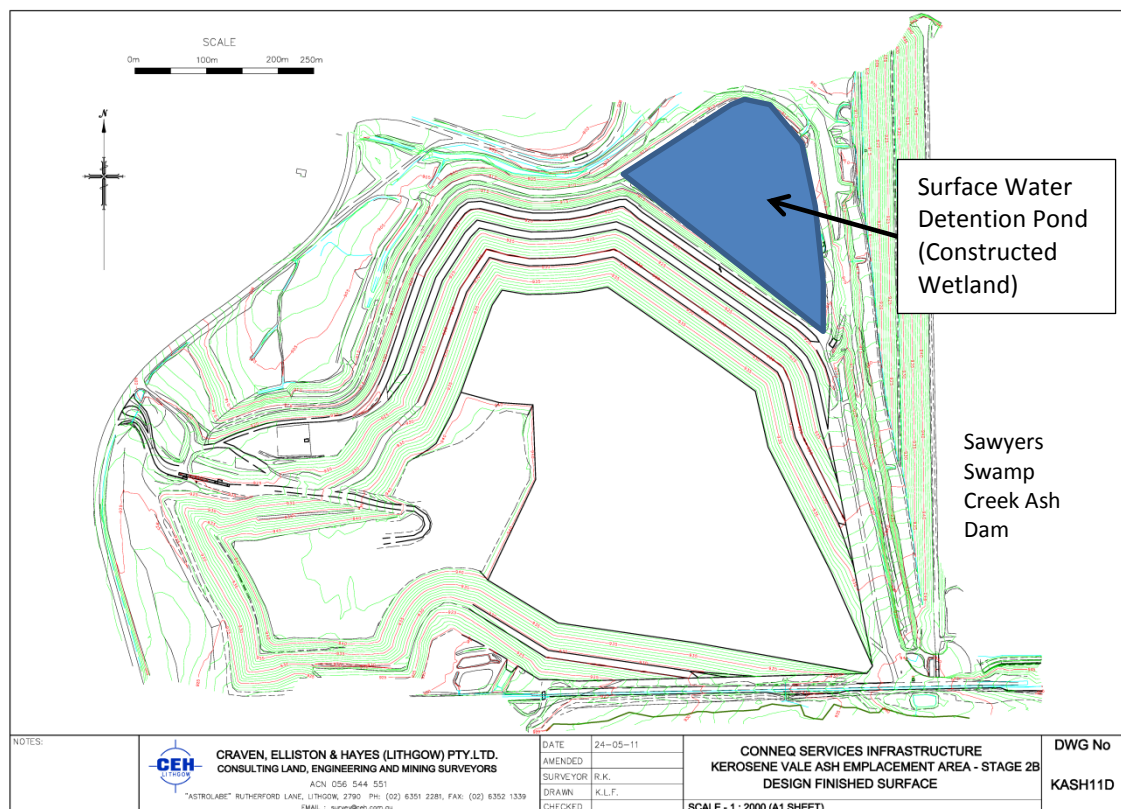


Figure 3 Final Form Ash Placement Design KVAR (Including structure of Stage 1 and 2 (A and B)).

1.5 WATER QUALITY & SITE INFORMATION

1.5.1 Location and Character

The soil and geomorphology are clay and sandy loam and sandy clay materials overlying sandstone, siltstone and some coal of the Cullen Bullen Soil Landscape (King 1992)².

KVAD is centrally located within the Sawyers Swamp Creek valley and is significantly influenced by regional groundwater flows. To the east groundwater is at an elevation of 920 m below a topographic ground surface of RL 930 m. Flow is downslope to the north and north-west beneath the KVAD and then on to Lidsdale Cut. From the south significant regional influence upon the KVAD also occurs via coal seam hydrology. Thus regional groundwater flows around and beneath KVAD occurs from the south side of KVAD as well as from upslope and east at Sawyers Creek Ash Dam. The flows from the south are fed along the Lithgow coal seam which is at an elevation between RL 900 and 903 m. These flows fill a backfilled excavation from the Lithgow coal seam as incorporated within the KVAD structure. Thus KVAD groundwater occurs as regional flows from the east and south, detained by the KVAD structure with flow through the KVAD walls on the west and northern sides through toe drains. Toe drains of KVAD as outflow of groundwater are connected into pipework which currently feeds into Lidsdale Cut, which in future, will be redirected for reuse. Consequently the plan for groundwater from the KVAD and KVAR site is collection and treatment, with reticulation around the site.

² King D.P (1992). *Soil Landscapes of the Wallerawang 1:100 000 Sheet* Report, Department of Conservation and Land Management, NSW.

Previous project modelling during 2006-2007 drought conditions indicated groundwater levels within the KVAD were at RL 911 m. However, since this time, a combination of rainfall and ash placement has resulted in water levels in the north and western side of KVAD to rise to a Relative Level of 916.7 m. Conversely, the water under KVAD beneath the Stage 1 area is higher at RL 921.7 m along its east side, being adjacent to the return water canal. Thus, groundwater knowledge has become an important component for the ash repository management.

As a consequence of the regional groundwater flows beneath KVAD and the Stage 2A area, the Stage 2A ash emplacement works required subsurface drainage works within the KVAD ash and replacement of an ash bund with an earth bund. The subsurface drainage was designed to assist with reducing water levels in KVAD. Geotechnical advice suggested the earth stability bund should be constructed to a finished relative level (RL) of 923 m before completion of final batter surfaces. Soil material for the stability bund for the Ash Dam is part of the volume of material to be excavated from the Stage 2B area (Table 3).

At present there is a significant distinction between the water qualities of different sources across the repository. In particular KVAD groundwater typically has a very low pH, with very high electrical conductivity and sulfate levels. Consequently groundwater management needs to include separation from catchment and site runoff. As such, a water management area that will include stormwater containment in the form of a constructed wetland would be located on the north side of the ash repository (Figure 1 and Figure 3). This comprises one part of the catchment management plan as outlined in section 1.9 of this document.

1.6 PROJECT STATUS: KVAR

The project status as outlined in sections 1.6.1 to 1.6.6 are those associated with:

1. Project approval
2. Ash placement Stage 2A in December 2010
3. Ash placement Stage 2A in June 2011
4. Stage 2B as at September 2011
5. Alternate access road as previously approved
6. Water management area

1.6.1 Project Approval

The Minister's Conditions of Approval (CoA) for Kerosene Vale Ash Repository (KVAR) includes provisions for ash management, a provision to facilitate assessment of the viability of coal resources in the project area, with the consequent provision for staging of ash placement activities, and for the realignment of Sawyers Swamp Creek. Ash placement within the Stage 2 project commenced in April 2009, but there was no co-incident coal extraction works commenced and therefore no material was made available for a stabilisation berm. Consequently, an assessment conducted by Delta's engineers determined that moving the northern boundary of ash placement at least 50m from the dam wall, with ash at a depth of no more than 12 m, would remove the necessity for the stabilisation berm and a design was accepted. In parallel, a monthly monitoring program was implemented to test the stability of the dam wall using survey assessment techniques. This monitoring was conducted for 12 months. Documentation associated with confirmation of the geotechnical advice is provided in Appendix C. Stability monitoring results are provided in Appendix D. Design plans are provided in Appendix E (Ref: Kerosene Vale Ash Placement – Plan Showing Location of Design Sections (Dwg No: KASH0510xl) and Design Cross Sections (Dwg No: KASH0710XA-K).)

As the stabilisation berm was no longer required, the ash placement design had been reviewed and it was recommended that setbacks be integrated into the operational management plan. These

design plans for the ash repository construction were submitted within the process of operational management as per Appendix E.

1.6.2 Ash Placement Stage 2A- December 2010

Ash placed by Delta Electricity as at December 2010 to Stage 2A was 0.843 Mt (dry tonnes). This was 56% of the estimated 1.5 million tonne placement capacity of Stage 2A (Craven Elliston & Hayes Surveyors). The time frame for this completion date is based on average estimated tonnage at 45,000 tonnes per month. This indicates a maximum of 15 months available placement, which gives a predicted close-out date of May 2012.

The following photographs illustrate the area for Stage 2B works and its relationship to current operations:

- Photograph 1 shows the view of the south side of Stage 2A, works for subsurface drainage within KVAD and the location of the central dirty water containment;
- Photograph 2 shows a view from Stage 1A looking to Sawyers Creek Ash Dam to the east and across to the southern boundary line as defined by the ash pipeline and return water canal. The area as described in Figure 1 covers about 13 ha. Bore hole logs indicate that soil material covers the site across an average depth of 2 m. This will provide 260,000 m³ of soil material; and
- Photograph 3 shows the beginning of soil excavation at the location of the return water canal and ash pipelines on the southern boundary in the distance.



Photograph 1 View from Stage 1B looking east to Sawyers Swamp and Kerosene Vale Ash Dam.



Photograph 2 View from Stage 1B looking to the south east corner of Stage 2B up to RL 940 m.



Photograph 3 View taken from Stage 1B looking south east across the area for Stage 2B placement.

1.6.3 Ash Placement Stage 2A - June 2011

The ash tonnage placed by June 2011 to Stage 2A was 1.15 Mt (dry tonnes) and 76.6% of the estimated 1.5 million tonne placement capacity of Stage 2A (Craven Elliston & Hayes Surveyors). The time frame of the Stage 2A completion date has as such been brought forward to February 2012, given that ash is being generated at a higher volume (approximately 51,000 tonnes/ month), which leaves 6.8 months available from the end of June 2011 for placement into the Stage 2A ash footprint.

Photograph (4) below shows the development of the ash repository Stage 2A works as at June 2011:



Photograph 4 View looking west back to KVAR showing Stage 1 (A & B) and Stage 2A ash placement.

We present a summary of works deemed necessary to meet general operational requirements for ash placement for the coming months in Table 1 below.

Table 1 Current Operational Works for the Kerosene Vale Ash Repository Stage 2A

Item	Description
1	Ash haulage and ash placement, repository management, dust suppression, water management to Stage 2A (as current placement)
2	Monitoring all subsurface drainage installations within the KVAD to accommodate the site's regional groundwater impacts including water level and water quality as part of routine monthly water monitoring procedures (refer to Annual Environmental Management Report for KVAR Stage 2 operations submitted to DP&I in October 2011 for said procedures).
3	Continue the established monitoring program of the KVAD wall drainage and dam wall stability functions
4	Commence planning for Stage 2B earthworks to ensure ash placement area is ready in January 2012. This includes planning for the removal of soil material from the Stage 2B site to enable an additional 490,000 m ³ ash storage, and development of an area for ash placement
5	Implementation of earthmoving activities, including a scope of earthworks as defined in Table 2
6	The re-development of future surface water requirements to enable a sustainable closure for the KVAR Stage 2 ash repository as future contributor to the Cox's River catchment area

The scope of earthworks for Stage 2A project requirements are listed in Table 2. This list includes the operational requirements needed in order to maintain a safe and stable operational area - such as the replacement of ash with earth materials to allow for a bund to surround the ash placement on the north-west side. This bund will be constructed as a precaution associated with groundwater flows encountered. Specific details for structural aspects for Stage 2A Earth Bund construction are as outlined by Golder Associates Report 066221138 016 Rev0 (dated 4/07/11).

A typical operational process is included as Appendix I in the form of a flowchart.

Table 2 Scope of Works for Stage 2A Project Requirements

Item	Description
1	The construction of the elevated bund around the perimeter of the KVAD footprint to a finished level at RL 923 m. Upon completion of the soil bund, ash will be stored against this boundary. The bund finished level of at 923 m will meet the upslope topography within the Stage 2B site.
2	When the 923 m high soil bund is completed then Stage 2A ash placement will be continued to the eastern boundary. This work will require management of surface runoff from the ash placement area, and is to be directed to the existing return water canal.
3	Permanent capping of all finished areas of exposed ash with subsequent revegetation programs undertaken.
4	For the current ash repository and linking into the second (Stage 2B) all works will be managed to protect the existing riparian zone of the Sawyers Swamp Creek.
5	Construction of water management storages for the north part of the KVAR catchment.

1.6.4 Stage 2B as at September 2011

As noted previously, the remaining storage area for Stage 2A ash emplacement will be fully utilised by February 2012. Consequently, the Stage 2B project now needs urgent development. At the end of September 2011, ash placed within the repository was recorded at 90.5% of the overall design capacity.

Under the initial KVAR project proposal, works to start Stage 2B ash placement would have been performed through the process of coal extraction, but that did not eventuate. Consequently, the

works program now requires the removal of topsoil and subsurface materials so that a maximum ash placement capacity can be achieved, as well as materials made available for other site requirements. The scope associated with materials excavation is presented in Table 3 (below). Material volumes are presented in Table 6 (Section 2.1).

Table 3 Earthmoving Component (KVAR) Stage 2

Item	Description		Reference
1	Stage 2B Preparation	Earthmoving of 490,000 m ³ soil material to develop the footprint for the Stage 2B ash placement as per the final form plan. This work is based on the current topography of stage 2B area and an excavation plan.	Figure 2 Appendix A Appendix B
2	Permanent capping	Material set-down for permanent capping to the final form of Stage 2A, within the repository footprint. Volumes for these set-downs are provided.	Table 4
3	Bund Wall	Material set-down as part of the structural stability plan for Stage 2A ash placement also within the repository footprint.	Table 4
4	Water Management Area	Material set-down for development of a water storage facility – a sediment basin and storage to achieve water quality as prescribed.	Table 4
5	Material stockpile	Stockpile of remaining soil materials along the southern boundary of the KVAR.	Table 4

All earthworks and excavation requirements will be conducted well within the stipulated hours of operation for the repository as in the original Conditions of Approval document. Hours of operation for all construction activities will be from 7am – 4pm as a maximum. Where the noise generated through the activities as outlined above appears to be in excess of reasonable levels, mitigation measures will be taken. These may include the reduction of construction hours where possible, and/or the repair or replacement of equipment. Where construction (i.e. earthmoving) activities are deemed to be disruptive to the local community or nearby residents, Delta Electricity will endeavour to liaise with affected individuals as soon as practicable.

Given that subsurface conditions do not require rock-breaking or blasting activities and the rock layer separating the repository from the coal seam is below the required depth for the Stage 2B area, it is not anticipated that noise will exceed allowable levels. Routine noise monitoring as outlined in Section 2.3 will be implemented to ensure this.

1.6.5 Alternative Access – Development of Previously Approved Access Road

Current access to Stage 2B requires traversing either the Stage 1 or Stage 2A areas. An upgrade of the existing access track into a new haul road will provide more direct access to the repository area from the south, and was originally planned and assessed in the Review of Environmental Factors for the Reinstatement of Dry Ash Placement in 2002 (for KVAR Stage 1). The upgraded road would also significantly reduce travel time, associated traffic noise, and minimise dust, and would be an upgrade of an existing access track as per department approval. The strategy for this project is as outlined in Table 4.

Table 4 New Haul Road Access Planning, Development and Construction

Ref #	Action	Reference	Timing	Responsibility
1	Development and construction of an alternate ash haulage route to the south of the stage 2B ash placement area, by upgrading/augmenting an existing access track.	Review of Environmental Factors	Pre construction	Delta Electricity (DE)
2	Initial feasibility design by surveyor, estimation of cut and fill.	Craven Elliston & Hayes	Pre construction	DE
3	Discussion with local council and department of planning	Lithgow City Council	Pre construction	DE
4	Final design and construction considerations confirmed and then undertake assessment for water and sediment control, temporary and permanent fixtures	Soil Conservation Service	Pre construction	DE

1.6.6 Water Management Area (Constructed Wetland)

An area to the north of the site (Figure 3) was designated for water management. Planning of this aspect is provided herein, including the following:

- The site area comprises a footprint of about 5 ha. It has subsurface conditions are that are of the original ash dam constructed within the RL elevation of 910 m as a footprint that is directly bounded by the Sawyers Swamp Creek to the east, north and west. To the south is the constructed wall of the ash dam and the Stage 2A ash repository;
- We propose to construct a water control area comprising sediment basin, wetland storage and outlet detention to service the catchment of the Stage 2A and Stage 2B ash repository. These structures will be built within an earth construction area of maximum 47,500 m², with a fill volume of approximately 233,500 m³ (Figure 5);
- This structure will capture all water from final batter surfaces that have soil capping. Construction will consume 280,000 m³ of the excavated material from the Stage 2B area within a footprint inside a 50 m boundary from the Sawyers Swamp Creek. The object of installing this water management area is to achieve the requirements for water quality reporting to the Cox's River catchment, and will collect clean water only, i.e. water that has not come into contact with ash;
- The project planning includes geotechnical design and construction methodology incorporating additional subsurface drainage for the upslope ash dam;
- Works that will allow for a rehabilitation and revegetation plan to complement the existing riparian corridor of the Sawyers Swamp Creek; and
- Construction will include the use of transport and earthmoving equipment, the management of water and sediments and the rehabilitation of soil areas to ensure regeneration of vegetation. Details of this work will be incorporated into the construction management sub-plan for erosion and sediment control.

Figure 4 presents the concept plan as developed for this project (Water Management Area – Kerosene Vale Ash Emplacement Area – Stage 2B; Dwg No: KASH11DW).

Table 5 provides quantities for the catchment area calculations as developed for the final form as provided in Figure 3.

Table 5 Calculated Catchment Areas for the Stage 2 KVAR

Catchment	Site	Area (ha)	Sub Total	Total
Top surface (North)	Stage 1-2 (North)	2.6		
	Stage 2A (North)	6.0		
	Stage 2B (North)	9.6	18.2	
Top surface (South)	Stage 1 (South)	3.8		
	Stage 2B (South)	2.3	6.1	24.3
Laybacks (North) – includes bench adjacent to perimeter road.	Some Stage 1, all of Stage 2A and part of Stage 2B	3.4		
Laybacks (South)	Stage 2B	0.35 ha	3.75	3.75
Batters (North)	Some Stage 1, all of Stage 2A and part of Stage 2B	9.3		
Batters (South)	Stage 1 (South)	8.2		
	Stage 2B (South)	2.45	19.95	19.95
Perimeter road	West of discharge point	0.5		
	South of discharge point Stage 2B	0.25	0.75	0.75
Compound area		1.3	1.3	1.3
Foot print of water control area		5.0	5.0	5.0
				55.0

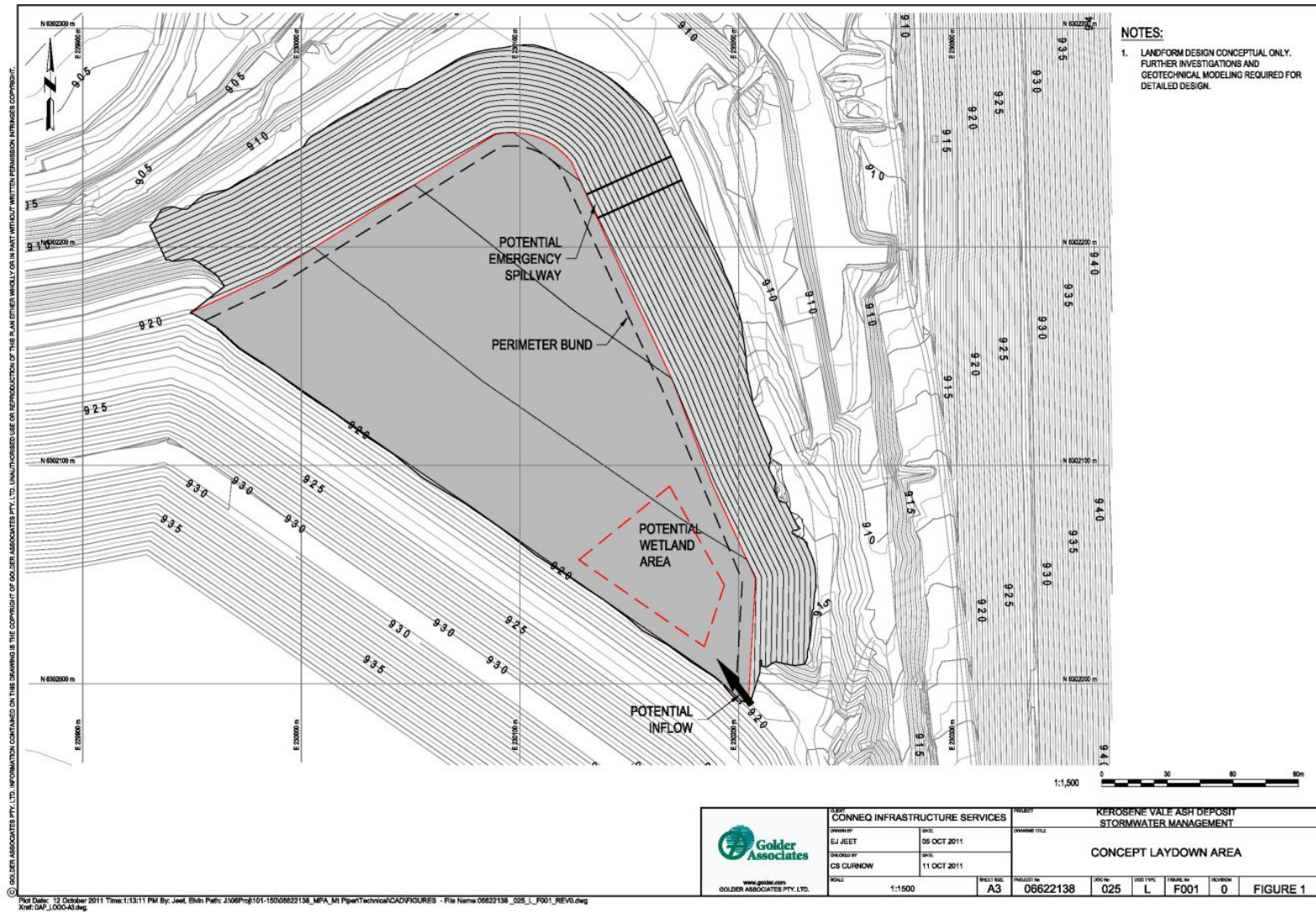


Figure 4 Concept plan for water management area

2 CONSTRUCTION ENVIRONMENTAL MANAGEMENT (EARTHWORKS)

This Construction Environmental Management Plan (CEMP), presents detail associated with Stage 2B Kerosene Vale Ash Repository (as approved for ash placement operations) for works required as part of standard ash placement operations - such as construction of water storage areas, haul and access roads, excavation of site materials and the use of those materials to manage the final ash repository landform for revegetation.

As noted in Section 1.6.3 above, since the commencement of ash placement for KVAR Stage 2 in April 2009 the need to realign the course of Sawyers Swamp Creek has *not* been realised. Accordingly, the environmental management of Stage 2 ash placement operations do not now include needs outside what is required under ordinary operating conditions. However, management objectives within the original DoP Conditions of Approval cover the specific aspects (i) traffic, (ii) noise and (iii) erosion and sediment control associated with major construction activities. We have incorporated these aspects into the project scope as redefined.

2.1 EXCAVATION PLAN

Excavation operations needed for the ash repository were summarised in Table 3 with set downs volumes detailed in Table 6 below. These soil materials estimates include a calculation for all soil materials required for Stage 2A close-out, capping for the Stage 2B ash repository and the materials estimated for the water management area. The total volume allocated directly is 449,903 m³ from a total of 490,000 m³. The balance will be used for other site management requirements.

Table 6 Excavation and Materials Set-down Volumes for works within the Stage 2 KVAR

		Total Material Source (m ³)	490,000
		Estimated Total Applied (m ³)	490,000
		Material Balance	0
Summary			Est Gross vol m ³
Set-down	1	Stage2A Ch 600-872 Layback	4,115
	2	Stage2A Ch 600-872 Permanent Capping (1m)	9,750
	3	Stage 2A - 923 m bund construction Ch 875 to Ch 1200	48,263
	4	Stage 2A - Batters & Laybacks Ch 895-1200 Distance Permanent Capping to RL 940 m – 923 m = 17 m	8,775
	5	Stage 2A Top Surface 9 ha (m ²)	90,000
		Sub - Total earth materials for Stage 2A works	160,000
	6	Stage 2B Batter, Laybacks, Top surface	9,000
	7	Sub - Water Management Facility to North Side of KVAR	280,000
	8	Material to Stockpile	40,097
		Total Accounted	449,903

2.2 CONSTRUCTION TRAFFIC MANAGEMENT SUB-PLAN

Regulatory requirements for traffic impacts for project works associated with necessary Stage 2B construction are as outlined by DOP CoA 6.3(a). The aim of this Traffic Sub-Plan is to manage construction traffic impacts by identifying vehicle volumes and haulage routes, road closures or traffic detours, detail for driver behaviour along haulage routes with compliance with the document Procedures for Use in the Preparation of a Traffic Management Plan (RTA, 2001). This is relevant to works as outlined (Table 1, items 4, 5, 6) and aspects of earthmoving (Table 2, items 1-6).

Planning for construction traffic needs to address the aspects as defined in Section 6.3 of project approval. The following table addresses Conditions of Approval 6.3a (i – iv). Further detail is contained in the Typical Operational Processes (Appendix I).

Condition of Approval	Proposed Actions
i) Identifying construction vehicle volumes (construction staff vehicles, heavy vehicles and oversized loads) and haulage routes.	<ul style="list-style-type: none"> Site construction staff light vehicles daily to and from site will include 6 operational personnel. Site construction vehicles will be transported to site and removed from site once only by a low loader truck or driven to site as registered vehicles. Site earthworks vehicles transported will include one D7 Dozer, one D11 Dozer, one 35 tonne Excavator, and two 30 tonne Tippers (5 earthworks vehicles). Only the D11 Dozer is classed as 'oversize' and requires an individual transport permit which will be supplied by the plant hire company. The D11 Dozer requires 2 'wide load' escort vehicles. Site construction vehicles driven to site include one Water Cart, one Grader, and one Fuel and Maintenance vehicle. These are all NSW road registered with transport by the haulage contract under an annual permit Public roads accessed during transportation to and from site are identified as main roads including the Castlereagh and Great Western highways. These roads do not have weight limits. No residential streets will be accessed other than when entering or exiting the premises of the plant hire contractors. Site location is 2km from a public road (Castlereagh Hwy) and is accessed from the private coal haul road (approx. 0.5km) within the Ash Repository Area (ARA). <p>Earthmoving vehicles will remain within the work area until works contracts are completed.</p>
ii) Identifying any road closures and/or traffic detours during the haulage of oversized loads as agreed to by the relevant roads authority.	<ul style="list-style-type: none"> Site earthworks equipment and vehicles as listed above will be transported to the site along public roads accompanied by escort vehicles as detailed. No road closures will be necessary based on the permits required for each vehicle. The RTA will be notified by the plant hire contractors according to their responsibilities under law for the D11 dozer with records kept for transport of other vehicles under annual permit

Detailing a Construction Vehicle Code of Conduct to set driver behaviour controls to minimise impacts on the land uses along haulage routes (including noise minimisation measures).	<ul style="list-style-type: none"> The Fly Ash and Furnace Ash Haulage procedure for Kerosene Vale will apply to Stage 2B activities (refer Appendix K: Work Procedure document 'Fly Ash and Furnace Ash Haulage Procedure', document number WW-PC-712.6.1).
iii) Complying with the document Procedures for Use in the Preparation of a Traffic Management Plan (RTA, 2001).	<ul style="list-style-type: none"> The Traffic Management Plan for KVAR Stage 2B construction activities involves the engagement of appropriately licensed contractors. The transport to site of the D7 Dozer, 35 tonne Excavator, and two 30 tonne Tippers is covered by annual permits through the hire company. This permit covers a specific area, including regional NSW.

