



**MAJOR PROJECT ASSESSMENT:
*Pasminco Cockle Creek Smelter Pty Ltd
Remediation Project***

Director-General's
Environmental Assessment Report
Section 75I of the
Environmental Planning and Assessment Act 1979

February 2007

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EXECUTIVE SUMMARY

Pasminco Cockle Creek Smelter Pty Ltd (the Proponent) (Subject to Deed of Company Arrangement) proposes to remediate land associated with its former lead smelting operations at Boolaroo, near Newcastle. The land proposed to be remediated includes Lot 201 DP 805914, Lot 21 DP 253122, Lot 1 DP 523781 and Lot 23 DP 251322. The main site of the PCCS land (Lot 201 DP805914) is currently subject to a Remediation Order issued by the Department of Environment and Conservation (DEC) on 1 July 2003 under the *Contaminated Land Management Act, 1997*. In issuing the Remediation Order, the DEC considered that the dust, surface water and groundwater leaving the main site posed a Significant Risk of Harm to human health and the environment. The Proponent closed the smelter on 12 September 2003 and since that time has undertaken actions to address the Remediation Order.

The Proponent now proposes to remediate the site by excavating contaminated material from the site and placing the material in a containment cell to be located around the existing on-site eastern slag stockpile. The proposal more specifically involves the removal and crushing of concrete, progressive excavation of contaminated soils with subsequent refilling, regrading and surface stabilisation with imported fill as necessary, treatment as necessary of excavated materials and the emplacement of excavated and other materials into an engineered containment cell (s) which will be progressively sealed by capping. The remediation works will be undertaken over a five year period. The site has been divided into 11 separate development areas for remediation. Each area is proposed to be remediated and validated to the point where laboratory validation results indicate that the site is suitable for the proposed land use. Remediation would enable the site to be rezoned in the future for a variety of uses from residential, industrial/commercial activities and open space opportunities. Future development of the remediated site is not part of the subject project application, and will be considered separately under the provisions of Part 3 of the *Environmental Planning and Assessment Act 1979*. The Proponent also seeks approval for the continued operation of the existing slag jig on the site for the processing of lead slag. The operation of the jig was approved by the then Minister Assisting the Minister for Infrastructure and Planning in March 2005 in a modification of the development consent originally granted by the then Minister for Urban Affairs and Planning in November 1995 for a total improvement plan of the smelter operations. The jig system process lead slag stored on the site with the aim of collecting high-lead content material for off-site sale disposal. The proposal also includes the possible acceptance of lead contaminated soils from nominated properties outside the site into the containment cell as part of a Lead Abatement Strategy being prepared on request from the DEC.

The capital cost of the proposed remediation project is estimated at \$45 million. Approximately 20 people would be employed during remediation works. Once the site is remediated and rezoned, the Proponent expects that the site would result in potential employment opportunities in the order of 1,300 to 1,600 permanent jobs in the industrial and mixed use zones. The project is subject to Part 3A of the *Environmental Planning and Assessment Act 1979* and requires the approval of the Minister for Planning.

Seven submissions were received during and after the public exhibition period. Five submissions were from State Government authorities, including the Hunter-Central Rivers Catchment Management Authority, the NSW Mine Subsidence Board, the Department of Natural Resources, the Department of Environment and Conservation and the Hunter New England Area Health Service. One submission was received from Lake Macquarie City Council and one submission from a private company. None of the agencies' submissions opposed the proposal. Key issues raised in their submissions included concern over the release of contaminated dust during remediation activities, the need to effectively manage the potential for migration of contaminated groundwater and surface water during remediation, potential noise impacts on residential areas during remediation, long term liability for the containment cell and water treatment plant. The submission from the private company objected to the proposal on the basis that the company considered that it could offer a more suitable technology to remediate the site.

The Proponent's Environmental Assessment report indicated that the potential impacts of the proposal to the surrounding environment are capable of being ameliorated to acceptable levels through various mitigation measures and that further mitigation measures would be considered during the detailed design phase.

The Department has reviewed and assessed the Proponent's Environmental Assessment and associated specialist documents (including Site Audit Reports prepared by the Site Auditor), the Proponent's Statement of Commitments, submissions on the proposal, and the Proponent's Submissions Report. Based on its assessment, the Department is satisfied that the proposed remediation project could be undertaken within acceptable environmental limits subject to the implementation of the Proponent's commitments and the recommended conditions of approval. This conclusion is made in recognition that further detailed design and investigations are required particularly associated with the proposed containment cell.

Key issues during remediation include potential dust and noise impacts in residential areas, and potential off site water quality impacts from releases of contaminated water. After remediation, key issues include the long-term management of the containment cell and monitoring the performance of the cell to ensure that there is no migration of contamination. The Department's recommended conditions have been prepared to address these key issues, placing a significant focus on the detailed design phase and on ensuring that off site impacts are minimised to acceptable levels. The Department has also recommended that the Minister's 1995 consent applying to the site be surrendered after approval of the currently-proposed remediation works. Relevant conditions of the 1995 consent have been adopted or further developed in the current recommended approval, including a requirement to finalise and obtain approval of a Lead Abatement Strategy for nominated properties around the site.

The Department concludes that the remediation proposal can be approved subject to the effective implementation of the Proponent's Statement of Commitments and the Department's recommended conditions of approval.

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1. BACKGROUND

1.1 Location and Site Description

Pasminco Cockle Creek Smelter Pty Ltd (Subject to Deed of Company Arrangement) (the Proponent) proposes to remediate land associated with its former lead smelting operations at Boolaroo, near Newcastle. The site is located at 13a Main Road, Boolaroo, in the Lake Macquarie Local Government Area.

The main site of the Pasminco Cockle Creek Smelter is currently subject to a Remediation Order issued by the Department of Environment and Conservation (DEC) on 1 July 2003 under the *Contaminated Land Management Act, 1997*. The DEC considered that the dust, surface water and groundwater leaving the main site posed a Significant Risk of