2.2.1 Construction Vehicle Volumes

Effective site management requires construction vehicles minimal use of local roads, adhere to nominated haulage routes and adhere to a Construction Vehicle Code of Conduct (CoA 2.36).

The machinery on site will be an excavator (30 tonne), two dump trucks (40 tonne), a D11 and a D7 dozer and road grading vehicles. These will require initial haulage by truck. Access to the site is via the coal haulage road and through the formal APA access.

Daily support vehicles will include fuel and maintenance trucks and a water cart. Daily workers vehicles will also access the repository area.

2.2.2 Road Closures or Traffic Detours

The RTA will be notified of any road closures and or traffic detours necessary for the haulage of oversized loads.

2.2.3 Construction Vehicle Code of Conduct

A driver vehicle code of conduct shall be incorporated into site management details, with the aim of minimising impacts on the land uses along haulage routes.

2.24 Relevant Environmental Aspects

2.2.4.1 Air Quality Monitoring

All activities on the site shall be undertaken with the objective of preventing visible emissions of dust from the site as set out in CoA parts 2.33-2.34.

Static dust monitoring is to be incorporated within the existing monitoring program for dust across the repository ash placement operations.

2.2.4.2 Lighting Emissions

Lighting controls to comply with Australian Standard AS4282 1997 – Control of the Obtrusive Effects of Outdoor Lighting (CoA 2.35). Procedures for lighting implementation and controls are to be integrated into the provisions for ash placement operations, but with consideration to operational hours for the project works associated with construction as set out in section 2.1.1 of this document.

2.2.4.3 Heritage Impacts

All construction and earthworks personnel are to be educated on their obligations in respect of the protection of Aboriginal and non-indigenous heritage sites and items (CoA part 2.37-2.38).

General project approval has included the previous statements about cultural heritage (See report prepared for Parsons Brinkerhoff by V. Hardy. Kerosene Ash Repository Stage 2 - Preliminary Archaeology and Heritage Assessment, Nov, 2006). General procedures associated with cultural heritage should be developed for this site.

2.2.4.4 Waste Management (CoA parts 2.39-2.41)

Site management of wastes is guided by the EPL 766 requirements. No wastes other than those as stated on the licence approval are to be kept on the site. All wastes associated with construction including fuels and oils will need to be removed from the site.

2.2.5 Traffic Management Procedure

The scope of traffic management for works at the KVAR site includes:

- All vehicle access to the repository site is via the private coal haulage road.
- The private coal haulage road is accessed from the Wallerawang Power Station site.
- Heavy vehicles, long and wide loads will access the site via the ash repository entrance accessed from the private coal haulage road.
- Support vehicles for fuel and maintenance will also access the site via the coal haulage road. Therefore there is no need for private or business vehicles to use any residential or public roads other than as general traffic from the Castlereagh Highway turning to the power station site.
- Workers vehicles will also access where necessary, as for support vehicles. All onsite traffic and personnel are required to keep records of their presence within the ash repository area. Records are to be kept on a daily basis.
- Communication will be by UHF radio on channel 19 or channel 15.
- Support vehicles are required to have flashing lights.
- All onsite haul roads are to be 12 m unless otherwise identified.
- Site access protocol information will be provided upon site induction.

2.2.6 Traffic Monitoring

A record of the traffic generated by associated works at the KVAR is to be developed. This should be consistent with the assessment for noise as outlined by Table 7.

Table 7 Proposed Traffic Monitoring Assessment

Site Undertaking
Normal Operations as Ash Placement
Earthworks Operations to develop Stage 2B
Earthworks Operations to develop Surface Water Structures
Earthworks Operations to develop New Haul Road by upgrading existing access track
Monitoring to occur when site practices change, with reporting defined as above.

2.3 CONSTRUCTION NOISE MANAGEMENT SUB-PLAN

Monitoring and mitigation for noise impacts for project works associated with KVAR Stage 2B construction are as outlined by DOP CoA 2. -2.25. The aim of this sub-plan is to detail how construction noise impacts would be minimised and managed.

The following list addresses Conditions of Approval 6.3b) i – v.

Condition of Approval	Proposed Actions
i) Details of construction activities and an indicative schedule for construction works.	See Appendix J – Indicative Work Schedule It is anticipated that all works will occur within the hours of 7am – 4pm Monday to Friday, and 8am – 1pm Saturdays. No work will be conducted on Sundays or Public Holidays.
ii) Identification of the site activities that have the potential to generate noise impacts on sensitive receivers.	No activities resulting in impulsive or tonal noise emissions are required, as the required soil materials can be won with an excavator without the necessity for rock breaking. Subsurface investigations indicated that the rock surface separating the repository from the coal seam was below the required depth (approximately 4metres). See section 2.3.2
iii) Documentation and the assessment of noise levels at sensitive receivers and test compliance.	Noise monitoring will be conducted at the three most affected sensitive receiver locations, as outlined in Section 2.3.2 below.
iv) Provision of details of the reasonable and feasible actions and measures to be implemented to minimise noise impacts and, if any noise exceedance is detected, how any non-compliance would be rectified.	Where noise generated through the activities as outlined in Appendix J are considered to be in excess of levels stipulated in the Conditions of Approval document, mitigation measures will be taken. These may include the reduction of construction hours and/or the repair or replacement of equipment. Where construction (i.e. earthmoving) activities are deemed to be disruptive to the local community or nearby residents due to inclement meteorological conditions or other factors, the following actions will be taken as appropriate: <ul style="list-style-type: none"> • The cause/s for the increase in noise levels will be investigated, with recorded noise data* checked to verify the breach. • Once cause/s have been identified, mitigation measures will be implemented. These could include: <ul style="list-style-type: none"> – The removal or replacement of faulty equipment – The reduction of operating hours (if the additional noise cannot be otherwise avoided) • Delta Electricity will endeavour to liaise with affected individuals as soon as practicable. <p>As the rock layer beneath the repository is at a depth greater than that required to create the required Stage 2B area, no rock-breaking activities are anticipated for the duration of the project. However, in the unlikely event that activities resulting in impulsive</p>

	<p>or tonal noise emission (such as rock breaking or rock hammering) are required to complete the Stage 2B construction, operating hours will be limited to:</p> <ul style="list-style-type: none"> • 8am – 12pm Monday to Saturday and • 2pm – 5pm Monday to Friday <p>as stipulated under Condition of Approval 2.4, and these activities shall not be undertaken for more than three continuous hours at any one time, unless situations arise as outlined in Condition of Approval 2.5 (Appendix M).</p> <p>*Refer to section 2.3.2 for more information on the proposed noise monitoring program.</p>
v) Procedures for notifying sensitive receivers of construction activities likely to affect their noise amenity.	<p>Delta Electricity will endeavour to liaise with affected individuals as soon as practicable. All complaints received will be investigated and processed immediately. This includes meeting with affected individuals on location and formally recording the incident.</p> <p>Refer to section 2.3.2.</p>

2.3.1 Site Activities and Indicative Works Schedule

The Indicative Schedule of Construction Works (Appendix J) outlines the major activities to be conducted in the construction of the Stage 2B area.

Construction hours for all works as defined in the DOP approval part 2.3 (CoA) for works as outlined in Table 1 items 4, 5, 6 will be (as a maximum):

- 7:00 am to 6:00 pm, Mondays to Fridays, inclusive;
- 8:00 am to 1:00 pm, Saturdays; and
- No time on Sundays or public holidays.

Activities resulting in impulsive or tonal noise emission (such as rock-breaking or rock hammering) should not continue for more three continuous hours and must provide a minimum one-hour respite period and shall be limited to:

- 8:00 am to 12:00 pm, Monday to Saturday; and
- 2:00 pm to 5:00 pm, Monday to Friday.

Where noise generated through the activities as outlined in Appendix J are considered to be in excess of levels are stipulated in the Conditions of Approval document, mitigation measures will be taken. These may include the reduction of construction hours and/or the repair or replacement of equipment.

2.3.2 Noise Monitoring Program

A noise assessment program has been defined in Table 8 below.

Those activities with the potential to generate noise are summarised below in Table 8 and include machine running noise during earthworks with dozer and dump trucks including reversing beeps.

The noise objective for the project (COA part 2.7) is to not exceed the background L_{A90} noise level by more than 10 dB(A) at any sensitive receiver.

Reports containing noise assessments will be forwarded to the DECC and the Director General describing any non-compliance within 14 days of conducting the noise assessment, implemented by Delta Electricity to meet the DOP project approvals.

Table 8 Proposed Noise Assessment Schedule

Site Undertaking	Assessment
Notification of residents at sensitive noise receivers that construction activities are due to commence	N/A
Notification of residents at sensitive noise receivers that noise monitoring is being undertaken	Residents invited to comment.
Commence Earthworks Operations to develop Stage 2B	<ul style="list-style-type: none"> Once-off general assessment by external noise consultant of project background noise: compare with ongoing noise results (as above). Calibrate field monitors for ongoing weekly measurement (where practicable).
Refer to Ongoing Operational Noise measurements report supplied to Delta Electricity	Use results of monitoring report as a baseline for assessment during construction activities
Earthworks Operations to develop Surface Water Structures	As above
Commence construction of haul road	As above
Monitoring to occur when site practices change, with reporting defined as above.	As above
Use Delta Electricity's existing Environmental Incidents and Complaints register to process/register any incidents reported	Individual complainants handled. Noise complaints investigated and referenced according to ongoing noise monitoring.

Routine noise monitoring conducted for ash placement operations at Kerosene Vale Stage 2 will be used as a benchmark for noise of normal operations versus noise generated through construction activities. The noise monitoring conducted over the 6th and 7th of November 2011 by Aurecon Group will be used for this purpose ([Appendix L](#)).

It is anticipated that the necessary machinery working on site for Stage 2B construction will generate additional noise. Ongoing noise monitoring for Stage 2 (both A and B) will be conducted at the three most affected sensitive receiver locations as identified in the OEMP ([Appendix L](#)) to ensure the increase in noise is not in excess of the requirement of 10dB(A) above background noise. The residents of each of the sensitive noise receiver locations are notified by Delta Electricity in person when noise monitoring is set to occur.

Delta has an existing Environmental Incidents and Complaints register (the contact details are outlined on the web) that is regularly maintained. Complainants are directed to the Chemical and Environment group for processing. Any complaints received are individually investigated and the cause/s of the complaint mitigated accordingly.

Details on how to contact Delta Electricity in the event of an incident are outlined on the website: www.de.com.au

There have been no noise related complaints received for operations at Kerosene Vale in the last 18 months.

2.4 EROSION AND SEDIMENT CONTROL PLAN

Measures to minimise erosion and the discharge of sediment and other pollutants to land and/or water during construction works are identified within this plan. Details required by DOP COA 6.4 (c) highlight the need to provide for

- (i) Identification of activities that could cause soil erosion or discharge sediment or water pollutants for the site
- (ii) A description of management methods to minimise soil erosion, discharge sediment, water pollutants, minimise are of bare surfaces, stabilise disturbed areas, and minimise bank erosion
- (iii) Demonstrate proposed measures will conform with, or exceed the relevant requirements of Managing Urban Stormwater: Soils and Construction (Landcom, 2004)³.

Works associated with management of erosion and sediment control are those with direct influence upon the Sawyers Swamp Creek as a regional catchment and the local catchment for the KVAR with reference to [Table 2](#) of this document. Further detail on the proposed timing and operational schedule of implementing erosion and sediment control aspects is provided in Appendix J Indicative Schedule of Construction Works.

2.4.1 Water Management Area North Side

For ash placement within the Stage 2 project the site requires management of stormwater both during and after the ash repository is completed. We our present a management strategy for surface water, groundwater and catchment quality associated with the Kerosene Vale Ash Repository in section 1.6.6 above and 2.4.2 below.

2.4.2 Catchment Planning

Stage 2B is an area that is bounded to the west and north by the footprints of Stage 2A and Stage 1 ash placement. To the east is Sawyers Swamp Creek and to the south is the power station ash pipeline to Kerosene Vale Ash Dam and the pine plantation area. The footprint boundary has, where practicable, been located at a 50 m distance from the creek bank.

Final design is height limited to RL 940 m for the entire repository (Stages 1 and 2). This provides a total catchment of about 50 ha, with the landscape form of KVAR keyed into existing topography at the south eastern corner. The quality of catchment water as surface water runoff from permanently capped and then revegetated areas will be clean water, that is, without ash contamination. In the medium term, surface water runoff will contain sediment and any catchment flow will need treatment, with no contaminated water allowed to discharge into the environment.

Across the whole form, the total area of batter slopes and laybacks will be 30 ha and the top about 20 ha. Catchment flows will be intercepted by laybacks at RL 930 m, 923 m and 920 m with those with a northern aspect directed for water and sediment containment. Alternatively, catchment runoff below the 930 m RL and batters on the southern aspect will be directed to containments to be constructed on the southern side. These will need to be located to the southern side of the canal pipe line.

³ Landcom (2004). Managing Urban Stormwater: Soils and Construction, 4th Ed. New South Wales Government.

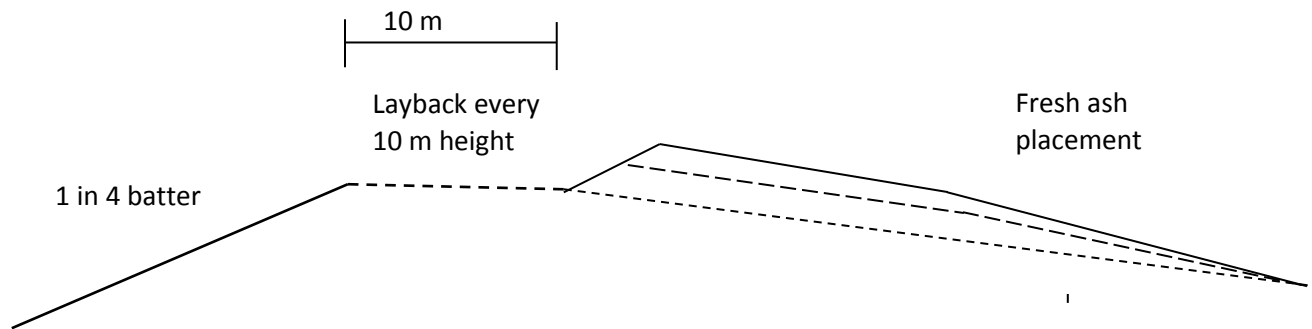


Figure 5 Ash bench with layback at 10 m height interval (not to scale)

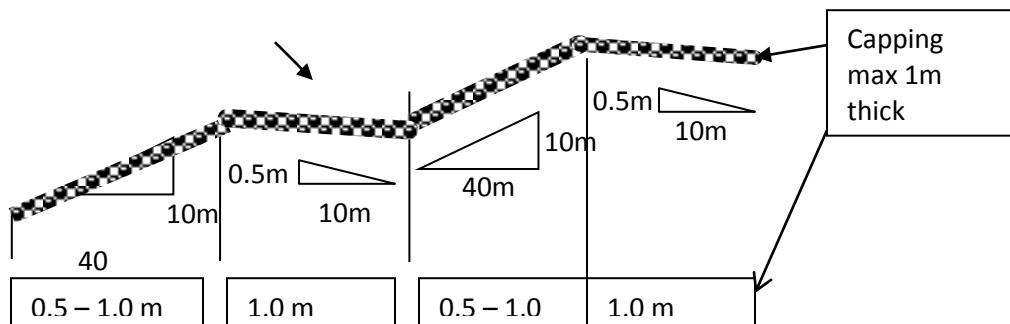


Figure 6 Capping thickness on 1:4 batters and laybacks (not to scale)

The water management proposal for the north side of KVAR consists of constructing a stormwater storage facility using the existing Detention Area as indicated in the OEMP (Figure 6-3). The development of this site into a 'constructed wetland' to control and provide water quality improvement, is to ensure that clean water runoff (that is, water that has not come into contact with ash) from the completed ash repository is a factor for the site closure plan. The area was allocated for this purpose previously, under the original project approval ([Figure 1](#)).

Water management structures for the duration of Stage 2B operations will be located on the south side of the repository- these structures will be used for dirty water management. The KVAR site Stage 2B footprint is as denoted on the survey plan (Craven Elliston & Hayes, KASH1210) ([Figure 3](#)). Locations for potential water management facilities on the northern side were noted within Figure 2. Those for the 2B south side are still to be constructed as part of the need to develop the existing access track (i.e. develop the track into a haul road for future use) and a stockpile for soil materials outside the repository footprint on the south side.

The repository is effectively divided into two catchments, with all water caught from the eastern, western and northern sides of the repository directed to the northern water management area. Water collected from the south side needs to be contained.

Currently there is a surface water management pond for the south side that is directed into the return water canal, which is gravity fed back to the power station. However as it is necessary to have greater capacity for containment, it is proposed that temporary sediment basins be constructed using materials won from the Stage 2B area development. These sediment basins will be used to contain dirty water runoff from ash emplacement operations and will be located between the ash repository and the new haul road. This means the haul road will effectively separate the repository catchment from the existing natural catchment. Until these temporary sediment basins are constructed all water collected off the southern side will continue to be directed into the return water canal. The temporary basins will be utilized for the life of the construction period.

Upon completion of the ash repository, all clean water collected from the KVAR footprint will be directed to the constructed wetland for discharge into the environment. Dirty water containment ponds will be individually decommissioned as appropriate, and when it is deemed safe to do so. No dirty water will be released into the catchment from the repository.

2.4.3 Sawyers Swamp Creek (CoA parts 2.26 – 2.29) Riparian Zone Protection & Management

The KVAR project consists of site management adjacent to flow of Sawyers Swamp Creek. Locations relevant to the Stage 2 approval are to the south to the north of the creek below the Sawyers Swamp Creek Ash Dam and the current alignment east to west along the KVAD wall ([Figure 1](#)).

All works adjacent to the Sawyers Swamp Creek will be setback 50 m.

2.4.4 Soil Management- Excavation

The primary objective for site management is to prevent discharge of sediments and pollutants from any construction and or operations for the project entering waterways, including the need to ensure that equipment and machinery shall be operated in a manner that minimises the potential for oil and grease spills and leaks (CoA parts 2.30-2.32). This section describes the proposed management methods to minimise soil erosion or discharge of sediment or water pollutants from the site, including a strategy to minimise the area of bare surfaces, stabilise disturbed areas, and minimise bank erosion.

To date all ash repository works have been located within the footprint of the KVAD, except to a surface water collection point located on the north eastern side. Future works that include excavation for soil extraction within the Stage 2B area will be located within the footprint dedicated for future ash emplacement that is bounded by Kerosene Vale Ash Dam, Sawyers Swamp Creek and the ash pipelines along the southern boundary. The extent of these works is as defined by [Figure 3](#) of the final form of the Stage 2 repository.

As noted within the Traffic and Noise Management Plans there is no expectation of rock breaking or rock hammering with excavation between RL 924 and RL 920 m. This is illustrated in the excavation plan ([Appendix B](#)). Soil will be pushed and mixed using a D11 dozer. Materials will be loaded onto 40 t dump trucks with a 30 t excavator. Road works will be maintained with grading equipment and materials placement implemented with a D7 dozer with all soil works for the Stage 2B area will be maintained within the repository footprint located at a distance of 50 m from the Sawyers Swamp Creek (refer to Appendices I and J for further detail). All works will ensure the preservation of the existing riparian area and provide for quarantining all surface water flows from entering the Sawyers Swamp Creek by runoff diversions into the existing control structure. Excavation for the Stage 2B soil removal is designed with a 1 % fall toward the southern corner.

To ensure that surface water can be managed within the site over a longer term, a proposal has been developed to construct a sedimentation control and stormwater harvesting constructed wetland at the north side of the KVAD wall and adjacent to the Sawyers Swamp Creek. This area has an existing detention basin, but this basin will not be of adequate size as a long term catchment management facility.

Given the clay topsoil and sandstone material that is being removed from the Stage 2B area, after materials mixing, prevention of runoff to Sawyers Swamp Creek is to be instigated with all grades and falls directed away from the creek. Where existing surface water runoff has access to the creek sediment controls during construction will include hay bales and sediment control fencing.

2.4.5 Proposed Sedimentation Control and Stormwater Harvesting Constructed Wetland

Details concerning design, structure and project approval are currently under development with suitably qualified external consultancies. Figure 4 provided the concept plan for works in the area for proposed water management work. As noted previously all works will be within 50 m of the Sawyers Swamp Creek (where practicable).

Details associated with specific aspects of sediment control are outlined in section 2.4.2 above.

2.4.6 Management Methods

Management methods are defined herein with several overriding principles. These include:

1. Management of flow direction away from Sawyers Swamp Creek
2. Management of flow direction away from all repository external boundaries
3. Use of existing grades and slopes and their maintenance so that all surface water runoff is controlled to dedicated collection areas
4. Laybacks and/or haul roads on all external perimeters and for all those used for water runoff are to be constructed with the outside edge 0.5 m higher than the inside
5. Water flow is to be controlled to prevent onsite erosion
6. All works and sediment control operations are conducted in accordance with the guidelines for Soils and Construction, Managing Urban Stormwater (Landcom, 2004) .

3 RISK MANAGEMENT AND RISK ASSESSMENT

This document is the first review (Rev1) of the development of a Construction Environmental Management Plan (CEMP) for the Kerosene Vale ash placement area. As part of the document development a risk assessment process has been included to identify significant environment aspects associated with site construction works.

Once the significant aspects were identified, the potential causes and consequences were documented. The Conneq risk score matrix was used to determine the initial / uncontrolled risk score. Potential control strategies were then included and the risk score matrix was utilised again to determine the reduced / controlled risk score.

The below list of environmental aspects / risks were ranked as significant prior to implementation of controls strategies, after control strategies were identified all environment aspects were ranked as moderate risks or lower.

The pages following this list contain the detailed Significant Environmental Aspect Assessment (Appendix C). The proponent is to ensure that appropriate controls are in place so that risks are managed.

Emissions to Air

- Generation of dust from clearing and topsoil removal at project sites
- Generation of dust from inclement weather at project sites
- Generation of dust from unsealed surfaces / stockpiles at project sites
- Generation of dust from concrete batching plants at project sites
- Generation of dust from vehicle movements on unsealed roads at project sites
- Generation of Carbon Dioxide and Greenhouse Gases Emissions

Release to Water (Surface and Ground Water)

- Release of turbid / dirty water to waters during construction activities
- Release of concrete wash water to waters during construction activities
- Release of saline water to waters during construction activities
- Spillage of Hydrocarbons / Chemicals / Hazardous substances to water from construction activities

Release to Land

- Spillage of Hydrocarbons / Chemicals / Hazardous substances to water from construction activities

Generation of Waste

- Inappropriate disposal of general waste during construction activities
- Inappropriate disposal of Contaminated waste during construction activities

Use of raw materials and natural resources

- Wastage of Water during construction activities
- Damage to protected flora / fauna species during construction activities
- Unmanaged disturbance of acid sulphate soils during construction activities.

Other Environmental and Community Issues

- Generation of excessive Noise during construction activities
- Generation of excessive light during construction activities
- Damage / disturbance to Cultural heritage during construction activities
- Damage to private property (vehicles and other property) during construction activities
- Damage to services (power, communication, gas, water, sewer etc) during construction activities
- Failure to respond to community complaints during construction activities
- Working outside of approved hours during construction activities

General

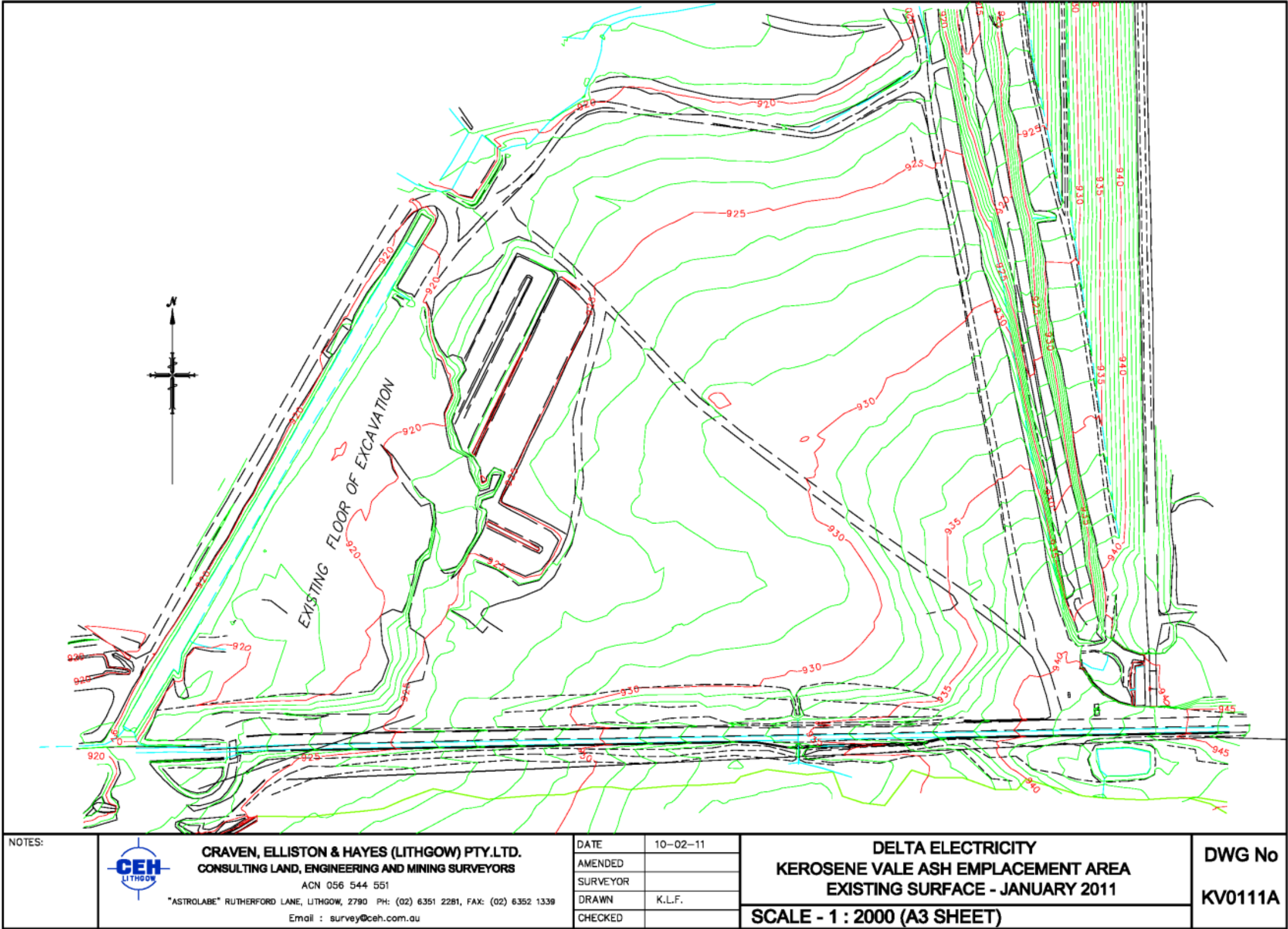
- Employment of Subcontractors
- Failure to conduct appropriate assessment and costing of environmental requirements in tenders
- Failure to conduct appropriate assessment of environmental requirements in design

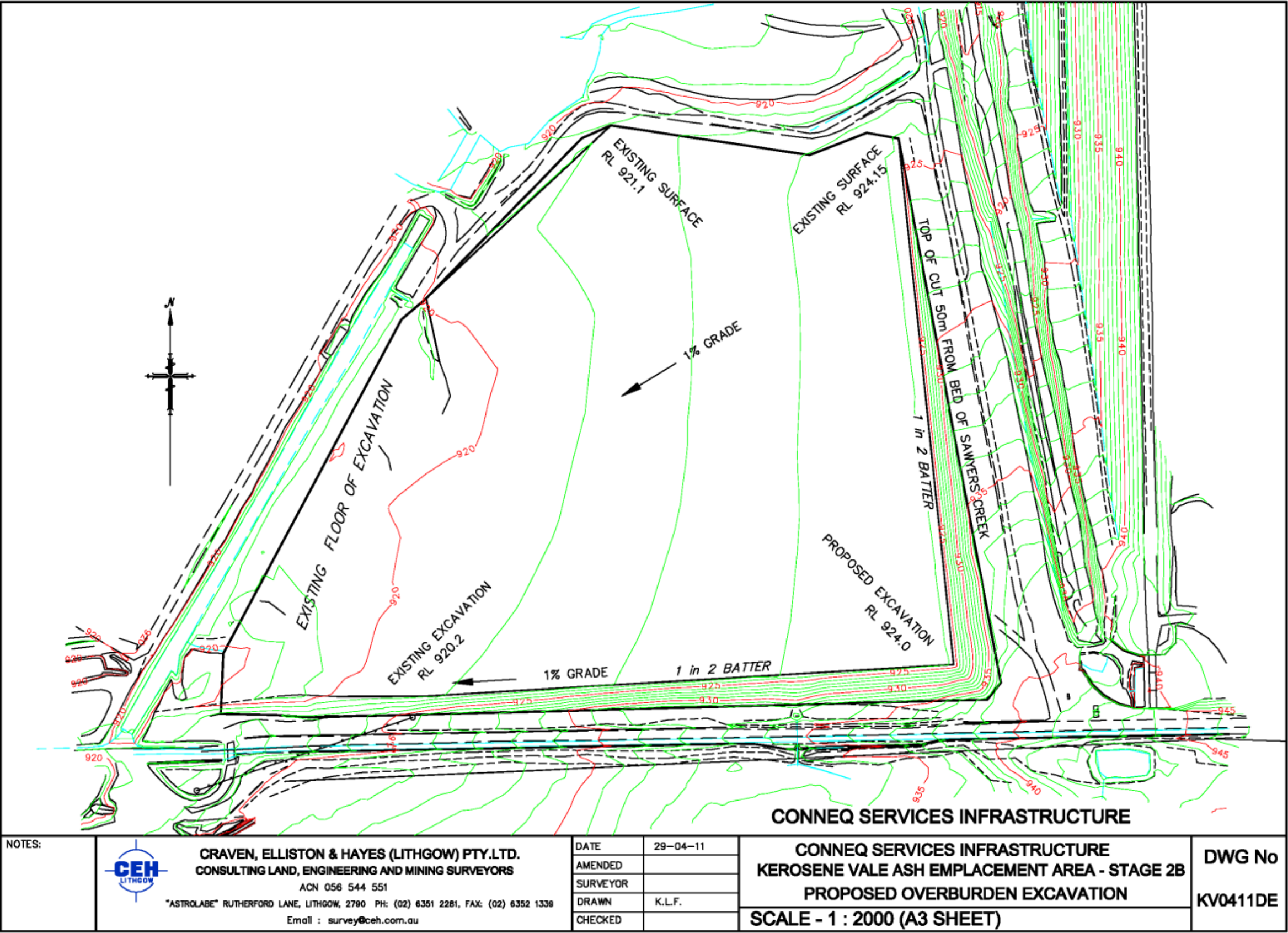
Opportunities for Improvement / Consideration

- Use of renewable energy
- Preference for solar powered equipment / plant
- Water saving devices
- Improvement to aesthetics
- Community improvements
- Improved access
- Improved local / regional air quality
- Purchasing locally
- Employment of local personnel
- Employment of indigenous personnel
- Sponsorships and donations
- Encouragement of new business
- Environmental education of subcontractors and community
- Improvement of company environmental reputation in marketplace.

APPENDICES

Appendix A - Existing Surface Topographic Survey as at January 2011 for Stage 2B area.





Appendix C – Discussion concerning geotechnical aspects for stabilization



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Our reference: 2110472A/LT_6578:JG:eh

4 December 2008

Mr Ian Pankhurst
Mining Operation Services Pty Ltd
PO Box 3102DC
SINGLETON NSW 2330

Dear Ian,

Re: Revised Kerosene Vale Bund Wall Stability Study for Centennial Coal

1. Introduction

This letter report serves to present results and conclusions from revised stability analyses performed on the Kerosene Vale Ash Repository (KVAR) Bund Wall. Earlier stability analyses were performed by Parsons Brinckerhoff (PB) and reported in correspondence 2116877A/LT_6463 (dated 11 July 2008). This earlier analysis contained several assumptions regarding soil properties and bund geometry. Following on from this earlier analysis, a site investigation was undertaken by PB to address key uncertainties. This investigation comprised five boreholes drilled through the upper lift of the existing embankment (at locations as shown in Appendix A). In-situ testing of soils was undertaken during this programme and samples were recovered for laboratory testing.

Following completion of field investigations and laboratory testing, PB had discussions with Graham Holt & Associates (GHA) to develop an agreed methodology for the revised stability analysis. This letter serves to outline results of this stability analysis only and does not present extensive background details. Detailed results of this site investigation and further detailed presentation of revised stability analysis will be presented in a report to be issued by PB in the near future.

The primary purpose of this modelling is to examine possible effects on stability of the bund wall as a result of further ash emplacement within the repository. This modelling examines effects associated with placement up to 50m and 25m behind the existing bund wall. Consideration was given to potential for development of localised instability (in a small portion of the bund wall) and larger scale (global) instability of the wall.

2. Modelling Input

2.1 Sections

In discussions with GHA, it was agreed that two sections, considered to be representative of the KVAR bund, should be analysed. The locations of these sections are as shown in Appendix A. Section A is on the western face of the bund (between BH02 and BH03) and Section B is on the northern face of the bund

(between BH03 and BH04). Section profiles used in analysis were developed from topographic survey data of the embankment and surrounding areas.

2.2 Embankment Geometry

Soil unit thicknesses adopted in the model were based on soils encountered in adjacent boreholes and also on geometry of embankment lifts as shown on the topographic survey plan. It is understood that the KVAR bund comprises the original embankment and one lift on the eastern side (near BH01 and BH02) and original embankment and two lifts on the remainder. Two lifts have been modelled in each of the sections (A and B) analysed in this latest modelling. Two lifts were apparent from the topographic survey data.

Following completion of the intrusive site investigations, some uncertainty remains regarding the positions and geometry of upstream faces of original embankment and subsequent lifts. No construction records were available to assist in understanding of this aspect. Consequently, conservative assumptions have been made regarding upstream face locations.

The proposed additional ash loading was assumed to have a geometry comprising a batter of 1V:4H from RL 920 to RL 940 with two set-back distances assumed - 25m and 50m back from the upstream edge of the existing bund wall.

2.3 Soil Properties

Three distinct soil units were encountered in the intrusive investigations – clay fill (used in embankments), ash and residual clay. Samples of each of these soils were recovered during investigations and sent for laboratory index testing. In-situ standard penetration testing was also undertaken on these soil units. In addition to these test results, further information on ash properties was obtained from an earlier study by Douglas Partners (Ref 31301, Aug 2001). This field data was supplemented with published data on similar materials to develop reasonable upper bound and lower bound estimates of soil properties. Summary soil properties are presented in Table 1.

Modelling was undertaken for each section using upper and lower bound values in order to assess sensitivity of changes in material properties.

Table 1: Lower / upper bound soil properties adopted in stability analysis

Soil Unit	Unit Weight, γ (kN/m ³)	Cohesion, c' (kPa)	Friction Angle, ϕ' (degrees)
Unit 1 – Clay Fill	19/20	5/10	28/32
Unit 2 – Ash	12/14	1/1	29/36
Unit 3 – Residual Clay	19/21	5/15	32/35

2.4 Groundwater

Broader regional groundwater monitoring (reported as part of the Kerosene Vale Stage 2 Environmental Assessment) suggests a groundwater gradient inclined down towards the northwest. This regional dataset suggests groundwater at approximately RL910m (near BH05) grading down to approximately RL900m

(near BH01 and BH02). General groundwater profiles, based on these observations, have been included in the modelling.

2.5 Modelling Approach

In order to assess the effect on the existing bund wall of further ash emplacement behind it, modelling was undertaken using SLOPE/W, which is a limit equilibrium software package developed specifically for the analysis of slope stability in geotechnical engineering projects. The soil model followed a Mohr-Coulomb failure criterion. Slope geometry and soil properties (as described above) were used in the Slope/W modelling. A factor of safety was calculated for each case under static conditions with no applied seismic loading. Appropriate seismic loading (of 0.08g per AS1170.4) was also applied to the model in pseudo-static analysis representing the effect of earthquake shaking by accelerations that create inertial forces. Cases were run for Sections A and B using upper and lower bound soil parameters and ash surcharge loading at 25m setback from the bund wall. Standard limit equilibrium factors of safety were generated from the Slope/W modelling for each of these cases. Results are presented in the following section of this letter report.

As a further check on Slope/W modelling results, additional modelling was undertaken using Plaxis. Plaxis is a finite element software package used for 2D analysis of deformation, stability and stresses in geotechnical engineering. A limit equilibrium factor of safety was generated from Plaxis for both 25m and 50m setbacks as a check on Slope/W results. In addition, an assessment of the likely deformation of the downstream face of the existing embankment (as a result of further ash emplacement) was also made using Plaxis. Results of this analysis are also presented in the following section of this letter report. No seismic loading effects were considered in the Plaxis modelling.

In both modelling approaches, drained conditions were modelled. This is considered appropriate based on presence of drain structures in the existing embankment wall, no observed seepage from these drains and no observations of groundwater inflow in boreholes during the site investigation.

3. Modelling Results

3.1 Slope/W Modelling Results

The results of the SLOPE/W modelling are summarised in Table 2 for Section A and Table 3 for Section B. Detailed output for both these sections is presented in Appendix B.

Table 2: Results of the SLOPE/W modelling – Predicted Factor of Safety (FOS) – Section A

Scenario	FOS	
	Upper Bound	Lower Bound
Ash emplacement to 25m behind upstream face – Static Loading	2.44 (local instability)	1.74 (local instability) 2.35 (global instability)
Ash emplacement to 25m behind upstream face – Seismic Loading	2.03	1.45

Table 3: Results of the SLOPE/W modelling – Predicted Factor of Safety (FOS) – Section B

Scenario	FOS	
	Upper Bound	Lower Bound
Ash emplacement to 25m behind upstream face – Static Loading	1.60 (local instability)	1.16 (local instability) 2.50 (global instability)
Ash emplacement to 25m behind upstream face – Seismic Loading	1.39	TBC

3.2 Plaxis Modelling Results

The results of the Plaxis numerical modelling are summarised in Table 4 for Section A and Table 5 for Section B. Detailed output for both these sections is presented in Appendix C.

Table 4: Results of the PLAXIS modelling – Predicted Factor of Safety (FOS) & Deformation – Section A

Scenario		FOS	Maximum Predicted Deformation on Downstream Face (mm)
Ash emplacement to 50m behind upstream face	Upper Bound Parameters	2.36	9.2
	Lower Bound Parameters	1.68	14.0
Ash emplacement to 25m behind upstream face	Upper Bound Parameters	2.36	10.7
	Lower Bound Parameters	1.68	16.8

Table 5: Results of the PLAXIS modelling - Predicted Factor of Safety (FOS) & Deformation – Section B

Scenario		FOS	Maximum Predicted Deformation on Downstream Face (mm)
Ash emplacement to 50m behind upstream face	Upper Bound Parameters	1.65	2.1
	Lower Bound Parameters	1.19	9.4
Ash emplacement to 25m behind upstream face	Upper Bound Parameters	1.64	2.4
	Lower Bound Parameters	1.19	17.0

4. Comments and Conclusions

Based on the results of the assessment as described above, we provide the following comments:

1. Results of limit equilibrium and numerical modelling provide relatively consistent results, supporting the efficacy of the combined modelling approach.
2. Two sections, considered to be representative of the KVAR bund, were chosen for analysis. Of the two sections analysed, Section B (on the northern side of the KVAR) is considered to be the more critical case, however in both cases typically observed factors of safety were generally well above 1.5 for normal loading conditions assuming either a 25m setback or 50m setback distance for further ash emplacement.
3. Factors of safety less than 1.5 are only obtainable for assessed lower bound soil parameters and for localised instability (at bench scale) as opposed to larger scale instability affecting the full embankment height. These results are consistent with reported past-performance of the embankment. Only localised small-scale instability has been reported in the past and addressed through minor repairs. Modelling suggests that the ash emplacement (at either 25m or 50m setback) does not affect factors of safety for the localised instability.
4. Modelling indicates that placement of ash to within 50m of the bund has very little effect on the existing bund wall with maximum predicted movement of the order of 14mm. For a 25m setback, maximum predicted movement is less than 17mm. These are considered to be acceptable for a structure of this nature.
5. Based on these calculated factors of safety and predicted displacements, it is assessed that adoption of a setback of 25m for further ash emplacement behind the upstream face of the existing bund wall is appropriate for the bulk of the KVAR bundwall. Further modelling could be undertaken to investigate effects of placement closer than 25m if required.
6. An additional margin of setback is recommended in the convex corner of the existing embankment (in the area close to BH3 shown in Appendix A). This is due to the presence of localised deeper ash deposits in this area. Through this section of the KVAR, a minimum setback of 40m is recommended at this stage. Further analysis is recommended in this area to more clearly establish an appropriate setback.
7. The modelling and recommendations presented herein are based on an assumption that drained conditions will continue to apply for the KVAR embankment. Checking and maintenance of the existing drainage elements will likely be required over the course of the life of the structure.

5. Closing

The results and conclusions presented herein will be presented in further detail in a report to be issued by PB summarising site investigation results and stability analyses. This letter presents an advance issue of the key findings in relation to the stability analyses in order to support further discussions between Centennial and Delta regarding further ash emplacement.

We trust that the results and conclusions presented herein meet your immediate project needs. Please feel free to contact the undersigned should you have any queries.

Yours sincerely

A handwritten signature in blue ink, appearing to read 'J Glastonbury', with a stylized flourish at the end.

Dr James Glastonbury

Principal Geotechnical Engineer
Parsons Brinckerhoff Australia Pty Limited

Attachments:

Appendix A - Figures

Appendix B – Slope/W Output

Appendix C – Plaxis Output

Appendix D – Kerosene Vale Ash Placement – Plan Showing Location of Design Sections (Dwg No: KASH0510XL and Design Cross Sections (Dwg No: KASH0710XA-K) for Stage 2A construction.

PR-PC-700 - Conneq Projects Division Significant Environmental Aspects

Complete by: Wendy Felsch Current on 24th May 2011

Risk Score = 1 - 5 = LOW 6 - 9 = MODERATE 10 - 25 = SIGNIFICANT (See - Conneq Risk Score Matrix Worksheet)

		Aspect Category	Aspect	Area of business	Impacts / Hazard Scenario	Potential Emergency Event	Uncontrolled Risk Score			Controlled Risk Score			Legal Requirements
							Likelihood	Consequence	Risk Score (as per PC-601)	Likelihood	Consequence	Risk Score (as per PC-601)	
9	1	Emissions to Air	Dust	Construction Projects	Generation of dust from clearing and topsoil removal at project sites	No	C	3	13	D	2	5	Yes
10	1	Emissions to Air	Dust	Construction Projects	Generation of dust from inclement weather at project sites	No	C	3	13	C	2	8	Yes
11	1	Emissions to Air	Dust	Construction Projects	Generation of dust from unsealed surfaces / stockpiles at project sites	No	C	3	13	C	1	4	Yes
12	1	Emissions to Air	Dust	Construction Projects	Generation of dust from concrete batching plants at project sites	No	C	2	8	D	2	5	Yes
13	1	Emissions to Air	Dust	Construction Projects	Generation of dust from vehicle movements on unsealed roads at project sites	Yes	C	3	13	C	1	4	Yes
28	1	Emissions to Air	Equipment Emissions	All	Generation of Carbon Dioxide and Greenhouse Gases Emissions	No	C	2	8	D	2	5	Yes
32	1	Release to Water (Surface and Ground Water)	Non Complying Releases to water	Construction Projects	Release of turbid / dirty water to waters during construction activities	Yes	C	3	13	D	2	5	Yes
33	1	Release to Water (Surface and Ground Water)	Non Complying Releases to water	Construction Projects	Release of concrete wash water to waters during construction activities	Yes	C	2	8	C	1	4	Yes
34	1	Release to Water (Surface and Ground Water)	Non Complying Releases to water	Construction Projects	Release of saline water to waters during construction activities	No	C	2	8	C	1	4	Yes
47	1	Release to Water (Surface and Ground Water)	Spillage of Hydrocarbons / Chemicals / Hazardous substances	Construction Projects	Spillage of Hydrocarbons / Chemicals / Hazardous substances to water from construction activities	Yes	C	2	8	D	2	5	Yes
58	1	Release to Land	Spillage of Hydrocarbons / Chemicals / Hazardous substances	Construction Projects	Spillage of Hydrocarbons / Chemicals / Hazardous substances to land from construction activities	No	C	2	8	D	2	5	Yes
70	1	Generation of Waste	General Waste Disposal	Construction Projects	Inappropriate disposal of general waste during construction activities	No	C	2	8	D	1	2	Yes
75	1	Generation of Waste	Hazardous Waste Disposal	Construction Projects	Inappropriate disposal of Contaminated waste during construction activities	Yes	C	3	13	C	1	4	Yes
103	1	Use of raw materials and natural resources	Water Usage	Construction Projects	Wastage of Water during construction activities	No	C	2	8	D	2	5	Yes
121	1	Use of raw materials and natural resources	Damage to protected flora / fauna species	Construction Projects	Damage to protected flora / fauna species during construction activities	No	C	2	8	C	1	4	Yes
129	1	Use of raw materials and natural resources	Land Disturbance	Construction Projects	Unmanaged disturbance of acid sulphate soils during construction activities	No	C	2	8	C	1	4	Yes
148	1	Other Environmental and Community Issues	Noise	Construction Projects	Generation of excessive Noise during construction activities	No	C	2	8	C	1	4	Yes
165	1	Other Environmental and Community Issues	Light Overspill	Construction Projects	Generation of excessive light during construction activities	No	C	2	8	D	1	2	Yes
174	1	Other Environmental and Community Issues	Cultural Heritage	Construction Projects	Damage / disturbance to Cultural heritage during construction activities	No	C	2	8	D	2	5	Yes
183	1	Other Environmental and Community Issues	Property	Construction Projects	Damage to private property (vehicles and other property) during construction activities	No	C	2	8	D	2	5	Yes
192	1	Other Environmental and Community Issues	Property	Construction Projects	Damage to services (power, communication, gas, water, sewer etc) during construction activities	No	C	3	13	C	2	8	Yes
204	1	Use of raw materials and natural resources	Community Issues	Construction Projects	Failure to respond to community complaints during construction activities	No	C	2	8	D	1	2	Yes
206	1	General	Subcontractors	All	Employment of Subcontractors	No	C	4	18	C	2	8	Yes
207	1	General	Tendering	All	Failure to conduct appropriate assessment and costing of environmental requirements in tenders	No	C	5	22	D	3	9	Yes
209	1	Opportunities for Improvement	Opportunities	All	Use of renewable energy		B	4	21				
210	1	Opportunities for Improvement	Opportunities	All	Preference for solar powered equipment / plant		B	4	21				
211	1	Opportunities for Improvement	Opportunities	All	Water saving devices		C	4	18				
212	1	Opportunities for Improvement	Opportunities	All	Improvement to aesthetics		C	4	18				
213	1	Opportunities for Improvement	Opportunities	All	Community improvements		C	4	18				
214	1	Opportunities for Improvement	Opportunities	All	Improved access		C	4	18				
215	1	Opportunities for Improvement	Opportunities	All	Improved local / regional air quality		C	4	18				
216	1	Opportunities for Improvement	Opportunities	All	Purchasing locally		C	4	18				
217	1	Opportunities for Improvement	Opportunities	All	Employment of local personnel		C	4	18				
218	1	Opportunities for Improvement	Opportunities	All	Employment of indigenous personnel		C	4	18				
219	1	Opportunities for Improvement	Opportunities	All	Sponsorships and donations		C	4	18				
220	1	Opportunities for Improvement	Opportunities	All	Encouragement of new business		C	4	18				
221	1	Opportunities for Improvement	Opportunities	All	Environmental education of subcontractors and community		C	4	18				
222	1	Opportunities for Improvement	Opportunities	All	Improvement of company environmental reputation in marketplace		C	4	18				

Appendix E – KVAR Stage 2B Project Approval Cross-Reference

MP 07_0005 – Construction Conditions	Relevant CEMP Section	DP&I and Delta Electricity Comments
Noise		
<p>2.1-The Proponent shall prepare a long-term ash management strategy including a program for investigation and assessment of alternative ash management measures with a goal of 40% reuse of ash by 31 December 2013. The report shall be submitted to the Director-General within six months of the commencement of operations. The Proponent shall report on the status and outcomes of its investigations to the Director-General every two years from the commencement of the operation of the project, unless otherwise agreed by the Director-General.</p>		
<p>2.2-To facilitate assessment of the viability of coal resources in the project area and provide a finite opportunity for their extraction, the Proponent shall undertake revised staging of ash placement activities as described in the document referred to in condition 1.1c) of this approval.</p>	<p><i>Sub-plan 6.3 - 'Ash haulage and placement procedures' (OEMP)</i></p>	<p><i>Highlighted by DP&I as ash placement has changed and may have repercussions for construction</i></p> <p>Delta Electricity Response: The original intention was for Centennial Coal to extract resources from Stage 2B to:</p> <ol style="list-style-type: none"> 1. Win the coal and obtain overburden for capping; and 2. Win material to construct the stabilisation berm. <p>In consideration of CoA 2.2 so as not to sterilise the coal reserve, Delta commenced placement of Ash in what Delta defined as Stage 2A (Figure 2 of the CEMP). The intention was that Centennial Coal would develop Stage 2B for ash placement in the meantime, through extracting coal (i.e. creating a space in which Delta could dispose of ash) and other materials for use within the repository site. Upon completion of coal extraction from the Stage 2B area, it was intended that Delta would seamlessly begin placing ash into the area Centennial Coal had created in the process of extracting the coal. However, this</p>

		did not occur as Centennial relinquished the right to extract coal, and therefore did not develop the area or win the materials necessary for the construction of the stabilisation berm or the necessary repository capping.
2.3- Construction activities associated with the project shall only be undertaken during the following hours: a) 7:00 am to 6:00 pm, Mondays to Fridays, inclusive; b) 8:00 am to 1:00 pm on Saturdays; and c) at no time on Sundays or public holidays.	<i>Section 2.2.1</i>	<i>OK – restates these</i>
2.4- Activities resulting in impulsive or tonal noise emission (such as rock breaking or rock hammering) shall be limited to 8:00 am to 12:00 pm, Monday to Saturday and 2:00 pm to 5:00 pm, Monday to Friday. The Proponent shall not undertake such activities for more than three continuous hours and must provide a minimum one-hour respite period.	<i>Section 2.2.1</i>	<i>Noted</i>
2.5- Construction outside the hours stipulated in condition 2.3 of this approval is permitted in the following circumstances: a) where construction works do not cause audible noise at any sensitive receiver; or b) for the delivery of materials required outside these hours by the Police or other authorities for safety reasons; or c) where it is required in an emergency to avoid the loss of lives, property and/or to prevent environmental harm.	<i>Relevant only as appropriate</i>	<i>Relevant only as appropriate</i>
2.6- The hours of construction activities specified under condition 2.3 of this approval may be varied with the prior written approval of the Director-General. Any request to alter the hours of construction specified under condition 2.3 shall be: a) considered on a case-by-case basis; b) accompanied by details of the nature and need for activities to be conducted during the varied construction hours; and c) accompanied by any information necessary for the Director-General to reasonably determine that activities undertaken during the varied construction hours will not adversely impact on the acoustic amenity of sensitive receivers in the vicinity of the site.	<i>Relevant only as appropriate</i>	<i>Relevant only as appropriate</i>

<p>2.7-The construction noise objective for the project is to manage noise from construction activities (as measured by a LA10 (15 minute) descriptor) so as not to exceed the background LA90 noise level by more than 10 dB(A) at any sensitive receiver. Any activities that have the potential for noise emissions that exceed the objective must be identified and managed in accordance with the Construction Noise Management Plan (as referred to under condition 6.3-b) of this approval). The Proponent shall implement all reasonable and feasible noise mitigation measures with the aim of achieving the construction noise objective.</p>	<p>Section 2.2.2</p>	<p><i>Report identifies activities with potential to generate noise in a table.</i> <i>See comments for 6.3b)</i></p>
<p>2.8-Operational activities associated with the project shall only be undertaken from 7.00 am to 10.00 pm Monday to Sunday</p>		
<p>2.9-Within six months of commencement of operation of the project the Proponent shall prepare and submit to the Director-General a review of the logistical arrangements for ash haulage and placement to determine the feasibility of reducing the hours of operation. If, as a result of the review, it is determined that ash haulage and placement times can commence later and/or finish earlier, the Proponent shall aim to observe the reduced hours whenever possible.</p>		
<p>2.10-Operations outside the hours stipulated in condition 2.8 of this approval are only permitted in the following emergency situations:</p> <ul style="list-style-type: none"> a) where it is required to avoid the loss of lives, property and/or to prevent environmental harm; or b) breakdown of plant and/or equipment at the repository or the Wallerawang Power Station with the effect of limiting or preventing ash storage at the power station outside the operating hours defined in condition 2.8; or c) a breakdown of an ash haulage truck(s) preventing haulage during the operating hours stipulated in condition 2.8 combined with insufficient storage capacity at the Wallerawang Power Station to store ash outside of the project operating hours; or d) in the event that the National Electricity Market Management 		

Company (NEMMCO), or a person authorised by NEMMCO, directs the Proponent (as a licensee) under the National Electricity Rules to maintain, increase or be available to increase power generation for system security and there is insufficient ash storage capacity at the Wallerawang Power Station to allow for the ash to be stored.		
<p>2.11-In the event that an emergency situation as referred to under condition 2.10b or 2.10c occurs more than once in any two month period, the Proponent shall prepare and submit to the Director-General for approval a report including, but not limited to:</p> <ul style="list-style-type: none"> a) the dates and a description of the emergency situations; b) an assessment of all reasonable and feasible mitigation measures to avoid recurrence of the emergency situations; c) identification of a preferred mitigation measure(s); and d) timing and responsibility for implementation of the mitigation measure(s) The report is to be submitted to the Director-General within 60 days of the exceedance occurring. <p>The Proponent shall implement all reasonable and feasible mitigation measures in accordance with the requirements of the Director-General.</p>		
2.12 -The Proponent shall notify the DECC prior to undertaking any emergency ash haulage or placement operations outside of the hours of operation stipulated in condition 2.8 of this approval and keep a log of such operations		
2.13 -The Proponent shall notify the Director-General in writing within seven days of undertaking any emergency ash haulage or placement operations outside of the hours of operation stipulated in condition 2.8 of this approval.		
2.14 -The Proponent shall notify nearby sensitive receivers (as defined in the Operational Noise Management Plan required under condition 6.5a of this approval) prior to 8.00 pm where it is known that emergency ash haulage or placement operations will be required outside of the hours of operation stipulated in		

condition 2.8 of this approval.		
Operational Noise		
<p>2.15-The cumulative operational noise from the ash placement area and ash haulage activity shall not exceed an LAeq (15 minute) of 40 dB(A) at the nearest most affected sensitive receiver during normal operating hours 7am to 10pm Monday to Friday (as defined in condition 2.8 of this approval). This noise criterion applies under the following meteorological conditions:</p> <p>a) wind speeds up to 3m/s at 10 metres above ground; and/or</p> <p>b) temp inversion conditions of up to 3°C/100m and source to receiver gradient winds of up to 2 m/s at 10 metres above ground level This criterion does not apply where the Proponent and the affected landowner reach a negotiated agreement in regard to noise, and a copy of the agreement has been forwarded to the DG and DECC This noise criterion applies under meteorological conditions [detailed in section a) and b) of Condition 2.15.</p>		
<p>2.16-The Proponent shall implement measures to ensure noise attenuation of trucks. These measures may include, but are not necessarily limited to, installation of residential class mufflers, engine shrouds, body dampening, speed limiting, fitting of rubber stoppers to tail gates, limiting the use of compression braking, and ensuring trucks operate in a one-way system at the ash repository where feasible.</p>		
<p>2.17-The Proponent shall liaise with the owner/operator of Angus Place Coal Mine with the aim of preparing a protocol which provides for a cooperative approach for the management and mitigation of noise impacts associated with coal and ash truck movements along the private haul road.</p>		

<p>2.18-Where noise monitoring (as required by conditions 3.2 or 3.3 of this approval) identifies any non-compliance with the operational noise criterion specified under condition 2.15 of this approval the Proponent shall prepare and submit to the Director-General for approval a report including, but not limited to:</p> <ul style="list-style-type: none"> a) an assessment of all reasonable and feasible physical and other mitigation measures for reducing noise at the source including, but not limited to <ul style="list-style-type: none"> i) construction of a noise barrier along the haulage road, ii) alternative ash haulage routes, and iii) alternative methods of ash conveyance to the repository; and b) identification of the preferred measure(s) for reducing noise at the source; c) feedback from directly affected property owners and the DECC on the proposed noise mitigation measures; and d) location, type, timing and responsibility for implementation of the noise mitigation measure(s). <p>The report is to be submitted to the Director-General within 60 days of undertaking the noise monitoring which has identified exceedances of the operational noise criterion specified under condition 2.15, unless otherwise agreed to by the Director-General.</p> <p>The Proponent shall implement all reasonable and feasible mitigation measures in accordance with the requirements of the Director-General.</p>		
<p>Additional Noise Mitigation Measures</p>		
<p>2.19-If, after the implementation of all reasonable and feasible source controls, as identified in the report required by condition 2.18, the noise generated by the project exceeds 40 dB(A) at the nearest most affected sensitive receiver during normal operating hours of 7am to 10pm Monday to Friday, upon receiving a</p>		

written request from an affected landowner (unless that landowner has acquisition rights under condition 2.20 of this approval and has requested acquisition) the Proponent shall implement additional noise mitigation measures such as double glazing, insulation and/or air conditioning at any residence on the land, in consultation with the landowner. These additional mitigation measures must be reasonable and feasible. If within three months of receiving this request from the landowner the Proponent and landowner cannot agree on the measures to be implemented, or there is a dispute about the implementation of these measures, then either party may refer the matter to the Director-General for resolution, whose decision shall be final.		
Land Acquisition Criteria		
2.20 -If, after the implementation of all reasonable and feasible source controls, as identified in the report required by condition 2.18, the noise generated by the project exceeds the criterion stipulated in condition 2.15 by more than 5 dB(A) at a sensitive receiver, the Proponent shall, upon receiving a written request for acquisition from the landowner, acquire the land in accordance with the procedures in conditions 2.22 to 2.24 of this approval. Any landowner that has agreed to, or property that has been the subject of, the application of additional noise mitigation measures under condition 2.19 of this approval waives the right to land acquisition.		
2.21 -The land acquisition rights under condition 2.20 of this approval do not apply to landowners who have obtained approval to subdivide their land after the date of this Project Approval, unless the subdivision is created pursuant to condition 2.24 of this approval.		

<p>2.22-Within three months of receiving a written request from a landowner with acquisition rights under condition 2.20 of this approval, the Proponent shall make a binding written offer to the landowner based on:</p> <p>a) the current market value of the landowner's interest in the property at the date of this written request, as if the property was unaffected by the project which is the subject of the project application, having regard to the:</p> <ul style="list-style-type: none"> i) existing and permissible use of the land, in accordance with the applicable planning instruments at the date of the written request; and ii) presence of improvements on the property and/or any approved building or structure which has been physically commenced at the date of the landowner's written request, and is due to be completed subsequent to that date, but excluding any improvements that have resulted from the implementation of condition 2.19 of this approval; <p>b) the reasonable costs associated with:</p> <ul style="list-style-type: none"> i) relocating within the Lithgow local government area, or to any other local government area determined by the Director-General; ii) obtaining legal advice and expert advice for determining the acquisition price of the land, and the terms upon which it is required; and <p>(c) reasonable compensation for any disturbance caused by the land acquisition process.</p> <p>However, if at the end of this period, the Proponent and landowner cannot agree on the acquisition price of the land, and/or the terms upon which the land is to be acquired, then either party may refer the matter to the Director-General for resolution. Upon receiving such a request, the Director-General shall request the President of the NSW Division of the Australian</p>		
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Property Institute to appoint a qualified independent valuer or Fellow of the Institute, to consider submissions from both parties, and determine a fair and reasonable acquisition price for the land, and/or terms upon which the land is to be acquired. Within 14 days of receiving the independent valuer's determination, the Proponent shall make a written offer to purchase the land at a price not less than the independent valuer's determination. If the landowner refuses to accept this offer within six months of the date of the Proponent's offer, the Proponent's obligations to acquire the land shall cease, unless otherwise agreed by the Director-General.		
2.23 -The Proponent shall bear the costs of any valuation or survey assessment requested by the independent valuer or the Director-General and the costs of determination referred to above.		
2.24 -If the Proponent and landowner agree that only part of the land shall be acquired, then the Proponent shall pay all reasonable costs associated with obtaining Council approval for any plan of subdivision (where permissible), and registration of the plan at the Office of the Registrar-General.		
2.25 -The Proponent shall provide written notice to all landowners that are entitled to rights under conditions 2.19 and 2.20 within 21 days of determining the landholdings to which the criteria specified in condition 2.20 apply.		
Sawyers Swamp Creek Realignment		

<p>2.26-The Proponent shall prepare and submit to the Director-General for approval a Rehabilitation Plan addressing the restoration of the in-stream area (i.e. bed and bank) of Sawyers Swamp Creek and the associated riparian corridor at least two months prior to the realignment of the creek, unless otherwise agreed by the Director-General. The Plan shall be developed in consultation with, and to the satisfaction of, the DPI (Fisheries) and shall include, but not necessarily be limited to:</p> <ul style="list-style-type: none"> a) the objectives and outcomes that would be sought through the implementation of the Plan; b) performance criteria for the realigned creek and associated riparian zone against which the impact of the project on the ecological health of Sawyers Swamp Creek will be assessed; c) methodology used in developing the realignment platform; d) details of the final creek realignment including bank, meander, depth and slope characteristics (including pool-riffle sequences), flow and channel capacity characteristics, scour potential, and in-stream vegetation; e) timing of the creek realignment; f) a description of the proposed riparian zone and restoration works along the entire length of the creek realignment, including details of plant species to be used in rehabilitation; g) details of any proposed riparian and in-stream controls to be implemented in the reach upstream of the alignment to ensure the effectiveness of the proposed creek realignment and rehabilitation; h) a description of the initial and ongoing weed control measures; i) the methodology and timing of post realignment monitoring of the hydrology and ecological health of the aquatic and riparian vegetation as required under conditions 3.6-and 3.7-of this approval, respectively; j) mitigation measures to be implemented in the event of an identified decline in ecosystem health as a direct result of the 	<p><i>Executive Summary states realignment no longer required.</i></p>	<p><i>There is inconsistency in the reason for realigning creek: EA states it was necessary for the construction of a stabilisation berm required for long-term stability of the Repository. CEMP implies this is no longer required due to Centennial Coal's decision not to extract coal at the site. Proponent must clarify why this stabilisation measure is no longer required, or how stability of the site is to be maintained.</i></p> <p><i>Delta Electricity Response:</i></p> <p>As Centennial relinquished their right to extract coal from the Stage 2B area, and as ash was being placed in Stage 2A, Delta's structural engineers reviewed the ash placement plan and determined that moving the northern boundary at least 60m from the dam wall, at a depth of no more than 12 m, removed the necessity for the stabilisation berm. As a result of this, a monthly monitoring program was implemented to test the stability of the dam wall using survey assessment techniques. This monitoring was conducted for the 1st 12 months.</p> <p>As the stabilisation berm was no longer required, it was not necessary to realign Sawyers Swamp Creek.</p> <p>This reduced the total ash storage capacity of the site, however a cost/benefit analysis determined that the realignment of the creek was an undesirable course of action, given the alternative provided by the engineers.</p> <p>The following documents are provided in the Appendices within the CEMP:</p> <ul style="list-style-type: none"> • Engineers report • Stability monitoring results • Ash placement design plans
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<p>realignment of the creek or construction or operation of the project, including a timetable for implementation;</p> <p>k) program for ongoing maintenance of the realigned creek system and associated riparian zone;</p> <p>l) any compensatory measures to offset the impacts of the project on the aquatic habitat and local waterways, if and as required by the DPI (Fisheries); and</p> <p>m) provisions for periodic reporting of monitoring results to the DPI (Fisheries).</p> <p>The Proponent shall not commence any construction work that would result in the disturbance of Sawyers Swamp Creek until the Rehabilitation Plan has been approved by the Director-General.</p>		
<p>2.27-The rehabilitation and restoration of Sawyers Swamp Creek and associated riparian zone are to be consistent with the Works and Watercourse Design Guideline (DWE, April 2007) and Guidelines for Controlled Activities: Vegetation Management Plans (DWE, February 2008).</p>		<p><i>As above.</i></p> <p><i>Delta Electricity Response:</i></p> <p>This is no longer applicable.</p> <p>The Annual Environmental Management Report for 2009-10, submitted to DoP in October 2010, indicated that the realignment did not occur. Therefore no monitoring or rehabilitation/revegetation of this area of SSC has been required. CoA 2.26 – 2.29 are not applicable. No KVAR activities come within a 50m buffer of the creek.</p>
<p>2.28-A riparian zone consisting of local native plant species shall be established and maintained in and adjacent to Sawyers Swamp Creek, for the entirety of the site and be a minimum width of 20 m on both sides of the creek. Seed and propagule sources are to be from local botanical provenance and same general habitat.</p>	<p>Section 2.3.1</p>	<p><i>Section 2.3.1 It is uncertain the extent to which this condition remains relevant given the construction changes in relation to Sawyers Swamp Creek. However, reference is made to repository operating within a boundary of Sawyers Swamp Creek riparian zone. Reference is made to Appendix B, however, this map is not clear both in size and in what it is trying to illustrate.</i></p> <p><i>Delta Electricity Response:</i></p> <p>Not Applicable.</p>
<p>2.29-The riparian zone referred to under condition 2.28-of this approval shall be maintained for a period of at least five years</p>	<p>Section 2.3.1</p>	<p><i>As above (2.28)</i></p>

after final planting.		<p><i>Delta Electricity Response:</i></p> <p>Not Applicable.</p>
Surface water quality		
2.30 -The Proponent shall take all reasonable and feasible measures to prevent discharge of sediments and pollutants from the construction and operation of the project entering waterways.		<p><i>As stated See comments for 6.3c)</i></p>
2.31 -Earthworks not associated with the realignment of Sawyers Swamp Creek shall not be undertaken within 50 m of the creek where reasonable and feasible	Section 2.3.1	<p><i>As above (2.28) Plan in Appendix B does not clearly illustrate whether a 50 metre setback is maintained.</i></p> <p><i>Delta Electricity Response:</i></p> <p>All figures provided in the CEMP indicate operations do not occur within 50m of the creek.</p>
2.32 -All equipment, machinery and vehicles associated with the construction and operation of the project shall be operated and maintained in a manner that minimises the potential for oil and grease spills/leaks		<p><i>As stated. However, no details on proposed maintenance checks to ensure this are provided.</i></p> <p><i>Delta Electricity Response:</i></p> <p>All vehicles and equipment used in the construction works will be maintained according to the regular maintenance works for all vehicles/machinery/plant used in the operation of the repository. For further detail, refer to Appendices D and E provided in the CEMP.</p>
Air Quality and ash Impacts		
2.33 -The Proponent shall construct and operate the project in a manner that minimises dust impacts generated by construction works and operational activities, including wind-blown and traffic-generated dust, on the receiving environment. All activities on the site shall be undertaken with the objective of preventing visible emissions of dust from the site. Should such visible dust emissions occur at any time, the Proponent shall identify and implement all practicable dust mitigation measures,	Section 2.1.4.1	<p><i>Proponent acknowledges condition, however, does not state the mitigation measures to be undertaken for dust suppression, triggers for cessation of works etc.</i></p> <p><i>Delta Electricity Response:</i></p> <p>Dust monitoring for the entire repository site is conducted daily and reviewed monthly. Emergency triggers for Air Quality include visible</p>

including cessation of relevant works, as appropriate, such that emissions of visible dust cease.		dust behind vehicles at a maximum of 40km/hr and complaints from the community. Any incidences are mitigated with immediate implementation of water cart. The site has in place an extensive network of sprinklers and an additional water cart is proposed during construction in Section ## of the CEMP.
2.34 -The Proponent shall ensure that the load carrying compartment(s) of all ash haulage trucks are covered at all times except when loading or unloading ash material	Section 2.4.1.1	<i>Proponent acknowledges condition, however, there are no details as how these are integrated into workplace procedures.</i> <i>Delta Electricity Response:</i> Not applicable. This CoA refers to haulage of ash, not construction. Refer to Section 6.7 of the OEMP.
Lighting emissions		
2.35 -The Proponent shall take all practicable measures to mitigate off-site lighting impacts from the project and ensure all external lighting associated with the project complies with <i>Australian Standard AS4282 1997 – Control of the Obtrusive Effects of Outdoor Lighting</i>	Section 2.1.4.2	<i>Proponent restates commitment to Australian standard.</i>
Construction Traffic and Transport Impacts		
2.36 -The Proponent shall ensure that construction vehicles associated with the project: a) minimise the use of local roads (though residential streets and town centres) to gain access to the site; b) adhere to any nominated haulage routes identified in the Construction Traffic Management Plan as referred to in condition 6.3-a) of this approval; and c) adhere to a Construction Vehicle Code of Conduct prepared to manage driver behaviour along the local road network to address traffic impacts (and associated noise) along nominated haulage routes.	Section 2.1.5	<i>Largely restates the condition in the document. There is no identification of haulage routes (including proposed new haul roads), or identification of provisions contained in the Code of Conduct.</i> <i>Delta Electricity Response:</i> a) No local roads will be used in Construction activities. Once the necessary construction vehicles are on site, they will not need to leave until construction is complete. This will involve a one-off delivery of construction equipment within the advised hours of operation along public roads and will not include driving through town centres or along residential streets. b) The Construction Traffic Management Plan in the CEMP proposes the refurbishment and upgrade of a current access

		<p>road for future use as a haul road. This road has already been approved (under KVAR Stage 1 approvals), and its upgrade is considered part of the necessary construction activities for Stage 2B. The augmentation of this road will effectively reduce traffic related noise, as well as time required to traverse the site in future when ash is being hauled.</p> <p>Refer to KVAR Stage 1 approval for details on the location and approval of the proposed haul road.</p> <p>c) All site personnel are inducted before being granted access to the site, and speed limits and codes of conduct are regularly enforced.</p>
Heritage Impacts		
<p>2.37-The Proponent shall ensure that all construction personnel are educated on their obligations in respect of the protection of Aboriginal and non-indigenous heritage sites and items.</p>	<p>Section 2.1.4.3</p>	<p><i>Condition restated. However, no details as to what the procedures are in the event that heritage items are found.</i></p> <p><i>Delta Electricity Response:</i></p> <p>Principal contractor Conneq Industrial Infrastructure have a detailed Work Procedures Manual, including a detailed induction before personnel are granted access to the site.</p>
<p>2.38-If any previously unidentified heritage sites or items (Aboriginal and/or non-indigenous) (as defined under the <i>National Parks and Wildlife Act 1974</i>, and/or <i>Heritage Act 1977</i>) are discovered during construction works or operational activities, all work likely to affect the heritage sites or item(s) is to cease immediately and the discovery of the objects shall be reported to DECC Regional Archaeologist, the Bathurst Local Aboriginal Land Council, or the NSW Heritage Office, or the Department as relevant, so that an appropriate course of Action can be determined.</p>	<p>Section 2.1.4.3</p>	<p><i>Inadequate. As above – no details of the procedures to be undertaken in the event that heritage items are found.</i></p> <p><i>Delta Electricity Response:</i></p> <p>Principal contractor Conneq Industrial Infrastructure have a detailed Work Procedures Manual, including a detailed induction before personnel are granted access to the site. Heritage impacts form part of this induction, and are also listed in the Risk Assessment for the CEMP (Appendix E).</p>
Waste Management		

<p>2.39-All waste materials shall be assessed, classified, managed and disposed of in accordance with <i>Environmental Guidelines: Assessment, Classification and Management of Liquid and Non-liquid Wastes</i> (EPA, 1999)</p>	<p>Section 2.1.4.3</p>	<p><i>Inadequate. States guided by the Environmental Protection Licence. However, only states “all wastes associated with construction including fuels and oils will need to be removed from the site”. No details on how this is proposed to be managed.</i></p> <p><i>Delta Electricity Response:</i></p> <p>Stage 2 operations can receive approved waste generated from Delta’s activities only in accordance with the EP licence 766. Any wastes not included in this are stored in Delta’s facilities and hauled away. We do anticipate any wastes will be generated during Construction activities.</p>
<p>2.40-All waste materials removed from the site shall only be directed to a waste management facility lawfully permitted to accept the materials.</p>	<p>Section 2.1.4.3</p>	<p><i>Largely as stated. However, as for above, no details provided.</i></p> <p><i>Delta Electricity Response:</i></p> <p>As above. Refer to the CEMP Risk Assessment (Appendix E).</p>
<p>2.41-The Proponent shall not cause, permit or allow any waste generated outside the site to be received at the site for storage, treatment, processing, reprocessing, or disposal on the site, except as expressly permitted by a licence under the <i>Protection of the Environment Operations Act 1997</i>, if such a licence is required in relation to that waste.</p>	<p>Section 2.1.4.3</p>	<p><i>As stated.</i></p>
<p>Environmental Monitoring</p>		

<p>3.1-The Proponent shall prepare and implement a Construction Noise Monitoring Program to confirm the predictions of the noise assessment detailed in the document referred to under condition 1.1b) of this approval and assess compliance against the construction noise criterion stipulated in condition 2.7-of this approval. The noise monitoring program shall be prepared in consultation with, and to the satisfaction of, the DECC. The monitoring program shall form part of the Construction Noise Management Plan referred to in condition 6.3-b) of this approval and must include monitoring of the construction noise generated during:</p> <ul style="list-style-type: none"> a) the realignment Sawyers Swamp Creek; b) construction of the stabilisation berm; c) excavation of the former pine plantation area; d) relocation and construction of surface water management structures; and e) concurrent construction activities. <p>The Proponent shall forward to the DECC and the Director-General a report containing the results of each noise assessment and describing any non-compliance within 14 days of conducting a noise assessment.</p>	<p><i>During Construction</i></p>	<p><i>Note. It appears that aspects of the proposal have changed from those items listed from a) to e). This includes the intensification of surface water management structures to a wetland.</i></p> <p><i>Delta Electricity Response:</i> Refer to the AEMR submitted for 2009-10 for details on the monitoring programs for Kerosene Vale Ash Repository. The AEMR for 2010-11 is in draft form and will be submitted soon. All monitoring for the area will be continued throughout construction in accordance with the current monitoring program. In addition to this an attended noise monitoring event will be conducted to ensure compliance with noise requirements.</p>
<p>3.2-Within 60 days of the commencement of operation of the project, unless otherwise agreed to by the Director-General, the Proponent shall submit for the approval of the Director-General an Operational Noise Review to confirm the operational noise impacts of the project. The Operational Noise Review must be prepared in consultation with, and to the satisfaction of, the DECC. The Review shall: a) identify the appropriate operational noise objectives and level for sensitive receivers; b) describe the methodologies for noise monitoring including the frequency of measurements and location of monitoring sites; c) document the operational noise levels at sensitive receivers as ascertained by the noise monitoring program; d) assess the noise performance</p>		

of the project against the noise criterion specified in condition 2.15 of this approval and the predicted noise levels as detailed in the report referred to under condition 1.1b of this approval; and e) provide details of any entries in the Complaints Register (as required under condition 5.4 of this approval) relating to noise impacts. Where monitoring indicates noise levels in excess of the operational noise criterion specified in condition 2.15 of this approval, Proponent shall prepare a report as required by condition 2.18 of this approval.		
Ongoing operational noise monitoring		
<p>3.3-The Proponent shall prepare and implement an Operational Noise Monitoring Program to assess compliance against the operational noise criterion stipulated in condition 2.15 of this approval, throughout the life of the project. The noise monitoring program shall be prepared in consultation with, and to the satisfaction of, the DECC. The noise monitoring program shall be prepared in accordance with the requirements of the <i>New South Wales Industrial Noise Policy</i> (EPA, 2000) and must include, but not be limited to:</p> <p>a) monitoring during ash placement in the far western area of the site adjacent to the haul road; and</p> <p>b) monitoring of the effectiveness of any noise mitigation measures against the noise criterion specified in condition 2.18 of this approval and the predicted noise levels as detailed in the report referred to under condition 2.15 of this approval.</p> <p>Noise from the project is to be measured at the most affected point or within the residential boundary, or at the most affected point within 30 metres of a dwelling (rural situations) where the dwelling is more than 30 metres from the boundary, to determine compliance with the noise criterion stipulated in condition 2.15 of this approval. Where it can be demonstrated that direct measurement of noise from the project is impractical, the DECC may accept alternative means of determining compliance (see Chapter 11 of the <i>NSW Industrial Noise Policy</i>).</p>		

<p>The modification factors in Section 4 of the <i>NSW Industrial Noise Policy</i> shall also be applied to the measured noise levels where applicable.</p> <p>The Proponent shall forward to the DECC and the Director-General a report containing the results of any non-compliance within 14 days of conducting a noise assessment.</p> <p>Where monitoring indicates noise levels in excess of the operational noise criterion specified in condition 2.15 of this approval, approval, the Proponent shall prepare a report as required by condition 2.18 of this approval.</p> <p>The monitoring program shall form part of the Operational Noise Management Plan referred to in condition 6.5a of this approval.</p>		
Groundwater Monitoring		
<p>3.4-The Proponent shall prepare and implement a Groundwater Monitoring Program to monitor the impacts of ash placement activities on local groundwater quality and hydrology. The Program shall be developed in consultation with, and to the satisfaction of, the SCA, and shall describe the location, frequency, rationale and procedures and protocols for collecting groundwater samples as well as the parameters analysed and methods of analysis. The monitoring program shall be ongoing for the life of the project and include, but not be limited to: a) monitoring at established bore sites (or replacement bore sites in the event that existing sites are damaged or lost) as described in the document referred to under condition 1.1b of this approval; and b) a schedule for periodic monitoring of groundwater quality, depth and flow at all monitoring sites, at an initial frequency of no less than once every month for the first 12 months of operation. The monitoring program shall form part of the Groundwater Management Plan referred to in condition 6.5b of this approval.</p>	<p><i>Generally relevant to OEMP</i></p>	<p><i>No details provided. If the ash disposal sites are changed because of the construction that is now proposed, changes may need to be made to the Groundwater Management Plan outlined in the OEMP.</i></p> <p><i>Delta Electricity Response:</i></p> <p>Relevant to the OEMP only. The CEMP refers to construction only and not to ash placement.</p> <p>The proposed construction activities (i.e. excavation of the Stage 2B area) plans to go down as deep as 9.4m which is approximately 5m above the existing water table (determined through monthly groundwater monitoring) which will continue.</p> <p>Refer to the AEMR submitted for 2009-10 for detail on the monitoring program implemented by Delta Electricity at KVAR. The AEMR for 2010-11 is in draft form and will be submitted to the DoP soon.</p>
Surface water quality monitoring		

<p>3.5-The Proponent is to implement a surface water quality monitoring program to monitor the impacts of the ash placement activities on, and the realignment of, Sawyers Swamp Creek. The Program shall be developed in consultation with and to the satisfaction of the DPI (Fisheries) and SCA, and shall describe the location, frequency, rationale and the procedures and protocols for collecting water samples as well as the parameters analysed and methods of analysis. The program shall include, but not necessarily be limited to:</p> <ul style="list-style-type: none"> a) monitoring at the four existing water quality monitoring sites as described in the document referred to under condition 1.1b of this approval b) monitoring downstream of the realigned section of Sawyers Swamp Creek c) monitoring at groundwater discharge points into Sawyers Swamp Creek d) wet weather monitoring with a minimum of two events recorded within the first 12 months of both the operation of the project and post realignment of Sawyers Swamp Creek e) a schedule for periodic monitoring of surface quality at all sites throughout the life of the project, at an initial frequency of no less than once every month for the first 12 months and must include, but not be limited to, dissolved oxygen, turbidity, total phosphorus and total nitrogen. <p>The monitoring program shall form part of the Surface Water Management Plan referred to in condition 6.5c of this approval.</p>		<p><i>As for groundwater monitoring, If the ash disposal sites are changed because of the construction now proposed, changes may need to be made to the Surface Water Quality Plan outlined in the OEMP.</i></p> <p><i>Delta Electricity Response:</i></p> <p>The ash disposal area for KVAR Stage 2 has <u>not changed</u>. Compare the Figures provided in the OEMP with Figure 2 provided in the CEMP. The change noted by the Department is the difference in the staging of the approach to ash placement to accommodate Centennial Coal whilst they decided whether or not to extract coal from the Stage 2B area.</p> <p>Refer to the AEMR submitted for 2009-10 for detail on the monitoring program implemented by Delta Electricity at KVAR. The AEMR for 2010-11 is in draft form and will be submitted to the DoP soon.</p>
<p>Sawyers Swamp Creek Realignment Monitoring</p>		

<p>3.6-The Proponent is to implement a Hydrological Monitoring Program to assess and quantify the impacts and effectiveness of the realigned section of Sawyers Swamp Creek in consultation with and to the satisfaction of the DPI (Fisheries). Monitoring is to be undertaken for a period of five (5) years upon completion of the creek realignment and is to include scour and erosion monitoring. The program must include sampling before and after the realignment works and include a sampling site downstream of the realigned section of creek. In the first 12 months following completion of the realignment, monitoring is to be undertaken at least every three (3) months upon completion of the creek realignment and after any wet weather/bankful flow event.</p> <p>The monitoring program shall form part of the Rehabilitation Plan for the project as referred to in condition 2.26-of this approval.</p>		<p><i>The relevance of this condition should be clearly noted in light of changes.</i></p> <p><i>Delta Electricity Response:</i></p> <p>N/A. This is not required as Sawyers Swamp Creek has not been realigned, as the revised placement of ash removed the necessity for the stabilisation berm. As the stabilisation berm is not required, ash placement will not encroach upon the creek area, and as such the creek does not need to be realigned. Details above.</p>
<p>3.7-The Proponent shall prepare an Ecological Monitoring Program, in consultation with, and to the satisfaction of, the DPI (Fisheries), to monitor and quantify the impacts of the realignment of Sawyers Swamp Creek on the ecology and ecosystems of the creek and the associated riparian environment. The Program shall include, but not necessarily be limited to:</p> <ul style="list-style-type: none"> a) a sampling, data collection and assessment regime to establish baseline ecological health and for ongoing monitoring of ecological health of the in-stream environment during construction and throughout the life of the project; b) at least one in-stream sampling period prior to the realignment of Sawyers Swamp Creek and at least two (2) sampling periods following the realignment of Sawyers Swamp Creek; and c) an assessment regime for monitoring the ecological health of the riparian environment for a period of at least five (5) years after final planting. 		<p><i>The relevance of this condition should be clearly noted in light of changes.</i></p> <p><i>Delta Electricity Response:</i></p> <p>N/A.</p>

The monitoring program shall form part of the Rehabilitation Plan for the project as referred to in condition 2.26-of this approval.		
Air Quality Monitoring		
<p>3.8-The Proponent shall prepare an Air Quality Monitoring Program, in consultation with, and to the satisfaction of, the DECC. The Program shall include, but not necessarily be limited to, monitoring for dust at the monitoring sites identified in the document referred to under condition 1.1b of this approval. The air quality monitoring program shall be ongoing for the life of the project, including final rehabilitation and stabilisation of the site.</p> <p>The monitoring program shall form part of the Air Quality Management Plan referred to in condition 6.5d of this approval.</p>		Addressed as part of OEMP.
Compliance monitoring and tracking		
<p>4.1-Prior to each of the events listed below, the Proponent shall certify in writing to the satisfaction of the Director-General that it has complied with all conditions of this approval applicable prior to that event:</p> <p>a) commencement of any construction works on the land subject of this approval; and</p> <p>b) commencement of operation of the project.</p>		<p><i>This has not been done.</i></p> <p><i>Delta Electricity Response:</i></p> <p>4.1a) approval has been sought in the form of the CEMP submitted to the Department of Planning; and</p> <p>4.1b) the Director-General was notified of commencement of operations at KVAR - check the AEMR submitted for 2009-10 for further details, and correspondence records.</p>

<p>4.2-The Proponent shall develop and implement a Compliance Tracking Program for the project, prior to commencing operations, to track compliance with the requirements of this approval and shall include, but not necessarily limited to:</p> <ul style="list-style-type: none"> a) provisions for periodic review of the compliance status of the project against the requirements of this approval and the Statement of Commitments detailed in the document referred to in condition 1.1c) of this approval; b) provisions for periodic reporting of the compliance status to the Director-General; c) a program for independent environmental auditing in accordance with AS/NZ ISO 19011:2003 -Guidelines for Quality and/or Environmental Management Systems Auditing; d) procedures for rectifying any non-compliance identified during environmental auditing or review of compliance; e) mechanisms for recording environmental incidents and actions taken in response to those incidents; f) provisions for reporting environmental incidents to the Director-General during construction and operation; and g) provisions for ensuring all employees, contractors and sub-contractors are aware of, and comply with, the conditions of this approval relevant to their respective activities. <p>The Compliance Tracking Program shall be implemented prior to operation of the project with a copy submitted to the Director-General for approval within four weeks of commencement of the project, unless otherwise agreed by the Director-General.</p>		
<p>4.3-Nothing in this approval restricts the Proponent from utilising any existing compliance tracking programs administrated by the Proponent to satisfy the requirements of condition 4.2. In doing so, the Proponent must demonstrate to the Director-General how these systems address the requirements and/or have been amended to comply with the requirements of the condition.</p>		

<p>4.4-The Proponent shall meet the requirements of the Director-General in respect of the implementation of any measure necessary to ensure compliance with the conditions of this approval, and general consistency with the Major Project Application 07_0005, Environmental Assessment (EA) dated April 2008, Submissions report dated 30 May 2008, and the CoA.</p>		<p><i>Note this condition.</i></p> <p><i>Delta Electricity Response:</i></p> <p>This condition is addressed in the CEMP and is noted. The CEMP and Repository Management Plan for KVAR are based on the Environmental Assessment and the OEMP.</p>
<p>Community information and complaints management</p>		
<p>5.1-Prior to the commencement of the project, the Proponent shall establish and maintain a website for the provision of electronic information associated with the project. The Proponent shall, subject to confidentiality, publish and maintain up-to-date information on this website or dedicated pages including, but not necessarily limited to:</p> <ul style="list-style-type: none"> a) the documents referred to under condition 1.1 of this approval; b) this project approval, Environment Protection Licence and any other relevant environmental approval, licence or permit required and obtained in relation to the project; c) all strategies, plans and programs required under this project approval, or details of where this information can be viewed; d) information on construction and operational progress; e) the outcomes of compliance tracking in accordance with the requirements of this project approval. 		<p><i>The Proponent must demonstrate this has been done for the construction phase with appropriate referrals (eg. to websites).</i></p> <p><i>Delta Electricity Response:</i></p> <p>The website is: http://www.de.com.au/About-Us/Ash-management/Kerosene-Vale-Ash-Repository/default.aspx</p> <p>Delta will notify the public via the website once approval has been granted by the Department of Planning and construction is due to commence.</p>
<p>5.2-The Proponent shall make all documents required to be provided under condition 5.1 of this approval publicly available.</p>		<p><i>As stated</i></p>
<p>Complaints and Enquiries procedure</p>		

<p>5.3-Prior to the commencement of the project, the Proponent shall ensure that the following are available for community complaints and enquiries during construction and operation:</p> <ul style="list-style-type: none"> a) a 24 hour contact number(s) on which complaints and enquiries about construction and operational activities may be registered; b) a postal address to which written complaints and enquiries may be sent; and c) an email address to which electronic complaints and enquiries may be transmitted. <p>The telephone number, postal address and email address shall be published in a newspaper circulating in the local area prior to the commencement of the project. The above details shall also be provided on the website required by condition 5.1 of this approval.</p>		<p><i>The Proponent must demonstrate this has been done for the construction phase with appropriate referrals (eg. to websites).</i></p> <p><i>Delta Electricity Response:</i> See response for CoA 5.1 above.</p>
<p>5.4-The Proponent shall record the details of all complaints received through the means listed under condition 5.3 of this approval in an up-to-date Complaints Register. The Register shall record, but not necessarily be limited to:</p> <ul style="list-style-type: none"> a) the date and time of the complaint; b) the means by which the complaint was made (e.g. telephone, email, mail, in person); c) any personal details of the complainant that were provided, or if no details were provided a note to that effect; d) the nature of the complaint; e) the time taken to respond to the complaint; f) any investigations and actions taken by the Proponent in relation to the complaint; g) any follow-up contact with, and feedback from, the complainant; and h) if no action was taken by the Proponent in relation to the complaint, the reason(s) why no action was taken. <p>The Complaints Register shall be made available for inspection by</p>		<p><i>The Proponent must demonstrate how this is to be done for the construction phase with appropriate referrals (eg. to websites).</i></p> <p><i>Delta Electricity Response:</i> See response for CoA 5.1 above. Also, incidents such as these are covered by Delta's extensive Environmental Management System and ISO14001 certification.</p> <p>For further detail, refer to the AEMR submitted to the DoP for 2009-10.</p>

the Director-General upon request.		
Environmental Management		
<p>6.1-Prior to the commencement of any construction or operational activities, or as otherwise agreed by the Director-General, the Proponent shall nominate for the approval of the Director-General a suitably qualified and experienced Environmental Representative(s) independent of the design, construction and operation personnel. The Proponent shall engage the Environmental Representative(s) during any construction activities, and throughout the life of the project, or as otherwise agreed by the Director-General. The Environmental Representative(s) shall:</p> <p>a) oversee the implementation of all environmental management plans and monitoring programs required under this approval, and advise the Proponent upon the achievement of these plans/programs;</p> <p>b) have responsibility for considering and advising the Proponent on matters specified in the conditions of this approval and the Statement of Commitments as referred to under condition 1.1c of this approval;</p> <p>c) oversee the implementation of the environmental auditing of the project in accordance with the requirements of condition 4.2 of this approval and all relevant project Environmental Management System(s); and</p> <p>d) be given the authority and independence to recommend to the Proponent reasonable steps to be taken to avoid or minimise unintended or adverse environmental impacts, and, failing the effectiveness of such steps, to recommend to the Proponent that relevant activities are to be ceased as soon as reasonably practicable if there is a significant risk that an adverse impact on the environment will be likely to occur.</p>		<p><i>Proponent must confirm who ER is. Has ER overseen the implementation of the plan? Plan has not been signed by an ER.</i></p> <p><i>Delta Electricity Response:</i></p> <p>The Environmental Representative, Environment Manager- Western Nino Di Falco was nominated in 2009. The nominated Environmental Representative and the Environment- Western team oversaw the preparation of the CEMP.</p> <p>As the Environment- Western team is independent of the operational personnel for Kerosene Vale, the Team ensures continued compliance through monitoring and tracking progress of operations for the repository area. This includes surface and groundwater, dust and noise monitoring.</p> <p>For further detail, refer to the AEMR submitted to the DoP for 2009-10.</p> <p>The Environment- Western team recently audited the Stage 2 operations for the AEMR for 2010-11. This report is currently in draft form and will be submitted to the DoP in the coming weeks.</p>
Construction Environmental Management		

<p>6.2-Prior to the commencement of construction work, the Proponent shall prepare and implement a Construction Environmental Management Plan (CEMP). The CEMP shall outline the environmental management practices and procedures to be followed during construction. The CEMP shall be prepared in accordance with Guideline for the Preparation of Environmental Management Plans (DIPNR, 2004).</p> <p>The Construction Environmental Management Plan for the project (or any stage of the project) shall be submitted to the Director-General for approval at least four weeks prior to the commencement of any construction work associated with the project (or stage as relevant), unless otherwise agreed by the Director-General. Construction shall not commence until written approval has been received from the Director-General.</p>		<p><i>Inadequate.</i></p> <p><i>Delta Electricity Response:</i></p> <p>Some clarification has been sought by the Department. The CEMP and all works proposed therein are covered by the CoA and all relevant documents.</p> <p>Comments provided have been considered and the CEMP has been updated for re-submission to the DoP.</p>
<p>6.3-As part of the Construction Environmental Management Plan for the project, the Proponent shall prepare and implement the following plans:</p> <p>a) a Construction Traffic Management Plan, prepared in consultation with RTA, the relevant Council and emergency services to manage the construction traffic impacts of the project, including but not limited to:</p> <ul style="list-style-type: none"> i) identifying construction vehicle volumes (construction staff vehicles, heavy vehicles and oversized loads) and haulage routes; ii) identifying any road closures and/or traffic detours during the haulage of oversized loads as agreed to by the relevant roads authority; iii) detailing a Construction Vehicle Code of Conduct to set driver behaviour controls to minimise impacts on the land uses along haulage routes (including noise minimisation measures); and 	<p>a) section 2.1 b) section 2.2 c) Section 2.3</p>	<p><i>Inadequate</i></p> <p><i>a) No details of consultation with RTA or relevant council or emergency services</i></p> <ul style="list-style-type: none"> i) <i>2.1.1 Vehicles include 1 excavator (30 tonne); 2 dump trucks (40 tonne); 1 D11 and 1D7 dozer for road grading; Daily support vehicles include fuel and maintenance trucks. No details of est. number per day (ie. volume) along haulage road.</i> <p><i>a)ii) 2.1.3 states RTA will be notified of road closure. However, what about Council?</i></p> <p><i>a)iii) 2.1.3 No details in code of conduct – eg. how noise will be minimised a)iv) No indication of any compliance with document. b) No evidence of consultation with OEH (formerly DECC).</i></p> <p><i>b)i) no details of construction activities or schedule of construction works;</i></p> <p><i>b)ii) a table of site undertaking predicted to have noise impact. However, no investigation of extent to which they will impact.</i></p> <p><i>b)iii) no procedures for assessing noise levels</i></p> <p><i>b)iv) no details of noise mitigation measures b)v) no procedures for</i></p>

<p>iv) complying with the document Procedures for Use in the Preparation of a Traffic Management Plan (RTA, 2001).</p> <p>b) a Construction Noise Management Plan to detail how construction noise impacts would be minimised and managed. The Strategy shall be developed in consultation with, and to the satisfaction of, the DECC and shall include, but not necessarily be limited to:</p> <ul style="list-style-type: none"> i) details of construction activities and an indicative schedule for construction works; ii) identification of construction activities that have the potential to generate noise impacts on sensitive receivers; iii) procedures for assessing noise levels at sensitive receivers and compliance; iv) details of the reasonable and feasible actions and measures to be implemented to minimise noise impacts and, if any noise exceedance is detected, how any non-compliance would be rectified; and v) procedures for notifying sensitive receivers of construction activities that is likely to affect their noise amenity. <p>c) an Erosion and Sediment Control Plan to detail measures to minimise erosion and the discharge of sediment and other pollutants to land and/or water during construction works. The Plan must include, but not necessarily be limited to:</p> <ul style="list-style-type: none"> i) identification of the construction activities that could cause soil erosion or discharge sediment or water pollutants from the site; ii) a description of the management methods to minimise soil erosion or discharge of sediment or water pollutants from the site, including a strategy to minimise the area of bare surfaces, stabilise disturbed areas, and minimise bank erosion; and 		<p><i>notifying noise sensitive receivers detailed. c) outlines management methods (2.3.4) – eg. managing flow direction away from Sawyers Swamp Creek; edge of external perimeters for run off on haul roads to be 0.5 metres higher than inside.</i></p> <p><i>c)i) 2.3.4 there is a very limited description of management methods to minimise soil erosion and sediment discharge. c)iii) states compliance with Landcom document but does not demonstrate compliance.</i></p> <p><i>Delta Electricity Response:</i></p> <p>The following are addressed within the CEMP document. Refer to the Discussion Table in the Appendices for further detail.</p> <ul style="list-style-type: none"> a) RTA will be notified of the preparation of a Construction Traffic Management Plan <ul style="list-style-type: none"> I. There will be no daily movement of traffic along the haul road during construction. Initial haulage of equipment by truck before commencement of construction activities will occur. II. Lithgow City Council and RTA will be notified of any road closures if they are required. It is not anticipated there will be any road closures. III. Principal contractors Conneq Industrial Infrastructure’s Work Procedures Manual covers this requirement. IV. This document was consulted in preparation of the Traffic Management Plan and is referenced in the CEMP. b) The Office of Environment and Heritage received a copy of the CEMP as a matter of course, and provided no comments. <ul style="list-style-type: none"> I. Refer to tables 1 – 4 contained in the CEMP. II. Information contained in the Risk Assessment (CEMP
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<p>iii) demonstration that the proposed erosion and sediment control measures will conform with, or exceed, the relevant requirements of Managing Urban Stormwater: Soils and Construction (Landcom, 2004).</p>		<p>Appendices) and monthly monitoring program.</p> <p>III. Information contained in the Risk Assessment (CEMP Appendices) and monthly monitoring program.</p> <p>IV. Information contained in the Risk Assessment (CEMP Appendices) and monthly monitoring program.</p> <p>V. Website- construction information will be provided on the website once approval is granted by the DoP and construction is due to commence.</p> <p>c) The entire construction site is contained within the KVAR boundary. All water from the site is contained for reuse in processes and is not allowed to enter the catchment. Risk of surface water runoff reaching SSC is mitigated as the construction area drains away from SSC to the ash washdown system. In addition to this, sediment controls have been implemented. These measures have been articulated in the CEMP.</p>
<p>Operational Environmental Management</p>		
<p>6.4-The Proponent shall prepare and implement an Operation Environmental Management Plan to detail an environmental management framework, practices and procedures to be followed during operation of the project. The Plan shall be consistent with Guideline for the Preparation of <i>Environmental Management Plans</i> (DIPNR 2004) and shall include, but not necessarily be limited to:</p> <p>a) identification of all statutory and other obligations that the Proponent is required to fulfil in relation to operation of the project, including all approvals, licences, approvals and consultations;</p> <p>b) a description of the roles and responsibilities for all relevant employees (including contractors) involved in the operation of the project;</p>		

<p>c) overall environmental policies and principles to be applied to the operation of the project;</p> <p>d) standards and performance measures to be applied to the project, and a means by which environmental performance can be periodically reviewed and improved, where appropriate;</p> <p>e) management policies to ensure that environmental performance goals are met and to comply with the conditions of this approval;</p> <p>f) the additional plans listed under condition 6.5 of this approval; and</p> <p>g) the environmental monitoring requirements outlined under conditions 3.3 to 3.5 inclusive and 3.8 of this approval.</p> <p>The Plan shall be submitted for the approval of the Director-General no later than four weeks prior to the commencement of operation of the project, unless otherwise agreed by the Director-General. Operation shall not commence until written approval has been received from the Director-General. Nothing in this approval precludes the Proponent from incorporating the requirements of the Operational Environmental Management Plan into existing environmental management systems and plans administered by the Proponent.</p>		
<p>6.5-As part of the Operation Environmental Management Plan for the project, required under condition 6.4 of this approval, the Proponent shall prepare and implement the following Management Plans:</p> <p>a) an Operational Noise Management Plan to detail measures to mitigate and manage noise during operation of the project. The Plan shall be prepared in consultation with, and to the satisfaction of, the DECC and include, but not necessarily be limited to:</p> <p>i) procedures to ensure that all reasonable and feasible noise mitigation measures are applied during operation of the project;</p>		

<p>ii) identification of all relevant sensitive receivers and the applicable criteria at those receivers commensurate with the noise limit specified under condition 2.15 of this approval;</p> <p>iii) identification of activities that will be carried out in relation to the project and the associated noise sources;</p> <p>iv) noise monitoring procedures (as referred to in condition 3.3 of this approval) for periodic assessment of noise impacts at the relevant receivers against the noise limits specified under this approval and the predicted noise levels as detailed in the report referred to under condition 1.1b) of this approval;</p> <p>v) details of all management methods and procedures that will be implemented to control individual and overall noise emissions from the site during operation;</p> <p>vi) procedures and corrective actions to be undertaken if noncompliance against the operational noise criteria is detected; and</p> <p>vii) provisions for periodic reporting of results to DECC.</p> <p>b) a Groundwater Management Plan to detail measures to mitigate and manage groundwater impacts. The Plan shall be prepared in consultation with, and to the satisfaction of, the SCA and include, but not necessarily be limited to:</p> <p>i) baseline data on groundwater quality, depth and flow in the project area;</p> <p>ii) groundwater objectives and impact assessment criteria;</p> <p>iii) a program to monitor groundwater flows and groundwater quality in the project area as required by condition 3.4 of this approval;</p> <p>iv) a protocol for the investigation of identified exceedances of the groundwater impact assessment criteria;</p>		
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<p>v) a response plan to address potential exceedances and groundwater quality impacts; and</p> <p>vi) provisions for periodic reporting of results to the SCA.</p> <p>c) a Surface Water Management Plan to outline measures that will be employed to manage water on the site, to minimise soil erosion and the discharge of sediments and other pollutants to lands and/or waters throughout the life of the project. The Plan shall be based on best environmental practice and shall be prepared in consultation with, and to the satisfaction of, the SCA and DPI (Fisheries). The Plan shall include, but not necessarily be limited to:</p> <ul style="list-style-type: none"> i) baseline data on the water quality and flow in Sawyers Swamp Creek up to the date of this approval; ii) water quality objectives and impact assessment criteria for Sawyers Swamp Creek; iii) a program to monitor surface water quality in Sawyers Swamp Creek as referred to in condition 3.5 of this approval; iv) a protocol for the investigation of identified exceedances in the impact assessment criteria; v) a response plan to address potential adverse surface water quality exceedances; vi) a site water management strategy identifying clean and dirty water areas for Stages A, B and C of the project and the associated water management measures including erosion and sediment controls and provisions for recycling/reuse of water and the procedures for decommissioning water management structures on the site; and vii) provisions for periodic reporting of results to the DPI (Fisheries) and the SCA. <p>d) an Air Quality Management Plan to outline measures to minimise impacts from the project on local air quality. The Plan</p>		
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shall be prepared in consultation with, and to the satisfaction of, the DECC and include, but not necessarily be limited to:

- i) baseline data on dust deposition levels;
- ii) air quality objectives and impact assessment criteria;
- iii) an air quality monitoring program as referred to in condition 3.8 of this approval;
- iv) an assessment of alternative methods of ash placement to minimise the exposure of active placement areas to prevailing winds;
- v) mitigation measures to be incorporated during emplacement activities and haulage of ash;
- vi) an operating protocol for the repository irrigation system including activation rates, application rates and area of coverage;
- vii) a protocol for the investigation of visible emissions from the repository area;
- viii) a response plan to address visible emissions from the repository area; and
- ix) provisions for periodic reporting of results to the DECC.

e) a **Landscape/Revegetation Plan** to outline measures to minimise the visual impacts of the repository and ensure the long-term stabilisation of the site and compatibility with the surrounding land fabric and land use. The Plan shall include, but not necessarily be limited to:

- i) identification of design objectives and standards based on local environmental values, vistas, and land uses;
- ii) a description of short-and long-term revegetation measures;
- iii) a schedule of species to be used in revegetation;
- iv) timing and progressive implementation of revegetation works as placement areas are completed, including landscape plans; and
- v) procedures and methods to monitor and maintain

<p>revegetated areas during the establishment phase and long-term.</p> <p>Revegetation works must incorporate the use of local native species.</p>		
Environmental Reporting		
<p>7.1-The Proponent shall notify the Director-General of any environmental incident within 12 hours of becoming aware of the incident. The Proponent shall provide full written details of the incident to the Director-General within seven days of the date on which the incident occurred.</p>		<p><i>No details of commitment to environmental reporting or procedures to be taken in the event of an incident.</i></p> <p><i>Delta Electricity Response:</i></p> <p>The KVAR construction works are covered by Delta's EMS and will be integrated into the Annual Environmental Management Report (AEMR). Refer to the AEMR submitted for 2009-10. The Second AEMR 2010-11 is in draft form and will be submitted soon. These Construction Activities will be included in the AEMR for 2011-12.</p>
<p>7.2-The Proponent shall meet the requirements of the Director-General to address the cause or impact of any environmental incident, as it relates to this approval, reported in accordance with condition 7.1 of this approval, within such period as the Director-General may require.</p>		<p><i>See above (7.1)</i></p>
Annual Performance Reporting		

<p>7.3-The Proponent shall, throughout the life of the project, prepare and submit for the approval of the Director-General, an Annual Environmental Management Report (AEMR). The AEMR shall review the performance of the project against the Operation Environmental Management Plan (refer to condition 6.4 of this approval) and the conditions of this approval. The AEMR shall include, but not necessarily be limited to:</p> <ul style="list-style-type: none"> a) details of compliance with the conditions of this approval; b) a copy of the Complaints Register (refer to condition 5.4 of this approval) for the preceding twelve-month period (exclusive of personal details), and details of how these complaints were addressed and resolved; c) identification of any circumstances in which the environmental impacts and performance of the project during the year have not been generally consistent with the environmental impacts and performance predicted in the documents listed under condition 1.1 of this approval, with details of additional mitigation measures applied to the project to address recurrence of these circumstances; d) results of all environmental monitoring required under 3.3 to 3.8 of this approval, including interpretations and discussion by a suitably qualified person; and e) a list of all occasions in the preceding twelvemonth period when environmental goals/objectives/impact assessment criteria for the project have not been achieved, indicating the reason for failure to meet the criteria and the action taken to prevent recurrence of that type of failure. The Proponent shall submit a copy of the AEMR to the Director-General every year, with the first AEMR to be submitted no later than twelve months after the commencement of operation of the project. The Director-General may require the Proponent to address certain matters in relation to the environmental performance of the project in response to review of the Annual Environmental Report. Any 		<p><i>May be addressed via OEMP. However, no referral to how CEMP would in any way be integrated into this.</i></p> <p><i>Delta Electricity Response:</i></p> <p>See CoA 7.1 above.</p>
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<p>action required to be undertaken shall be completed within such period as the Director-General may require. The Proponent shall make copies of each AEMR available for public inspection on request.</p>		
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PR-PC-700 - Conneq Projects Division Significant Environmental Aspects

Complete by: Wendy Felsch Current on 24th May 2011
Risk Score = 1 - 5 = LOW 6 - 9 = MODERATE 10 - 25 = SIGNIFICANT (See - Conneq Risk Score Matrix Worksheet)

		Aspect Category	Aspect	Area of business	Impacts / Hazard Scenario	Potential Emergency Event	Uncontrolled Risk Score			Controlled Risk Score			Legal Requirements
							Likelihood	Consequence	Risk Score (as per PC-601)	Likelihood	Consequence	Risk Score (as per PC-601)	
9	1	Emissions to Air	Dust	Construction Projects	Generation of dust from clearing and topsoil removal at project sites	No	C	3	13	D	2	5	Yes
10	1	Emissions to Air	Dust	Construction Projects	Generation of dust from inclement weather at project sites	No	C	3	13	C	2	8	Yes
11	1	Emissions to Air	Dust	Construction Projects	Generation of dust from unsealed surfaces / stockpiles at project sites	No	C	3	13	C	1	4	Yes
12	1	Emissions to Air	Dust	Construction Projects	Generation of dust from concrete batching plants at project sites	No	C	2	8	D	2	5	Yes
13	1	Emissions to Air	Dust	Construction Projects	Generation of dust from vehicle movements on unsealed roads at project sites	Yes	C	3	13	C	1	4	Yes
28	1	Emissions to Air	Equipment Emissions	All	Generation of Carbon Dioxide and Greenhouse Gases Emissions	No	C	2	8	D	2	5	Yes
32	1	Release to Water (Surface and Ground Water)	Non Complying Releases to water	Construction Projects	Release of turbid / dirty water to waters during construction activities	Yes	C	3	13	D	2	5	Yes
33	1	Release to Water (Surface and Ground Water)	Non Complying Releases to water	Construction Projects	Release of concrete wash water to waters during construction activities	Yes	C	2	8	C	1	4	Yes
34	1	Release to Water (Surface and Ground Water)	Non Complying Releases to water	Construction Projects	Release of saline water to waters during construction activities	No	C	2	8	C	1	4	Yes
47	1	Release to Water (Surface and Ground Water)	Spillage of Hydrocarbons / Chemicals / Hazardous substances	Construction Projects	Spillage of Hydrocarbons / Chemicals / Hazardous substances to water from construction activities	Yes	C	2	8	D	2	5	Yes
58	1	Release to Land	Spillage of Hydrocarbons / Chemicals / Hazardous substances	Construction Projects	Spillage of Hydrocarbons / Chemicals / Hazardous substances to land from construction activities	No	C	2	8	D	2	5	Yes
70	1	Generation of Waste	General Waste Disposal	Construction Projects	Inappropriate disposal of general waste during construction activities	No	C	2	8	D	1	2	Yes
75	1	Generation of Waste	Hazardous Waste Disposal	Construction Projects	Inappropriate disposal of Contaminated waste during construction activities	Yes	C	3	13	C	1	4	Yes
103	1	Use of raw materials and natural resources	Water Usage	Construction Projects	Wastage of Water during construction activities	No	C	2	8	D	2	5	Yes
121	1	Use of raw materials and natural resources	Damage to protected flora / fauna species	Construction Projects	Damage to protected flora / fauna species during construction activities	No	C	2	8	C	1	4	Yes
129	1	Use of raw materials and natural resources	Land Disturbance	Construction Projects	Unmanaged disturbance of acid sulphate soils during construction activities	No	C	2	8	C	1	4	Yes
148	1	Other Environmental and Community Issues	Noise	Construction Projects	Generation of excessive Noise during construction activities	No	C	2	8	C	1	4	Yes
165	1	Other Environmental and Community Issues	Light Overspill	Construction Projects	Generation of excessive light during construction activities	No	C	2	8	D	1	2	Yes
174	1	Other Environmental and Community Issues	Cultural Heritage	Construction Projects	Damage / disturbance to Cultural heritage during construction activities	No	C	2	8	D	2	5	Yes
183	1	Other Environmental and Community Issues	Property	Construction Projects	Damage to private property (vehicles and other property) during construction activities	No	C	2	8	D	2	5	Yes
192	1	Other Environmental and Community Issues	Property	Construction Projects	Damage to services (power, communication, gas, water, sewer etc) during construction activities	No	C	3	13	C	2	8	Yes
204	1	Use of raw materials and natural resources	Community Issues	Construction Projects	Failure to respond to community complaints during construction activities	No	C	2	8	D	1	2	Yes
206	1	General	Subcontractors	All	Employment of Subcontractors	No	C	4	18	C	2	8	Yes
207	1	General	Tendering	All	Failure to conduct appropriate assessment and costing of environmental requirements in tenders	No	C	5	22	D	3	9	Yes
209	1	Opportunities for Improvement	Opportunities	All	Use of renewable energy		B	4	21				
210	1	Opportunities for Improvement	Opportunities	All	Preference for solar powered equipment / plant		B	4	21				
211	1	Opportunities for Improvement	Opportunities	All	Water saving devices		C	4	18				
212	1	Opportunities for Improvement	Opportunities	All	Improvement to aesthetics		C	4	18				
213	1	Opportunities for Improvement	Opportunities	All	Community improvements		C	4	18				
214	1	Opportunities for Improvement	Opportunities	All	Improved access		C	4	18				
215	1	Opportunities for Improvement	Opportunities	All	Improved local / regional air quality		C	4	18				
216	1	Opportunities for Improvement	Opportunities	All	Purchasing locally		C	4	18				
217	1	Opportunities for Improvement	Opportunities	All	Employment of local personnel		C	4	18				
218	1	Opportunities for Improvement	Opportunities	All	Employment of indigenous personnel		C	4	18				
219	1	Opportunities for Improvement	Opportunities	All	Sponsorships and donations		C	4	18				
220	1	Opportunities for Improvement	Opportunities	All	Encouragement of new business		C	4	18				
221	1	Opportunities for Improvement	Opportunities	All	Environmental education of subcontractors and community		C	4	18				
222	1	Opportunities for Improvement	Opportunities	All	Improvement of company environmental reputation in marketplace		C	4	18				

Appendix G – Risk Likelihood Matrix & Significant Aspects and Risk Assessment



Conneq Safety and Environmental Risk Score Matrix

As per [PC-601 – Safety and Environmental Risk Management](#)

	People Consequences	Environmental, Plant, Property, Productivity Consequences
1	First Aid Case	Under \$5k Damage and / or Minimal Production Disruption, No Environmental Damage
2	Medical Treatment Injury	\$5k - \$50k Damage and / or Slight Production Disruption, Minor Environmental Damage
3	Lost Time Injury	\$50k - \$100k Damage and / or Production Disruption, Reversible Environmental Damage
4	Disabling Injury	Contingency Plan Required, Serious Environmental Damage \$100k - \$500k Damage and / or Project
5	Extreme Incident	More than \$500k Damage and / or Large Reorganisation of Project, Major Environmental Damage

Figure 1: Risk Severity Matrix

Level	Likelihood	Description	Consequences	Frequency
A	Almost certain	Common or Frequent Occurrence many times per year.	Certain result in the consequences; no minimisation; no effective control	1
B	Likely	Is known to occur or "It has happened regularly"	10% result in the consequences; 90% minimisation; 90% effective control	1 in 10
C	Possible	Could occur or "I've heard of it happening occasionally"	1% result in the consequences; 99% minimisation; 99% effective control	1 in 100
D	Unlikely	Not likely to occur very often say once per life of project (many years)	0.1% result in the consequences; 99.9% minimisation; 99.9% effective control	1 in 1000
E	Rare	Practically impossible, only in exceptional circumstances	Consequences improbable, even if initiated	1 in 10,000 or greater

Figure 2: Risk Likelihood Matrix

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

Figure 3: Risk Score Matrix

Risk Score

E = 18 - 25 Extreme Risk

H = 10 - 17 High Risk

M = 6 - 9 Moderate Risk

L = 1 - 5 Low Risk

Legend:

E = Extreme risk; detailed research & management planning required at senior levels.

H = Significant (High) risk; senior management attention needed.

M = Moderate risk; management responsibility must be specified.

L = Low risk; manage by routine procedures

** Conneq deems both High and Extreme risks as significant.

Appendix H – Table of Environmental Aspect Assessment Pages 1-12

Conneq Projects Division Environmental Aspect Assessment

Complete by: Wendy Felsch Current on 1st December 2010

Risk Score = 1 - 5 = LOW 6 - 9 = MODERATE 10 - 25 = SIGNIFICANT (See - Conneq Risk Score Matrix Worksheet)

		Aspect Category	Aspect	Area of business	Impacts / Hazard Scenario	Potential Emergency Event	Causes	Consequences	Uncontrolled Risk Score			Suggested Controls	Controlled Risk Score			Legal Requirements
									Likelihood	Consequence	Risk Score (as per PC-601)		Likelihood	Consequence	Risk Score (as per PC-601)	
9	1	Emissions to Air	Dust	Construction Projects	Generation of dust from clearing and topsoil removal at project sites	No	Clearing Construction of roads Failure to control subcontractors Failure to follow / communicate procedures Failure to implement community management procedures Failure to monitor Failure to stabilise stockpiles / topsoiled areas Inclement weather Lack of dust suppression Lack of inspection Lack of planning Lack of risk assessment Lack of stabilisation Lack of training and awareness Poor scheduling Poor work practice Uncovered loads	Breach of legislation / licence Client dissatisfaction Community complaints Contamination of Waters Damage to flora / fauna Damage to reputation Environmental Damage Financial loss Health impacts Loss of productivity Potential collisions Potential Regulatory Authority concerns / fines	C	3	13	Appropriate planning and scheduling Audits / Inspections Clearing controls Communications Community involvement / consultation Community management plans Compliance legal / licence requirements Cover loads Dust monitoring Dust Suppression - Water truck Identification of legal requirements JSEAs Management procedures Progressive rehabilitation Regular audits Regular inspection Regular monitoring Risk Assessment Stabilisation Subcontractor controls Supervision Training / Awareness sessions Weather monitoring	D	2	5	Yes
10	1	Emissions to Air	Dust	Construction Projects	Generation of dust from inclement weather at project sites	No	Clearing Construction of roads Failure to control subcontractors Failure to follow / communicate procedures Failure to implement community management procedures Failure to monitor Failure to stabilise stockpiles / topsoiled areas Inclement weather Lack of dust suppression Lack of inspection Lack of planning Lack of risk assessment Lack of stabilisation Lack of training and awareness Poor scheduling Poor work practice Uncovered loads	Breach of legislation / licence Client dissatisfaction Community complaints Contamination of Waters Damage to flora / fauna Damage to reputation Environmental Damage Financial loss Health impacts Loss of productivity Potential collisions Potential Regulatory Authority concerns / fines	C	3	13	Appropriate planning and scheduling Audits / Inspections Clearing controls Communications Community involvement / consultation Community management plans Compliance legal / licence requirements Cover loads Dust monitoring Dust Suppression - Water truck Identification of legal requirements JSEAs Management procedures Progressive rehabilitation Regular audits Regular inspection Regular monitoring Risk Assessment Stabilisation Subcontractor controls Supervision Training / Awareness sessions Weather monitoring	C	2	8	Yes
11	1	Emissions to Air	Dust	Construction Projects	Generation of dust from unsealed surfaces / stockpiles at project sites	No	Clearing Construction of roads Failure to control subcontractors Failure to follow / communicate procedures Failure to implement community management procedures Failure to monitor Failure to stabilise stockpiles / topsoiled areas Inclement weather Lack of dust suppression Lack of inspection Lack of planning Lack of risk assessment Lack of stabilisation Lack of training and awareness Poor scheduling	Breach of legislation / licence Client dissatisfaction Community complaints Contamination of Waters Damage to flora / fauna Damage to reputation Environmental Damage Financial loss Health impacts Loss of productivity Potential collisions Potential Regulatory Authority concerns / fines	C	3	13	Appropriate planning and scheduling Appropriate storage facility Audits / Inspections Communications Community management plans Compliance legal / licence requirements Cover loads Dust monitoring Dust Suppression - Water truck Identification of legal requirements JSEAs Location of stockpiles Management procedures Maximise distance from Private property Physical barriers	C	1	4	Yes

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		Aspect Category	Aspect	Area of business	Impacts / Hazard Scenario	Potential Emergency Event	Causes	Consequences	Uncontrolled Risk Score			Suggested Controls	Controlled Risk Score			Legal Requirements
									Likelihood	Consequence	Risk Score (as per PC-601)		Likelihood	Consequence	Risk Score (as per PC-601)	
							Poor work practice Uncovered loads					Regular monitoring Risk Assessment Scheduling of works / activities Stabilisation Stockpiles less than 2m Supervision Training / Awareness sessions Weather monitoring				
12	1	Emissions to Air	Dust	Construction Projects	Generation of dust from concrete batching plants at project sites	No	Failure to control subcontractors Failure to follow / communicate procedures Failure to implement community management procedures Inappropriate containment Inclement weather Lack of appropriate equipment Lack of appropriate facilities Lack of dust extraction equipment Lack of dust suppression Lack of inspection / maintenance Lack of physical barriers Lack of risk assessment Lack of training and awareness Poor housekeeping Poor placement of equipment Poor planning / scheduling Poor product selection Poor work practice Inappropriate Storage	Breach of legislation / licence Client dissatisfaction Community complaints Contamination of Waters Damage to flora / fauna Damage to reputation Environmental Damage Financial loss Health impacts Loss of productivity Potential collisions Potential Regulatory Authority concerns / fines	C	2	8	Appropriate dust suppression Appropriate planning and scheduling Audits / Inspections Communications Compliance legal / licence requirements Dust monitoring Equipment selection Housekeeping Standards Identification of legal requirements JSEAs Management procedures Physical barriers Regular inspections / maintenance Risk Assessment Subcontractor controls Supervision Training / Awareness sessions Weather monitoring	D	2	5	Yes
13	1	Emissions to Air	Dust	Construction Projects	Generation of dust from vehicle movements on unsealed roads at project sites	Yes	Clearing Construction of roads Failure to control subcontractors Failure to follow / communicate procedures Failure to implement community management procedures Failure to monitor Failure to stabilise stockpiles / topsoiled areas Inclement weather Lack of dust suppression Lack of inspection Lack of planning Lack of risk assessment Lack of stabilisation Lack of training and awareness Poor scheduling Poor work practice Uncovered loads	Breach of legislation / licence Client dissatisfaction Community complaints Contamination of Waters Damage to flora / fauna Damage to reputation Environmental Damage Financial loss Health impacts Loss of productivity Potential collisions Potential Regulatory Authority concerns / fines	C	3	13	Appropriate planning and scheduling Audits / Inspections Clearing controls Communications Community involvement / consultation Community management plans Compliance legal / licence requirements Cover loads Dust monitoring Dust Suppression - Water truck Identification of legal requirements JSEAs Management procedures Progressive rehabilitation Regular audits Regular inspection Regular monitoring Risk Assessment Stabilisation Subcontractor controls Supervision Training / Awareness sessions Weather monitoring	C	1	4	Yes
18	1	Emissions to Air	Smoke	Construction Projects	Generation of smoke from bushfires generated at project sites	Yes	Chemical Reaction Cigarette butts Clearing Equipment failure Failure to control subcontractors Failure to follow / communicate procedures Failure to implement community management procedures Fire Hot work	Breach of legislation / licence Client dissatisfaction Climate change Community complaints Damage to flora / fauna Damage to private property Damage to reputation Environmental Damage Health impacts	D	2	5	Appropriate planning and scheduling Audits / Inspections Clearing controls Communications Community involvement / consultation Compliance legal / licence requirements Emergency Response Plan / equipment Fire breaks Hot work permits	D	2	5	Yes

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		Aspect Category	Aspect	Area of business	Impacts / Hazard Scenario	Potential Emergency Event	Causes	Consequences	Uncontrolled Risk Score			Suggested Controls	Controlled Risk Score			Legal Requirements
									Likelihood	Consequence	Risk Score (as per PC-601)		Likelihood	Consequence	Risk Score (as per PC-601)	
							Inappropriate Storage Inclement weather Lack of communication Lack of emergency procedures / training Lack of inspection / maintenance Lack of training and awareness Lightning Poor housekeeping Poor planning / scheduling Sabotage	Financial loss Loss of native species Potential collisions Potential Regulatory Authority concerns / fines				Housekeeping Standards Identification of legal requirements JSEAs Management procedures Regular inspections / maintenance Risk Assessment Scheduling of works / activities Subcontractor controls Supervision Training / Awareness sessions Weather monitoring				
27	1	Emissions to Air	Equipment Emissions	Construction Projects	Generation of Greenhouse Gas Emissions from equipment used during construction activities	No	Equipment failure Failure to control subcontractors Failure to follow / communicate procedures General operations Lack of appropriate equipment Lack of inspection / maintenance Lack of risk assessment Lack of training and awareness Old equipment Poor equipment selection Poor work practice Use of fuel / energy	Climate change Damage to reputation Environmental Damage Health impacts	C	1	4	Alternative energy sources - (Solar or Wind) Audits / Inspections Equipment selection JSEAs Management procedures Regular inspections / maintenance Regular servicing and maintenance Risk Assessment Subcontractor controls Supervision Training / Awareness sessions Training in energy efficient equipment operation	D	1	2	Yes
28	1	Emissions to Air	Equipment Emissions	All	Generation of Carbon Dioxide and Greenhouse Gases Emissions	No	Equipment failure Failure to control subcontractors Failure to follow / communicate procedures General operations Lack of appropriate equipment Lack of inspection / maintenance Lack of risk assessment Lack of training and awareness Old equipment Poor equipment selection Poor work practice Use of fuel / energy	Climate change Damage to reputation Environmental Damage Health impacts	C	2	8	Alternative energy sources - (Solar or Wind) Audits / Inspections Equipment selection JSEAs Management procedures Regular inspections / maintenance Regular servicing and maintenance Risk Assessment Subcontractor controls Supervision Training / Awareness sessions Training in energy efficient equipment operation	D	2	5	Yes
32	1	Release to Water (Surface and Ground Water)	Non Complying Releases to water	Construction Projects	Release of turbid / dirty water to waters during construction activities	Yes	Clearing Construction activities Construction of roads Dewatering Diversion of surface water Dust Erosion Failure to control subcontractors Failure to follow / communicate procedures Failure to recognise contaminated water Failure to seek approvals Failure to stabilise stockpiles / topsoiled areas Flooding Inappropriate / lack of bunding Lack of communication Lack of containment Inclement weather Lack of dust suppression Lack of erosion controls Lack of inspection / maintenance Lack of monitoring Lack of physical barriers Lack of risk assessment Lack of sediment ponds / controls Lack of training and awareness	Breach of legislation / licence Client dissatisfaction Community complaints Contamination of Waters Contamination of Drinking water supply Contamination of land Introduction of disease / pest Odours Damage to flora / fauna Damage to reputation Environmental Damage Financial loss Health impacts Loss of productivity Potential collisions Potential Regulatory Authority concerns / fines	C	3	13	Appropriate Bunding / Containment Appropriate diversion / storage capacity Appropriate dust suppression Appropriate planning and scheduling Audits / Inspections Clearing controls Communications Community involvement / consultation Compliance legal / licence requirements Containment of road runoff Designated concrete washout area Drainage controls Dust monitoring Housekeeping Standards JSEAs Location of stockpiles Management procedures Physical barriers Regular inspections / maintenance Risk Assessment Sediment and erosion controls Spill kits Stabilisation Stockpiles less than 2m Subcontractor controls	D	2	5	Yes

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		Aspect Category	Aspect	Area of business	Impacts / Hazard Scenario	Potential Emergency Event	Causes	Consequences	Uncontrolled Risk Score			Suggested Controls	Controlled Risk Score			Legal Requirements
									Likelihood	Consequence	Risk Score (as per PC-601)		Likelihood	Consequence	Risk Score (as per PC-601)	
							Over clearing Poor housekeeping Poor planning / scheduling Poor work practice Uncontrolled drainage					Supervision Training / Awareness sessions Vehicle washdown prior to exiting site Weather monitoring				
33	1	Release to Water (Surface and Ground Water)	Non Complying Releases to water	Construction Projects	Release of concrete wash water to waters during construction activities	Yes	Construction activities Dewatering Failure to control subcontractors Failure to follow / communicate procedures Failure to recognise contaminated water Failure to seek approvals Flooding Inappropriate / lack of bunding Lack of communication Lack of containment Inclement weather Lack of inspection / maintenance Lack of monitoring Lack of physical barriers Lack of risk assessment Lack of sediment ponds / controls Lack of training and awareness Poor housekeeping Poor planning / scheduling Poor work practice Uncontrolled drainage	Breach of legislation / licence Client dissatisfaction Community complaints Contamination of Waters Contamination of Drinking water supply Contamination of land Introduction of disease / pest Odours Damage to flora / fauna Damage to reputation Environmental Damage Financial loss Health impacts Loss of productivity Potential collisions Potential Regulatory Authority concerns / fines	C	2	8	Appropriate Bunding / Containment Appropriate diversion / storage capacity Appropriate planning and scheduling Audits / Inspections Communications Community involvement / consultation Compliance legal / licence requirements Designated concrete washout area Drainage controls Housekeeping Standards JSEAs Management procedures Physical barriers Regular inspections / maintenance Risk Assessment Spill kits Subcontractor controls Supervision Training / Awareness sessions Weather monitoring	C	1	4	Yes
34	1	Release to Water (Surface and Ground Water)	Non Complying Releases to water	Construction Projects	Release of saline water to waters during construction activities	No	Construction activities Dewatering Failure to control subcontractors Failure to follow / communicate procedures Failure to recognise saline water Failure to seek approvals Flooding Inappropriate / lack of bunding Lack of communication Lack of containment Inclement weather Lack of inspection / maintenance Lack of monitoring Lack of physical barriers Lack of risk assessment Lack of sediment ponds / controls Lack of training and awareness Poor housekeeping Poor planning / scheduling Poor work practice Uncontrolled drainage	Breach of legislation / licence Client dissatisfaction Community complaints Contamination of Waters Contamination of Drinking water supply Contamination of land Introduction of disease / pest Odours Damage to flora / fauna Damage to reputation Environmental Damage Financial loss Health impacts Loss of productivity Potential collisions Potential Regulatory Authority concerns / fines	C	2	8	Appropriate Bunding / Containment Appropriate diversion / storage capacity Appropriate planning and scheduling Audits / Inspections Communications Community involvement / consultation Compliance legal / licence requirements Containment of saline waters Drainage controls Housekeeping Standards JSEAs Management procedures Physical barriers Regular inspections / maintenance Risk Assessment Spill kits Subcontractor controls Supervision Training / Awareness sessions Weather monitoring	C	1	4	Yes
47	1	Release to Water (Surface and Ground Water)	Spillage of Hydrocarbons / Chemicals / Hazardous substances	Construction Projects	Spillage of Hydrocarbons / Chemicals / Hazardous substances to water from construction activities	Yes	Equipment failure Failure to control subcontractors Failure to follow / communicate procedures Failure to identify Failure to recognise contaminated water Failure to respond during emergency Hydrocarbon spillage Impact damage Inappropriate / lack of bunding Inappropriate containment Inclement weather Lack of communication Lack of designated area for washout Lack of emergency procedures / training	Breach of legislation / licence Chemical / hydrocarbon contamination of surface and groundwater Client dissatisfaction Community complaints Contamination of Waters Contamination of Drinking water supply Contamination of land Introduction of disease / pest Damage to flora / fauna Damage to reputation Environmental Damage Financial loss Health impacts Loss of productivity	C	2	8	Appropriate Bunding / Containment Appropriate storage facility Audits / Inspections Bunding Communications Emergency Response Plan / equipment Housekeeping Standards Compliance legal / licence requirements Identification of legal requirements JSEAs Management procedures Product substitution (Less toxic) Refuelling controls / design Regular inspections / maintenance	D	2	5	Yes

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		Aspect Category	Aspect	Area of business	Impacts / Hazard Scenario	Potential Emergency Event	Causes	Consequences	Uncontrolled Risk Score			Suggested Controls	Controlled Risk Score			Legal Requirements
									Likelihood	Consequence	Risk Score (as per PC-601)		Likelihood	Consequence	Risk Score (as per PC-601)	
							Lack of inspection / maintenance Lack of risk assessment Lack of secondary containment / storage capacity Lack of spill kits Lack of training and awareness Poor housekeeping Poor placement of equipment Poor work practice Storage failure	Potential collisions Potential Regulatory Authority concerns / fines				Regular servicing and maintenance Risk Assessment Servicing to be conducted within workshop when practicable Spill kits Subcontractor controls Supervision Training / Awareness sessions Weather monitoring				
58	1	Release to Land	Spillage of Hydrocarbons / Chemicals / Hazardous substances	Construction Projects	Spillage of Hydrocarbons / Chemicals / Hazardous substances to land from construction activities	No	Equipment failure Failure to control subcontractors Failure to follow / communicate procedures Failure to identify Failure to recognise contaminated water Failure to respond during emergency Hydrocarbon spillage Impact damage Inappropriate / lack of bunding Inappropriate containment Inclement weather Lack of communication Lack of designated area for washout Lack of emergency procedures / training Lack of inspection / maintenance Lack of risk assessment Lack of secondary containment / storage capacity Lack of spill kits Lack of training and awareness Poor housekeeping Poor placement of equipment Poor work practice Storage failure	Breach of legislation / licence Chemical / hydrocarbon contamination of surface and groundwater Client dissatisfaction Community complaints Contamination of Waters Contamination of Drinking water supply Contamination of land Introduction of disease / pest Damage to flora / fauna Damage to reputation Environmental Damage Financial loss Health impacts Loss of productivity Potential collisions Potential Regulatory Authority concerns / fines	C	2	8	Appropriate Bunding / Containment Appropriate storage facility Audits / Inspections Bunding Communications Emergency Response Plan / equipment Housekeeping Standards Compliance legal / licence requirements Identification of legal requirements JSEAs Management procedures Product substitution (Less toxic) Refuelling controls / design Regular inspections / maintenance Regular servicing and maintenance Risk Assessment Servicing to be conducted within workshop when practicable Spill kits Subcontractor controls Supervision Training / Awareness sessions Weather monitoring	D	2	5	Yes
70	1	Generation of Waste	General Waste Disposal	Construction Projects	Inappropriate disposal of general waste during construction activities	No	Cost of correct disposal Cigarette butts Failure to consider impact on external property Failure to control subcontractors Failure to follow / communicate procedures General operations Inappropriate containment Inclement weather Lack of bins / storage for waste Lack of covering of wastes Lack of inspection / maintenance Lack of risk assessment Lack of training and awareness Poor housekeeping Poor planning / scheduling Poor waste management Poor work practice	Attraction of vermin Breach of legislation / licence Breeding of mosquitoes Chemical / hydrocarbon contamination of surface and groundwater Clean up costs Client dissatisfaction Community complaints Contamination of Drinking water supply Contamination of land Contamination of Waters Damage to flora / fauna Damage to reputation Environmental Damage Financial loss Health impacts Introduction of disease / pest Potential Regulatory Authority concerns / fines Wastage of resources (potential for recycling)	C	2	8	Alternative disposal methods Appropriate planning and scheduling Appropriate waste facilities Assessment of waste streams and disposal options Audits / Inspections Baiting programs Communications Compliance legal / licence requirements Coverage of wastes Housekeeping Standards Identification of legal requirements JSEAs Management procedures Physical barriers Regular disposal Regular inspections / maintenance Regular monitoring Retention of waste disposal records Risk Assessment Scheduling of works / activities Subcontractor controls Supervision Training / Awareness sessions Weather monitoring	D	1	2	Yes

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		Aspect Category	Aspect	Area of business	Impacts / Hazard Scenario	Potential Emergency Event	Causes	Consequences	Uncontrolled Risk Score			Suggested Controls	Controlled Risk Score			Legal Requirements
									Likelihood	Consequence	Risk Score (as per PC-601)		Likelihood	Consequence	Risk Score (as per PC-601)	
75	1	Generation of Waste	Hazardous Waste Disposal	Construction Projects	Inappropriate disposal of Contaminated waste during construction activities	Yes	<p>Cost of correct disposal</p> <p>Failure to consider impact on external property</p> <p>Failure to control subcontractors</p> <p>Failure to follow / communicate procedures</p> <p>General operations</p> <p>Inappropriate containment</p> <p>Inclement weather</p> <p>Lack of bins / storage for waste</p> <p>Lack of covering of wastes</p> <p>Lack of inspection / maintenance</p> <p>Lack of risk assessment</p> <p>Lack of training and awareness</p> <p>Poor housekeeping</p> <p>Poor planning / scheduling</p> <p>Poor waste management</p> <p>Poor work practice</p>	<p>Breach of legislation / licence</p> <p>Clean up costs</p> <p>Client dissatisfaction</p> <p>Community complaints</p> <p>Contamination of Drinking water supply</p> <p>Contamination of land</p> <p>Damage to reputation</p> <p>Financial loss</p> <p>Health impacts</p> <p>Potential Regulatory Authority concerns / fines</p>	C	3	13	<p>Alternative disposal methods</p> <p>Appropriate planning and scheduling</p> <p>Appropriate waste facilities</p> <p>Assessment of waste streams and disposal options</p> <p>Audits / Inspections</p> <p>Communications</p> <p>Compliance legal / licence requirements</p> <p>Coverage of wastes</p> <p>Housekeeping Standards</p> <p>Identification of legal requirements</p> <p>JSEAs</p> <p>Management procedures</p> <p>Physical barriers</p> <p>Regular disposal</p> <p>Regular inspections / maintenance</p> <p>Regular monitoring</p> <p>Retention of waste disposal records</p> <p>Risk Assessment</p> <p>Scheduling of works / activities</p> <p>Subcontractor controls</p> <p>Supervision</p> <p>Training / Awareness sessions</p> <p>Weather monitoring</p>	C	1	4	Yes
89	1	Generation of Waste	Waste Recycling	Construction Projects	Inappropriate recycling of wastes during construction activities	No	<p>Cost of correct disposal</p> <p>Failure to control subcontractors</p> <p>Failure to identify</p> <p>Failure to monitor</p> <p>Lack of bins / storage for waste</p> <p>Lack of inspection / maintenance</p> <p>Lack of signage</p> <p>Lack of training and awareness</p> <p>Poor housekeeping</p> <p>Poor planning / scheduling</p> <p>Poor product selection</p> <p>Poor waste management</p>	<p>Client dissatisfaction</p> <p>Community complaints</p> <p>Damage to reputation</p> <p>Environmental Damage</p> <p>Financial loss</p> <p>Unnecessary landfilling</p> <p>Wastage of resources (potential for recycling)</p>	D	1	2	<p>Alternative disposal methods</p> <p>Appropriate planning and scheduling</p> <p>Appropriate waste facilities</p> <p>Assessment of waste streams and disposal options</p> <p>Audits / Inspections</p> <p>Communications</p> <p>Housekeeping Standards</p> <p>Identification of legal requirements</p> <p>JSEAs</p> <p>Management procedures</p> <p>Retention of waste disposal records</p> <p>Scheduling of works / activities</p> <p>Signage</p> <p>Subcontractor controls</p> <p>Supervision</p> <p>Training / Awareness sessions</p>	D	1	2	Yes
103	1	Use of raw materials and natural resources	Water Usage	Construction Projects	Wastage of Water during construction activities	No	<p>Equipment failure</p> <p>Failure to control subcontractors</p> <p>Failure to follow / communicate procedures</p> <p>Failure to monitor</p> <p>Impact damage</p> <p>Inappropriate Storage</p> <p>Inclement weather</p> <p>Lack of inspection / maintenance</p> <p>Lack of risk assessment</p> <p>Lack of training and awareness</p> <p>Leaking fittings</p>	<p>Breach of legislation / licence</p> <p>Breeding of mosquitoes</p> <p>Client dissatisfaction</p> <p>Community complaints</p> <p>Damage to reputation</p> <p>Financial loss</p> <p>Potential Regulatory Authority concerns / fines</p> <p>Wastage of resources</p>	C	2	8	<p>Aboveground pipework and storage facilities</p> <p>Appropriate diversion / storage capacity</p> <p>Appropriate planning and scheduling</p> <p>Audits / Inspections</p> <p>Communications</p> <p>Compliance legal / licence requirements</p> <p>Drainage controls</p> <p>Housekeeping Standards</p> <p>Identification of legal requirements</p> <p>Inspection / maintenance of pipelines and storage facilities</p> <p>JSEAs</p>	D	2	5	Yes

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		Aspect Category	Aspect	Area of business	Impacts / Hazard Scenario	Potential Emergency Event	Causes	Consequences	Uncontrolled Risk Score			Suggested Controls	Controlled Risk Score			Legal Requirements
									Likelihood	Consequence	Risk Score (as per PC-601)		Likelihood	Consequence	Risk Score (as per PC-601)	
							Over extraction of groundwater Poor housekeeping Poor planning / scheduling Poor work practice Storage failure Unattended refilling of tanks Unauthorised use of water Uncontrolled drainage Underground pipework failure					Management procedures Regular inspections / maintenance Risk Assessment Scheduling of works / activities Subcontractor controls Supervision Training / Awareness sessions Weather monitoring				
117	1	Use of raw materials and natural resources	Energy Usage	Construction Projects	Wastage of Energy during construction activities	No	Equipment failure Failure to control subcontractors Failure to follow / communicate procedures Failure to monitor Inclement weather Lack of inspection / maintenance Lack of power saving options on equipment Lack of risk assessment Lack of training and awareness Old equipment Placement of lighting Poor housekeeping Poor equipment selection Poor placement of equipment Poor planning / scheduling Poor product selection Poor work practice Use of fuel / energy	Client dissatisfaction Climate change Community complaints Damage to reputation Environmental Damage Natural resource depletion Unsustainable practices Wastage of resources	D	1	2	Alternative energy sources - (Solar or Wind) Appropriate equipment placement Appropriate planning and scheduling Audits / Inspections Building design Communications Community management plans Equipment selection Housekeeping Standards Identification of legal requirements JSEAs Management procedures Regular inspections / maintenance Risk Assessment Scheduling of works / activities Subcontractor controls Supervision Training / Awareness sessions Training in energy efficient equipment operation Weather monitoring	D	1	2	Yes
121	1	Use of raw materials and natural resources	Damage to protected flora / fauna species	Construction Projects	Damage to protected flora / fauna species during construction activities	No	Clearing Construction activities Dewatering Dust Erosion Failure to control subcontractors Failure to follow / communicate procedures Failure to identify Failure to seek approvals Fire Impact damage Inclement weather Lack of communication Lack of dust suppression Lack of erosion controls Lack of identification by client Lack of inspection Lack of physical barriers Lack of risk assessment Lack of signage Lack of site fauna survey Lack of site flora survey Lack of training and awareness Unauthorised clearing	Breach of legislation / licence Client dissatisfaction Community complaints Damage to flora / fauna Damage to reputation Environmental Damage Financial loss Loss of biodiversity Loss of productivity Media coverage / attention Potential Regulatory Authority concerns / fines	C	2	8	Appropriate dust suppression Appropriate planning and scheduling Audits / Inspections Clearing controls Communications Community involvement / consultation Compliance legal / licence requirements Drainage controls Fencing Identification of legal requirements Impact Assessment JSEAs Management procedures Physical barriers Regular inspections / maintenance Risk Assessment Sediment and erosion controls Signage Site flora / fauna surveys Subcontractor controls Supervision Training / Awareness sessions Weather monitoring	C	1	4	Yes
129	1	Use of raw materials and natural resources	Land Disturbance	Construction Projects	Unmanaged disturbance of acid sulphate soils during construction activities	No	Chemical Reaction Dewatering Failure to control subcontractors Failure to follow / communicate procedures Failure to seek approvals Lack of communication Lack of identification	Breach of legislation / licence Clean up costs Client dissatisfaction Community complaints Contamination of Drinking water supply Contamination of land Contamination of Waters	C	2	8	Appropriate planning and scheduling Audits / Inspections Communications Community involvement / consultation Compliance legal / licence requirements Identification of legal requirements Impact Assessment	C	1	4	Yes

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		Aspect Category	Aspect	Area of business	Impacts / Hazard Scenario	Potential Emergency Event	Causes	Consequences	Uncontrolled Risk Score			Suggested Controls	Controlled Risk Score			Legal Requirements
									Likelihood	Consequence	Risk Score (as per PC-601)		Likelihood	Consequence	Risk Score (as per PC-601)	
							lack of investigation Lack of risk assessment Lack of stabilisation Lack of training and awareness Poor work practice	Damage to private property Damage to reputation Damage to structures Financial loss Health impacts				JSEAs Management procedures Regular monitoring Risk Assessment Scheduling of works / activities Stabilisation Subcontractor controls Supervision Training / Awareness sessions				
148	1	Other Environmental and Community Issues	Noise	Construction Projects	Generation of excessive Noise during construction activities	No	Construction activities Equipment failure Failure to consider impact on external property Failure to control subcontractors Failure to follow / communicate procedures Failure to implement community management procedures Failure to monitor Failure to seek approvals General operations Inclement weather Lack of appropriate equipment Lack of communication Lack of containment Lack of inspection / maintenance Lack of physical barriers Lack of risk assessment Lack of suppression Lack of training and awareness Poor design Poor equipment selection Poor housekeeping Poor placement of equipment Poor planning / scheduling Poor product selection Poor work practice Proximity to community Reversing alarms Scheduling of noisy activities	Breach of legislation / licence Client dissatisfaction Community complaints Damage to reputation Financial loss Health impacts Potential Regulatory Authority concerns / fines	C	2	8	Appropriate equipment placement Appropriate planning and scheduling Audits / Inspections Communications Community involvement / consultation Community management plans Compliance legal / licence requirements Equipment selection Identification of legal requirements JSEAs Management procedures Maximise distance from Private property Physical barriers Regular servicing and maintenance Risk Assessment Scheduling of works / activities Seek approvals for work hours Subcontractor controls Supervision Training / Awareness sessions Weather monitoring	C	1	4	Yes
156	1	Other Environmental and Community Issues	Vibration	Construction Projects	Generation of excessive Vibration during construction activities	No	Construction activities Failure to control subcontractors Failure to follow / communicate procedures Failure to monitor Lack of appropriate equipment Lack of communication Lack of risk assessment Lack of training and awareness Poor placement of equipment Poor planning / scheduling Poor product selection Poor work practice Poorly loaded trucks Proximity to community	Breach of legislation / licence Client dissatisfaction Community complaints Damage to private property Damage to reputation Damage to structures Financial loss	D	1	2	Appropriate equipment placement Appropriate planning and scheduling Audits / Inspections Communications Community involvement / consultation Compliance legal / licence requirements Equipment selection Identification of legal requirements JSEAs Management procedures Maximise distance from Private property Regular servicing and maintenance Risk Assessment Scheduling of works / activities Subcontractor controls Supervision Training / Awareness sessions	D	1	2	Yes
165	1	Other Environmental and Community Issues	Light Overspill	Construction Projects	Generation of excessive light during construction activities	No	Construction activities Direction of lighting at night for night works Equipment failure Failure to consider impact on external property Failure to control subcontractors Failure to follow / communicate procedures	Breach of legislation / licence Client dissatisfaction Community complaints Damage to reputation Financial loss Potential collisions	C	2	8	Appropriate equipment placement Appropriate planning and scheduling Audits / Inspections Communications Community involvement / consultation Community management plans	D	1	2	Yes

Conneq Projects Division Environmental Aspect Assessment

Complete by: Wendy Felsch Current on 1st December 2010

Risk Score = 1 - 5 = LOW 6 - 9 = MODERATE 10 - 25 = SIGNIFICANT (See - Conneq Risk Score Matrix Worksheet)

		Aspect Category	Aspect	Area of business	Impacts / Hazard Scenario	Potential Emergency Event	Causes	Consequences	Uncontrolled Risk Score			Suggested Controls	Controlled Risk Score			Legal Requirements
									Likelihood	Consequence	Risk Score (as per PC-601)		Likelihood	Consequence	Risk Score (as per PC-601)	
							Failure to implement community management procedures Failure to monitor Failure to notify Failure to seek approvals Lack of appropriate equipment Lack of communication Lack of inspection / maintenance Lack of physical barriers Lack of risk assessment Lack of training and awareness Placement of lighting Poor equipment selection Poor planning / scheduling Poor work practice Proximity to community					Compliance legal / licence requirements Equipment selection Identification of legal requirements JSEAs Management procedures Physical barriers Regular inspections / maintenance Regular monitoring Risk Assessment Scheduling of works / activities Seek approvals for work hours Subcontractor controls Supervision Training / Awareness sessions				
174	1	Other Environmental and Community Issues	Cultural Heritage	Construction Projects	Damage / disturbance to Cultural heritage during construction activities	No	Clearing Construction activities Failure to control subcontractors Failure to follow / communicate procedures Failure to identify Failure to implement community management procedures Failure to seek approvals Impact damage Lack of communication Lack of identification by client Lack of inspection / maintenance Lack of physical barriers Lack of risk assessment Lack of training and awareness Poor work practice Sabotage	Breach of legislation / licence Client dissatisfaction Community complaints Damage to reputation Environmental Damage Financial loss Loss of heritage Loss of productivity Potential Regulatory Authority concerns / fines	C	2	8	Audits / Inspections Clearing controls Communications Community involvement / consultation Compliance legal / licence requirements Identification of legal requirements JSEAs Management procedures No Go Zones Physical barriers Risk Assessment Site heritage surveys Subcontractor controls Supervision Training / Awareness sessions	D	2	5	Yes
183	1	Other Environmental and Community Issues	Property	Construction Projects	Damage to private property (vehicles and other property) during construction activities	No	Chemical spillage Clearing Dust Equipment failure Erosion Failing to wash equipment prior to transport Failure to control subcontractors Failure to follow / communicate procedures Failure to identify quarantine requirements Failure to implement community management procedures Failure to recognise contaminated water Failure to recognise saline water Failure to seek approvals Fire Flooding General operations Hot work Hydrocarbon spillage Impact damage Inappropriate containment Inclement weather Lack of communication Lack of inspection / maintenance lack of investigation Lack of risk assessment Lack of signage Lack of training and awareness Over extraction of groundwater Poor housekeeping Poor placement of equipment	Breach of legislation / licence Clean up costs Community complaints Damage to private property Damage to reputation Damage to structures Environmental Damage Financial loss Fire risk Flooding Health impacts Introduction of disease / pest Media coverage / attention Potential collisions Potential Regulatory Authority concerns / fines Transmission of disease Vehicle accidents	C	2	8	Appropriate dust suppression Appropriate equipment placement Appropriate planning and scheduling Audits / Inspections Communications Community involvement / consultation Community management plans Compliance legal / licence requirements Containment of road runoff Containment of saline waters Cover loads Decontamination of plant / equipment Drainage controls Fencing Fire breaks Groundwater monitoring Hot work permits Housekeeping Standards Identification of legal requirements JSEAs Management procedures No Go Zones Physical barriers Product substitution (Less toxic) Regular inspections / maintenance Risk Assessment Scheduling of works / activities Sediment and erosion controls Signage Site security - fencing	D	2	5	Yes

Conneq Projects Division Environmental Aspect Assessment

Complete by: Wendy Felsch Current on 1st December 2010

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		Aspect Category	Aspect	Area of business	Impacts / Hazard Scenario	Potential Emergency Event	Causes	Consequences	Uncontrolled Risk Score			Suggested Controls	Controlled Risk Score			Legal Requirements
									Likelihood	Consequence	Risk Score (as per PC-601)		Likelihood	Consequence	Risk Score (as per PC-601)	
							Poor planning / scheduling Poor Transportation practices Poor waste management Poor work practice Poorly loaded trucks Proximity to community Relocation of services Sewage discharge Storage failure Uncontrolled drainage					Stabilisation Subcontractor controls Supervision Training / Awareness sessions Weather monitoring				
192	1	Other Environmental and Community Issues	Property	Construction Projects	Damage to services (power, communication, gas, water, sewer etc) during construction activities	No	Clearing Construction activities Dust Equipment failure Failure to control subcontractors Failure to follow / communicate procedures Failure to identify Failure to notify Failure to seek approvals Fire Flooding Hot work Impact damage Lack of communication Lack of dust suppression Lack of inspection / maintenance Lack of risk assessment Lack of signage Lack of training and awareness Poor planning / scheduling Poor Transportation practices Poor work practice Relocation of services Unauthorised clearing Underground pipework failure	Breach of legislation / licence Client dissatisfaction Community complaints Damage to reputation Damage to structures Financial loss Fire risk Flooding Loss of productivity Potential Regulatory Authority concerns / fines	C	3	13	Appropriate dust suppression Appropriate planning and scheduling Assessment of facilities prior to site start up Audits / Inspections Clearing controls Communications Community involvement / consultation Compliance legal / licence requirements Drainage controls Early notification of pending disruptions Identification of legal requirements JSEAs Labelling of pipelines Management procedures No Go Zones Physical barriers Regular inspections / maintenance Risk Assessment Scheduling of works / activities Signage Subcontractor controls Supervision Training / Awareness sessions	C	2	8	Yes
204	1	Use of raw materials and natural resources	Community Issues	Construction Projects	Failure to respond to community complaints during construction activities	No	Community backlash Failure to consider impact on external property Failure to control subcontractors Failure to follow / communicate procedures Failure to identify Failure to implement community management procedures Failure to notify Lack of communication lack of investigation Lack of monitoring lack of record keeping Lack of training and awareness Poor planning / scheduling Poor work practice	Breach of legislation / licence Client dissatisfaction Community complaints Damage to reputation Financial loss Loss of productivity Media coverage / attention Potential Regulatory Authority concerns / fines	C	2	8	Appropriate planning and scheduling Audits / Inspections Communications Community involvement / consultation Community management plans Compliance legal / licence requirements Early notification of pending disruptions Identification of legal requirements JSEAs Management procedures Risk Assessment Subcontractor controls Supervision Training / Awareness sessions	D	1	2	Yes
205	1	Use of raw materials and natural resources	Community Issues	Construction Projects	Working outside of approved hours during construction activities	No	Construction activities Equipment failure Failure to control subcontractors Failure to follow / communicate procedures Failure to implement community management procedures Failure to monitor Failure to seek approvals Inclement weather Lack of communication Lack of risk assessment	Breach of legislation / licence Client dissatisfaction Community complaints Damage to reputation Financial loss Loss of productivity Potential Regulatory Authority concerns / fines	C	2	8	Appropriate planning and scheduling Audits / Inspections Communications Community involvement / consultation Community management plans Compliance legal / licence requirements Identification of legal requirements JSEAs Management procedures Regular inspections / maintenance	C	1	4	Yes

Conneq Projects Division Environmental Aspect Assessment

Complete by: Wendy Felsch Current on 1st December 2010

Risk Score = 1 - 5 = LOW 6 - 9 = MODERATE 10 - 25 = SIGNIFICANT (See - Conneq Risk Score Matrix Worksheet)

		Aspect Category	Aspect	Area of business	Impacts / Hazard Scenario	Potential Emergency Event	Causes	Consequences	Uncontrolled Risk Score			Suggested Controls	Controlled Risk Score			Legal Requirements
									Likelihood	Consequence	Risk Score (as per PC-601)		Likelihood	Consequence	Risk Score (as per PC-601)	
							Lack of training and awareness Poor planning / scheduling Poor work practice					Risk Assessment Scheduling of works / activities Subcontractor controls Supervision Training / Awareness sessions Weather monitoring				
206	1	General	Subcontractors	All	Employment of Subcontractors	No	Failure to control subcontractors Failure to follow / communicate procedures Failure to monitor Lack of containment Lack of due diligence Lack of inspection Lack of planning Lack of risk assessment Lack of training and awareness	Breach of legislation / licence Client dissatisfaction Damage to reputation Environmental Damage Financial loss Loss of productivity Potential Regulatory Authority concerns / fines Unsustainable practices	C	4	18	Appropriate planning and scheduling Audits / Inspections Communications Due Diligence Audits prior to purchase / commencement Early notification of pending disruptions Management procedures Regular inspections / maintenance Risk Assessment Scheduling of works / activities Subcontractor controls Supervision Training / Awareness sessions	C	2	8	Yes
207	1	General	Tendering	All	Failure to conduct appropriate assessment and costing of environmental requirements in tenders	No	Failure to follow / communicate procedures Failure to identify Lack of communication Lack of identification Lack of planning Lack of risk assessment Lack of training and awareness Poor planning / scheduling	Client dissatisfaction Damage to reputation Environmental Damage Financial loss Loss of productivity Potential Regulatory Authority concerns / fines Unsustainable practices Wastage of resources	C	5	22	Audits / Inspections Communications Competent personnel Due Diligence Audits prior to purchase / commencement Early notification of pending disruptions Equipment selection Identification of legal requirements Management procedures Risk Assessment Scheduling of works / activities Subcontractor controls Training / Awareness sessions	D	3	9	Yes
208	1	General	Design	All	Failure to conduct appropriate assessment of environmental requirements in design	No	Failure to follow / communicate procedures Failure to identify Lack of communication Lack of identification Lack of planning Lack of risk assessment Lack of training and awareness Poor planning / scheduling	Client dissatisfaction Damage to reputation Environmental Damage Financial loss Loss of productivity Potential Regulatory Authority concerns / fines Unsustainable practices Wastage of resources	C	5	22	Audits / Inspections Communications Competent personnel Due Diligence Audits prior to purchase / commencement Early notification of pending disruptions Equipment selection Identification of legal requirements Management procedures Risk Assessment Scheduling of works / activities Subcontractor controls Training / Awareness sessions	D	3	9	Yes
209	1	Opportunities for Improvement	Opportunities	All	Use of renewable energy				B	4	21					
210	1	Opportunities for Improvement	Opportunities	All	Preference for solar powered equipment / plant				B	4	21					
211	1	Opportunities for Improvement	Opportunities	All	Water saving devices				C	4	18					
212	1	Opportunities for Improvement	Opportunities	All	Improvement to aesthetics				C	4	18					
213	1	Opportunities for Improvement	Opportunities	All	Community improvements				C	4	18					
214	1	Opportunities for Improvement	Opportunities	All	Improved access				C	4	18					
215	1	Opportunities for Improvement	Opportunities	All	Improved local / regional air quality				C	4	18					
216	1	Opportunities for Improvement	Opportunities	All	Purchasing locally				C	4	18					
217	1	Opportunities for Improvement	Opportunities	All	Employment of local personnel				C	4	18					
218	1	Opportunities for Improvement	Opportunities	All	Employment of indigenous personnel				C	4	18					
219	1	Opportunities for Improvement	Opportunities	All	Sponsorships and donations				C	4	18					
220	1	Opportunities for Improvement	Opportunities	All	Encouragement of new business				C	4	18					

Conneq Projects Division Environmental Aspect Assessment

Complete by: Wendy Felsch Current on 1st December 2010

Risk Score = 1 - 5 = LOW 6 - 9 = MODERATE 10 - 25 = SIGNIFICANT (See - Conneq Risk Score Matrix Worksheet)

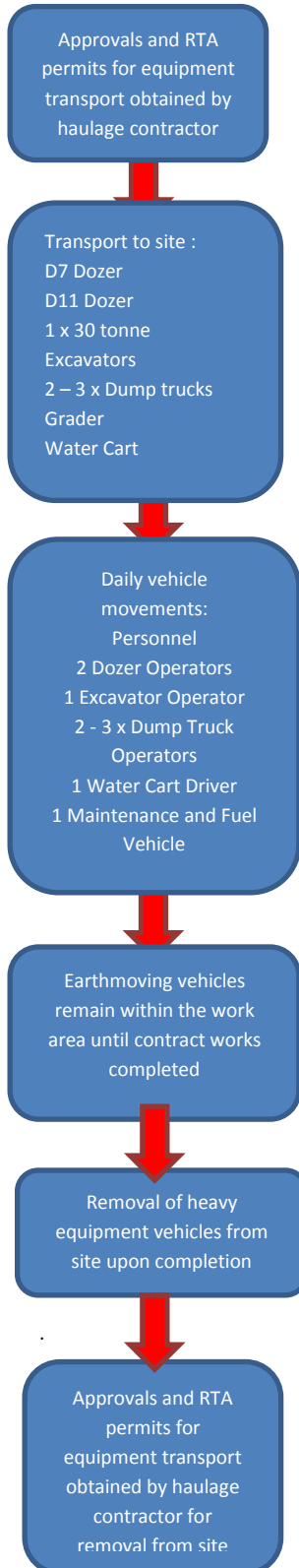
		Aspect Category	Aspect	Area of business	Impacts / Hazard Scenario	Potential Emergency Event	Causes	Consequences	Uncontrolled Risk Score			Suggested Controls	Controlled Risk Score			Legal Requirements
									Likelihood	Consequence	Risk Score (as per PC-601)		Likelihood	Consequence	Risk Score (as per PC-601)	
221	1	Opportunities for Improvement	Opportunities	All	Environmental education of subcontractors and community				C	4	18					
222	1	Opportunities for Improvement	Opportunities	All	Improvement of company environmental reputation in marketplace				C	4	18					

Appendix I – Typical Operational Processes for Earthworks Excavation and Soil Emplacement

Typical Operational Processes- Appendix I

Site Set Up

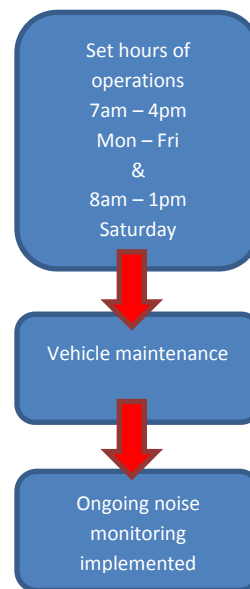
The site is located 2km from a public road, via 1.5km of private coal haul road







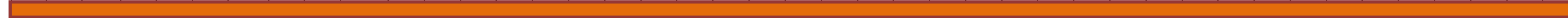





Site Operations



Site Management



Appendix J – Indicative Work Schedule

	Quarter 1												Quarter 2												Quarter 3												Quarter 4													
Month	December				January				February				March				April				May				June				July				August				September				October				November					
Week	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48		
	Commence moving material for permanent capping Stage 2A and stability bund												Commence moving material for water management area – Stage 1 (foundation)												Commence construction for alternative haul road access												Commence construction of water management area – Stage 2 (permanent sediment control and water treatment [wetland] structures)													
	Complete stability bund								Commence stockpile of soil materials as dedicated for topsoil, clay liner or subgrade foundations																Commence permanent capping of Stage 2B												Complete permanent capping to Stage 2A				Complete earthworks for water management area									
							Commence ash placement in Stage 2B area						Commence riparian zone management																								Complete riparian zone management													
Set-up excavation area as defined by plan “cut indicator pegs” according to design																																																		
Excavation of soil material																																																		
Construct a stability bund for Stage 2A																																																		
Permanently cap existing ash on Stage 2A repository																																																		
Operational activities (i.e. ash placement into Stage 2B area)																																																		
Water Management Area. Transport material and commence construction.																																																		
Commence creation of Long-term material stockpile(s)																																																		
New haul road construction for alternative access																																																		
Water Cart engaged for dust suppression																																																		
Permanent capping of Stage 2B area as part of routine operations																																																		

Appendix K – Work Procedure document ‘Fly Ash and Furnace Ash Haulage Procedure’

FLY ASH AND FURNACE ASH HAULAGE PROCEDURE

KEROSENE VALE

DOCUMENT NO. WW-PC-712.6.1

VERSION

REV	DATE	DESCRIPTION	PREPARED	CHECKED	APPROVED
05	23/11/11	Additional reference to haulage road operational times as detailed in planning documents. Change of company name to Lend Lease.	JA	JA	BL
04	22/10/10	Inclusion of detail about wheel wash requirements	JA	TW	BL
03	23/9/10	Update to include load covers on trucks	JA	TW	BL
02	18/5/10	Addition of information about tail-gate slamming and body wash out for Benz Actros trucks as section 5.5 (Safety & Environmental Management).	PR	KM/TW	BL
01	23/09/09	Operational review to encompass Merc-Benz Actros Operational Requirements	TW	KM	BL
0	2/9/09		DC	KM	JA

1 PURPOSE AND SCOPE

Personnel working on the ash repository area contribute to a team responsible for ash placement and dust suppression. In 2009 a review and update of the team requirements was undertaken for the Mt Piper site. APA team requirements have been organised to 11 parts 1) Quality Aims & Objectives (2) Plans OHS Risk Management (3) Sprinkler Pumps (4) Testing (5) Survey (6) Mobile Plant (7) Vehicle Maintenance (8) Civils (9) Site Emergency Housekeeping (10) Recording Communication (11) Out of Scope. Within each section work details have been prepared.

This detail covers **Ash Haulage – Fly Ash – Magaldi Ash - Ash Placement Team Operations**.

This document is numbered 712 (Work Procedures) 6 (Mobile Plant) and 1 for the first procedure.

2 DEFINITIONS/ABBREVIATIONS

APA – Ash Placement Area; OHS – Occupational Health Safety; DE – Delta Electricity; EPA – Environment Protection Authority; DOP – Department of Planning. PTO – Power Take Off, JSEA – Job Safety and Environmental Awareness, NSW - New South Wales; OEMP – Operational Environmental Management Plan.

3 RESPONSIBILITIES

APA team operations have responsibilities as outlined in the current CIS – Delta Electricity contract 5131, which covers the scope of requirements outlined within the DE EPA licence 766 and its subsequent amendments, and other government planning requirements such as the DOP. For Kerosene Vale, this includes the OEMP.

4 FLOW CHART

- Haulage Operational Times
- Safety and Environmental Responsibilities
- Fly Ash Filling Procedure
 - Before entry under flyash silo
- Furnace Ash Filling Procedure
 - Before entry under Magaldi Bin
- Haulage of Ash to Repository and Return
- Safety and Environmental Management
 - Unloading Mercedes Actros dumpers
 - Control of ash build-up in the truck bodies
 - Control of ash build-up mud and dust – use of wheel wash

5 PROCEDURE DETAILS

This work instruction has been prepared to guide the user through the process of fly and furnace ash haulage from the flyash silo and magaldi bin at Wallerawang Power Station.

The ash haulage activity is required to keep the flyash silo and magaldi bin level below 90% maximum and at the end of a shift the flyash and magaldi bins should be below 20% and 10% respectively.

The procedure also includes direction concerning unloading of the Mercedes Actross dumpers, tailgate slamming and body wash out.

5.1 Haulage Operational Times (Reference – Monthly Instruction Document).

Hours for ash haulage are 7 am to 10 pm. No ash transport or heavy vehicle transport is to occur outside these times, as per requirements of the Environment Protection Licence referenced in OEMP and RMP documents.

Daily operational times are recorded on the daily operational time sheet and the ash placement area daily operating log – action sheet.

5.2 Safety and Environmental Responsibilities

Health and safety must always be considered when performing fly and furnace ash haulage. Caution and concentration needs to be applied when entering silo area and filling truck to prevent spillage and damage to truck and cover. Any faulty equipment must be reported to team leader and entered on log book.

Road and weather conditions vary on the haul road and the ash pad – drive to conditions and report any new hazards

Airborne dust and ash spillage on the haul road is considered an environmental incident and must be reported immediately. All spills are to be contained and cleaned up. Hazards need to be incorporated into a JSEA prior to commencement of work.

“All truck loads will be covered during transport to minimise dust emissions”. (Page 7, Section 2.3.2, Ash Delivery in OEMP).

5.3 Flyash Filling Procedure

5.3.1 Before entry under flyash silo

- Stop truck at stop sign and push “cover operation button (or manual operation method for tarp)” to operate cover.
- Exit truck, visually check that cover has rolled back and that tail gate hinges have locked tail gate closed. If there is ash build up preventing tailgate closure, clean this area using hose and manually lock tailgate. Clean windscreen and mirrors if required.
- Re-enter truck, verify that “tarp indication light is **not** lit” and drive under silo with green light on (green light is situated above silo level display unit)
- Position truck central to loading chute following painted line on the road.
- Traffic light will turn red once the truck is in position between sensors.
- Fill truck following *Flyash Filling with Remote Procedure*

5.4 Furnace Ash Filling Procedure

5.3.1 Before entry under Magaldi Bin

- Stop truck just outside bin and push “cover operation button (or manual operation method for tarp)” to operate cover.

- Exit truck, visually check that cover has rolled back and that tail gate hinges have locked tail gate closed. If there is ash build up preventing tailgate closure, clean this area and manually lock tailgate. Clean windscreen and mirrors if required.
- Re-enter truck, verify that “tarp indication light is **not** lit” and drive under bin and position truck central to loading chute following painted line on the road.
- Fill truck following *Magaldi Operation Procedure*

5.5 Haulage of Ash to Repository and Return

Once loaded remain stationary for 30 seconds under silo while conditioner stops (in case residual ash is released).

- Move clear from under silo/bins and stop clear of all structures. Replace cover on load via push button (or manual operation method for tarp), verify “tarp indication light **is** lit”. Double check cover (in mirrors) has closed prior to moving off.
- Cover is to stay closed on truck until back at designated fill up entry point.
- Exit loading area.
- Follow designated haul road/s to ash repository – drive in accordance to all signposted speeds and NSW road regulations.
- Drive to designated tipping area as per weekly/monthly instruction.
- Tipping area will be marked with a yellow/red bunds at either end and should be free of all other traffic and obstacles. Turn and reverse towards tipping edge until cab is level with bunds.
- Note: the truck should never reverse past the rolled area.
- Tip off load.
- Move truck forward short distance “remaining within working area” from load and lower body and lock tailgate.
- Ensure “body down light” is **not** lit.
- Ensure PTO and Power Down switches are returned to the normal position.
- Proceed slowly through truck wash.
- Exit repository – follow haul road back to designated silo/bin driving in accordance to all sign posted speeds and NSW road regulations.

5.6.1 Safety and Environmental Management

5.6.1 Unloading Mercedes Actros dumpers

During the unloading of the Mercedes Actros dumpers, the ash is unloaded and the truck leaves the tip area. If the truck draws the tailgate over the pile with momentum, severe slamming occurs. The effects of the slamming are two fold.

- Noise being generated that has the potential to breach environmental limits.
- On inspection of Benz body liners it has been noted that there is significant cracking of welds to body.

Truck Operators must ensure the truck is moved from the tip area at a speed low enough to prevent slamming.

5.5.2 Control of ash build-up in the truck bodies

For the control on ash build-up in the truck bodies, regular inspections are to be performed to monitor the extent of the build-up and the requirement to clean the bodies. One aspect is that the tail-gate pins are not stressed from ash build up on the tail gate.

Please ensure there is no build up of ash on the tailgates.

For washing the truck bodies the procedure is as provided below; following review and completion of the task based JSEA

- JSEA to be completed prior to commencement of task
- Position truck in red drive through wheel wash (area marked out with reflectors)
- Ensure tarp is open
- Disengage tailgate
- Lift truck body
- Hose out using yellow fire hose
- If no water at wheel wash utilise water cart canon (washout in same area)
- If no water cart, then wash the truck bodies at the bins.

5.5.3 Control of ash build-up mud and dust – use of wheel wash

It is necessary to keep the truck wheels and lower bodies clean of mud collected when driving around the ash placement area. Mud and dust carry over will drop on the coal haul road and when it dries it will need to be washed down by the water cart.

Limitations to wheel washing are that supply from the Sawyers Creek Ash Dam is corrosive and will damage the vehicles when the sprays in the red wheel wash are high pressure, and fresh water supplies are limited in drought conditions for the supply of the yellow wheel wash. Consequently, common sense is required. The wheel wash sprays are to be used more times in wet weather.

There should be no carry over of mud, wet ash or dust out of the ash placement area.

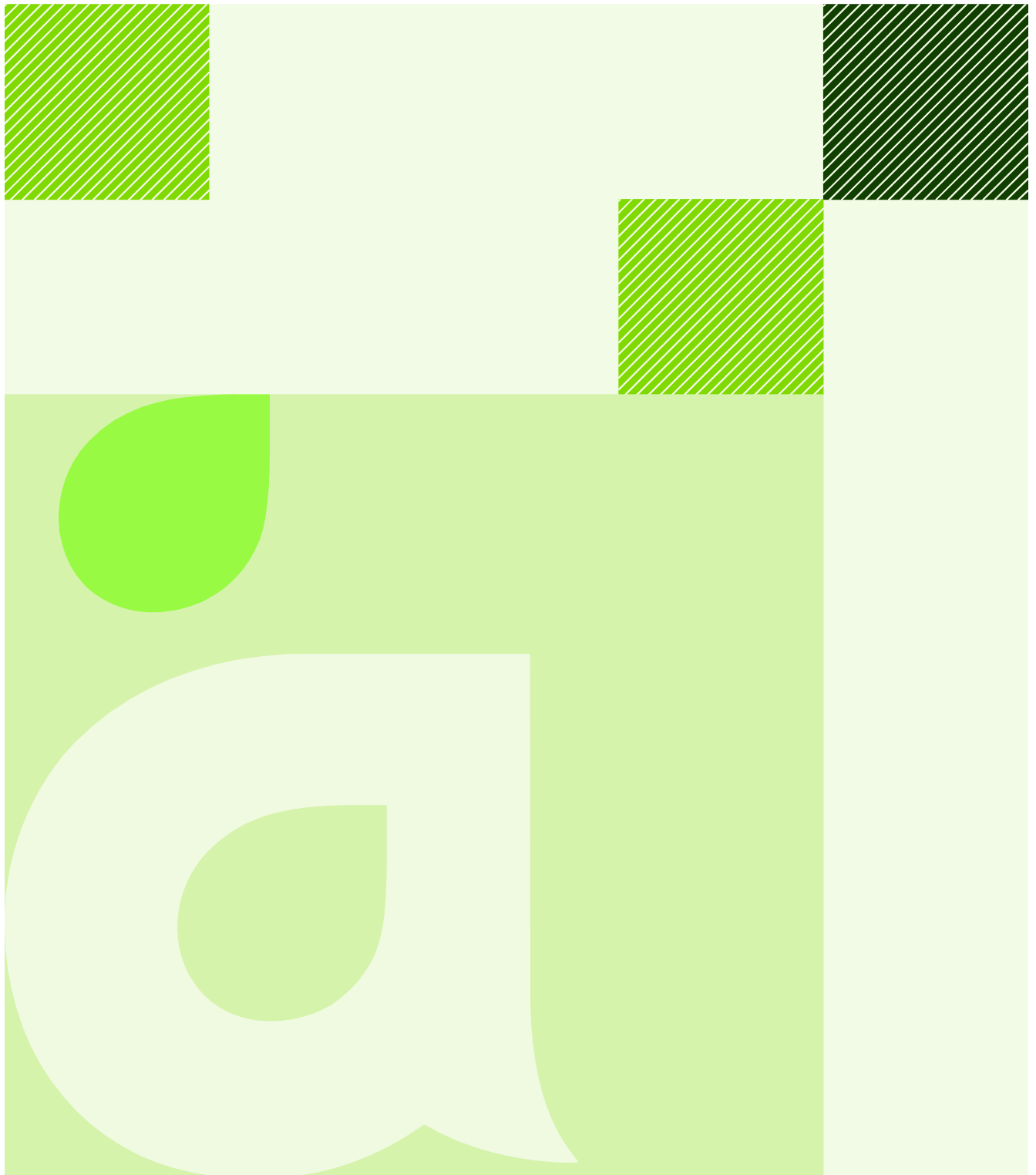
6 RECORDS

7 REFERENCES

Monthly instructions for Ash Haulage Wallerawang Power Station
Competency Assessment Document: BBS-SF-TR-WW-712.6.1

8 ATTACHMENTS

Appendix L – Ongoing Operational Noise Measurement Report



Project: Kerosene Vale Ash
Repository Stage 2

Ongoing operational noise
measurements

Prepared for: Delta
Electricity

Project: 226131

22 November 2011

Document Control Record

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Client		Delta Electricity	Client Contact		Emily Cotteril	
Rev	Date	Revision Details/Status	Prepared by	Author	Verifier	Approver
1	16 November 2011	Internal draft	RK	RK		
2	22 November 2011	Client issue	RK	RK	BD	
Current Revision		2				

Approval			
Author Signature		Approver Signature	
Name		Name	
Title		Title	



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1. Introduction

Aurecon was engaged by Delta Electricity to carry out ongoing operational noise monitoring for the Kerosene Vale Stage 2 Ash Repository (KVAR) located in Wallerawang, NSW. The noise measurements were carried out on Sunday 6 November and Monday 7 November 2011, during the early morning and evening periods as per the requirements outlined in the KVAR Stage 2 Operations, Operational Noise and Vibration Management Plan (ONVMP).

1.1 Site details

The project site consists of an Ash Repository which services the nearby Wallerawang Power Station (WPS). The major noise emissions associated with the Stage 2 KVAR works are:

- Unloading of ash from trucks at the repository.
- Placement and handling of ash at the repository site.
- Operation of trucks on the private haul road; trucks leave WPS loaded with ash (travelling north) and return from the repository empty (travelling south)

Figure 1 shows the site layout and location of sensitive receivers relative to the major noise sources including WPS as well as major roads in the area. Table 1 outlines the most affected sensitive receivers and their distance to the haul road.

Table 1 Representative noise measurement locations

Representative sensitive receiver	Distance (m) to haulage road*
60 Skelly Road	330
10 Skelly Road	240
21 Neubeck Street	160

Note * - distance relates to the property boundary or a point 30 m from the dwelling location

It should be noted that coal supply trucks also utilise the private haul road. Their noise impacts are not considered to be part of the Stage 2 KVAR works and thus their noise impact is outside the scope of this report.



Figure 1 Site details

2. Noise criteria

The applicable operational noise criteria are outlined in the Project Approval, Application No. 07_0005. The criteria are summarised in condition 2.15 as follows:

2.15 The cumulative operational noise from the ash placement area and ash haulage activity shall not exceed an $L_{Aeq (15 \text{ minute})}$ of 40 dBA at the nearest most affected sensitive receiver during normal operating hours as defined in condition 2.8.

This criterion applies under the following meteorological conditions:

- a) Wind speeds up to 3 m/s at 10 meters above ground; and/or*
- b) Temperature inversion conditions of up to 3°C/100 m and source to receiver gradient winds of up to 2 m/s at 10 m above ground level*

Normal operating hours in accordance with Conditions 2.8 are 7:00 am to 10:00 pm Monday to Sunday.

3. Noise measurements

3.1 Measurement methodology

Two types of measurements were carried out at the site: ambient noise and sound exposure levels. The measurements were carried out on Sunday 6 November and Monday 7 November 2011, during the early morning and evening periods, when the noise impacts are likely to be the most significant.

The ambient compliance noise measurements were conducted using a Larson Davis 831 Type 1 sound level meter which was set to 'A' frequency weighting, 'F' time weighting, and was fitted with an approved windshield. The measurement period at each location consisted of 15 minutes. A Larson Davis CAL200 was utilised to calibrate all sound level meters before and after each series of measurements. The weather during the noise logging ranged from overcast to sunny periods.

The Sound Exposure Level (SEL) measurements were also carried out using a Larson Davis 831 Type 1 sound level meter which was set to 'A' frequency weighting, 'F' time weighting, and was fitted with an approved windshield. SEL is the equivalent A-weighted sound level which, if it lasted for one second, would produce the same sound energy as the actual event. The measurement was commenced when the truck was observed to pass a consistent location and stopped when the end of the truck passed a second consistent location. The reference locations were identified where the truck could be visually observed.

During both types of measurements no rain periods were experienced. Minimal wind was induced on the microphone with any light breeze periods being significantly below the 5 m/s threshold.

3.2 Measurement locations

The measurement locations were chosen to represent the three most affected sensitive receivers as outlined in the Operational Noise and Vibration Management Plan (ONVMP). The three most affected receivers prior to commencement of the measurements were identified based on the information in the Stage 2 Kerosene Vale Ash Repository operational noise review.

Due to the increased background noise level at each of the three noise monitoring locations it was difficult to assess individual truck noise events (discussed below). A fourth noise monitoring location was selected closer to the haulage route to measure individual truck pass-by events. Table 2 and Figure 2 outline the noise measurement locations.


Table 2 Representative noise measurement locations

Measurement location	Measurement distance (m) to haulage road	Representative sensitive receiver
A	300	60 Skelly Road

Measurement location	Measurement distance (m) to haulage road	Representative sensitive receiver
B	270	10 Skelly Road
C	160	21 Neubeck Street
D	95	-



Figure 2 Noise measurement locations



General observation regarding ambient noise environment as well as the truck movements and ash repository operations are described as follows. Individual truck noise varied significantly between trucks. The noise emissions were dependant on the speed travelled, driving technique and direction of travel. The variances were apparent even between the same types of vehicles. Truck pass-by numbers were higher during the morning period on both measurement days when compared to the evening truck counts. Operational noise from the Ash Repository was seldom audible at the noise sensitive receiver locations during all the attended noise measurements.

The noise levels at all locations were affected by other ambient noise sources such as bird life, domestic animals, background noise from the Wallerawang Power Station as well as intermittent traffic noise from nearby Castlereagh Highway and Wolgan Road. Due to these other noise sources not all of the truck events were clearly audible, or could be distinguished from the ambient noise levels.

3.2.1 Location A

Noise measurements at Location A were affected by bird noise as well as foliage noise. There was direct exposure to the truck noise as the trucks could be visually identified. Individual truck pass by events were observed to generate peak noise levels of up to 50 dBA. The use of airbrakes by some drivers was clearly audible. Bird life reached instantaneous noise levels in excess of 60 dBA. Background hum from the nearby power station as well as traffic noise from Castlereagh Highway was clearly audible with the sound pressure levels dependant on the time of day and meteorological conditions.

3.2.2 Location B

Location B was similar to Location A with measurements also affected by bird life and audible levels from the power station and highway. Other noise sources included domestic animal noise. Individual vehicle pass-bys along Wolgan Road, were clearly audible.

3.2.3 Location C

Location C was the closest position to the haulage road (representative of a noise-sensitive receiver), however there was no direct line of site of the trucks. An earth mound directly to the east of the property boundary acts as an acoustic barrier. This made it difficult at time to identify truck movement. Other audible noise sources during the noise survey included workshop activities, domestic gardening. Despite the increased distance (approximately 1300 m) to the Wallerawang Power Station, background hum was still clearly audible.

3.2.4 Location D

The noise data collected at Location D measured the Sound Exposure Levels (SEL) of individual truck pass-by events. At this closer location to the truck haulage road, each truck pass-by was clearly audible above other ambient noise sources.

3.3 Operating and meteorological conditions

Delta Electricity has provided the following information regarding the operations during the noise survey.

- The ash silos were at approximately 83 – 85% capacity during the noise survey.
- Two trucks were operating at a constant rate, with approximate 15 minute circuits for each truck. From 7am – 10pm daily this is the constant mode of operation. This signifies that the worst case

ash truck movements that could occur within a 15 minute periods are 4 drive-bys (2 in the northern direction, 2 in the southern direction)

The meteorological conditions during the noise survey based on 5 minute data from the Mount Piper weather station are shown in Table 3. The weather station details are as follows:

- Location – South: 33° 21' 46.0", East: 150° 01' 21.0"
- Elevation – 956 m
- Anemometer height – 10 m above ground level

Table 3 Meteorological conditions during noise survey

Time and date	Wind speed (m/s)	Wind direction (deg)	Relative Humidity (%)	Temp (°C)	Net Rad (W/m ²)	Atmospheric Stability*
6/11/2011 7:30	1.7	8	71	17.9	112	B
6/11/2011 7:35	2.2	17	67	18.5	116	C
6/11/2011 7:40	2.8	15	66	18.5	105	C
6/11/2011 7:55	2.4	17	65	18.9	108	B
6/11/2011 8:00	2.3	9	65	18.9	132	A
6/11/2011 8:05	1.4	326	65	18.9	47	A
6/11/2011 8:25	1.6	333	67	19.0	259	A
6/11/2011 8:30	2.9	340	65	19.5	210	C
6/11/2011 8:35	2.7	349	65	19.7	162	C
6/11/2011 18:30	2.5	301	70	18.6	21	B
6/11/2011 18:35	2.0	312	71	18.5	6	A
6/11/2011 18:40	1.5	301	72	18.3	-1	A
6/11/2011 18:50	2.4	301	74	18.0	-12	C
6/11/2011 18:55	1.7	324	74	18.0	-17	B
6/11/2011 19:00	1.1	326	75	17.9	-25	A
6/11/2011 19:10	1.6	334	76	17.6	-37	C
6/11/2011 19:15	1.3	348	76	17.5	-38	B
6/11/2011 19:20	0.9	329	77	17.4	-37	A
7/11/2011 7:30	3.1	250	81	17.6	118	B
7/11/2011 7:35	3.1	273	80	17.8	93	B

Time and date	Wind speed (m/s)	Wind direction (deg)	Relative Humidity (%)	Temp (°C)	Net Rad (W/m ²)	Atmospheric Stability*
7/11/2011 7:40	4.1	255	80	17.7	97	C
7/11/2011 7:50	3.3	257	80	17.7	100	C
7/11/2011 7:55	4.5	277	80	17.5	93	D
7/11/2011 8:00	3.1	281	81	17.5	46	B
7/11/2011 8:10	2.8	294	82	17.2	28	B
7/11/2011 8:15	2.7	287	82	17.2	47	A
7/11/2011 8:20	3.3	273	82	17.1	73	B
7/11/2011 20:55	0.8	191	77	18.7	-44	B
7/11/2011 21:00	0.9	189	78	18.4	-43	B
7/11/2011 21:05	1.5	205	79	18.1	-44	D
7/11/2011 21:15	0.8	142	79	17.8	-44	A
7/11/2011 21:20	0.7	268	80	17.6	-44	A
7/11/2011 21:25	1.0	228	81	17.4	-45	C
7/11/2011 21:35	1.0	258	83	16.9	-42	C
7/11/2011 21:40	1.3	261	84	16.7	-42	C
7/11/2011 21:45	0.5	240	85	16.6	-41	A

Note *: Atmospheric stability class is determined using Sigma Theta data (not shown) and applying the Pasquill method. Pasquill-Gifford stability classes range from: A being highly Unstable, D neutral and G extremely stable.

As can be observed from the above meteorological data, the wind speeds were predominately low during the noise survey, with atmospheric stability predominantly ranging from unstable to neutral.

3.4 Results

3.4.1 Ambient noise measurements

The results from the 15 minute ambient noise measurements at each of the measurement locations are shown in Table 4.

Table 4 Noise measurement results (15 minute)

Location	Date	Time	Sound pressure level (dBA)				Trucks Pass-bys and direction of travel*		
			L _{Aeq}	L _{Amax}	L _{A10}	L _{A90}	North	South	Total
C	06/11/2011	07:30	44	67	45	37	4	7	11
B	06/11/2011	07:55	44	62	46	38	9	7	16
A	06/11/2011	08:24	43	60	46	38	6	9	15
A	06/11/2011	18:29	41	56	43	38	4	3	7
B	06/11/2011	18:48	41	60	44	36	3	4	7
C	06/11/2011	19:09	44	65	45	38	2	5	7
A	07/11/2011	07:29	46	62	47	43	6	5	11
B	07/11/2011	07:49	47	67	49	40	7	6	13
C	07/11/2011	08:08	44	67	46	38	3	8	11
A	07/11/2011	20:56	41	61	41	37	1	2	3
B	07/11/2011	21:15	40	61	42	37	2	2	4
C	07/11/2011	21:35	43	59	44	39	1	1	2

Note * - truck counts include both coal and ash trucks

The measured L_{Aeq (15 min)} is generally in excess of the assessment criteria of L_{Aeq (15 min)} of 40 dBA. The high noise levels are associated with local noise events such as mainly bird noise and traffic noise levels from surrounding roads as well as some truck pass-bys along the haulage route. The high background noise level is predominantly associated with the Wallerawang Power Station operation.

3.4.2 SEL measurements

The individual truck pass-by noise event measurements at Location D are summarised in Table 5.

Table 5 SEL noise measurement results at Location D

Truck travelling direction	Average event time (s)	Average SEL (dBA)	No. of valid truck event measurements
South	28.9	68	8
North	18.1	70	9

4. Data analysis

As can be observed from the results presented in Table 4, the existing ambient noise levels (L_{Aeq}) are predominantly in excess of the assessment criteria of L_{Aeq (15 min)} of 40 dBA. The background noise

(L_{A90}) from the consistent noise sources during all of the noise measurements was also very close assessment criteria. This signifies that noise emissions from the truck movements and ash repository operation cannot be determined based on ambient noise measurements.

To assess the impact of the ash truck noise emissions individual truck pass-by noise events have to be taken into account. Based on the SEL measurement results (shown in Table 5), a $L_{Aeq (15 \text{ min})}$ noise level was predicted, which takes into account the number of ash truck pass-bys, distance noise correction and any potential barrier effects. These predictions are shown in Table 6 below.

The noise emissions from the ash repository are considered to be below the assessment criteria as they were predominantly not audible during the noise survey and could not distinguished.

Table 6 Noise predictions from truck movements based on SEL measurements

Sensitive receiver	Distance to haulage road (m)	No. of truck movements	Predicted $L_{Aeq (15 \text{ min})}$ (dBA)	Criteria $L_{Aeq (15 \text{ min})}$ (dBA)
60 Skelly Road	330	4, (2 N, 2 S)	35	40
10 Skelly Road	240	4, (2 N, 2 S)	38	40
21 Neubeck Street	160	4, (2 N, 2 S)	36*	40

Note * - includes barrier attenuation from earth mound of approximately 5 dBA

It can be seen from the above result that the predicted $L_{Aeq (15 \text{ min})}$ noise emissions based on the SEL measurements satisfy the required assessment criteria. Therefore the operational noise emissions from the Stage 2 KVAR are considered compliant to the Conditions of Approval.

5. Conclusion

Aurecon conducted ongoing operational noise monitoring for the Kerosene Vale Stage 2 Ash Repository (KVAR) located in Wallerawang, NSW. The noise measurements were carried out at the three most affected sensitive receiver locations on Sunday 6 November and Monday 7 November 2011. The assessment criteria are outlined in the Project Approval, Application No. 07_0005, with the criteria consisting of $L_{Aeq (15 \text{ minute})}$ of 40 dBA from all ash haulage and placement associated operational noise emissions at the nearest sensitive receivers.

The ambient noise measurements identified significant other noise sources in the area. This meant that the noise emissions from the Stage 2 KVAR activities could not be sufficiently distinguished from the other ambient noise sources to carry out an assessment. Additional Sound Exposure Levels of individual truck pass-by events at a closer distance to the truck haulage road were carried out. Based on the SEL measurement results, a $L_{Aeq (15 \text{ min})}$ noise level was predicted at each of the assessment sensitive noise receiver. The predicted noise levels took into account only truck movements associated with Stage 2 KVAR works and excluded any coal truck noise. The predicted noise level at each of the noise receivers showed compliance with assessment criteria, thus the operational noise emissions from the Stage 2 KVAR are considered compliant to the Conditions of Approval.



6. References

- Kerosene Vale Stage 2 Ash Repository, Operational Environmental Management Plan (OEMP), Parsons Brinckerhoff, April 2009, which includes:
 - Appendix A: KVAR Stage 2 Operations, Operational Noise and Vibration Management Plan (ONVMP), Parsons Brinckerhoff, April 2009
- Project Approval (PA), Application: No 07_0005, Delta Electricity, 26 November 2008, Department of Planning
- Stage 2 Kerosene Vale Ash Repository operational noise review, Parsons Brinckerhoff, September 2009



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Appendix M – Construction Noise Conditions of Approval

2. SPECIFIC ENVIRONMENTAL CONDITIONS

Ash Management

- 2.1 The Proponent shall prepare a long-term ash management strategy including a program for investigation and assessment of alternative ash management measures with a goal of 40% reuse of ash by 31 December 2013. The report shall be submitted to the Director-General within six months of the commencement of operations. The Proponent shall report on the status and outcomes of its investigations to the Director-General every two years from the commencement of the operation of the project, unless otherwise agreed by the Director-General.
- 2.2 To facilitate assessment of the viability of coal resources in the project area and provide a finite opportunity for their extraction, the Proponent shall undertake revised staging of ash placement activities as described in the document referred to in condition 1.1c) of this approval.

Noise Impacts

Construction Hours

- 2.3 Construction activities associated with the project shall only be undertaken during the following hours:
- a) 7:00 am to 6:00 pm, Mondays to Fridays, inclusive;
 - b) 8:00 am to 1:00 pm on Saturdays; and
 - c) at no time on Sundays or public holidays.
- 2.4 Activities resulting in impulsive or tonal noise emission (such as rock breaking or rock hammering) shall be limited to 8:00 am to 12:00 pm, Monday to Saturday and 2:00 pm to 5:00 pm, Monday to Friday. The Proponent shall not undertake such activities for more than three continuous hours and must provide a minimum one-hour respite period.
- 2.5 Construction outside the hours stipulated in condition 2.3 of this approval is permitted in the following circumstances:
- a) where construction works do not cause audible noise at any sensitive receiver; or
 - b) for the delivery of materials required outside these hours by the Police or other authorities for safety reasons; or
 - c) where it is required in an emergency to avoid the loss of lives, property and/or to prevent environmental harm.
- 2.6 The hours of construction activities specified under condition 2.3 of this approval may be varied with the prior written approval of the Director-General. Any request to alter the hours of construction specified under condition 2.3 shall be:
- a) considered on a case-by-case basis;
 - b) accompanied by details of the nature and need for activities to be conducted during the varied construction hours; and
 - c) accompanied by any information necessary for the Director-General to reasonably determine that activities undertaken during the varied construction hours will not adversely impact on the acoustic amenity of sensitive receivers in the vicinity of the site.

Construction Noise

- 2.7 The construction noise objective for the project is to manage noise from construction activities (as measured by a L_{A10} (15 minute) descriptor) so as not to exceed the background L_{A90} noise level by more than 10 dB(A) at any sensitive receiver.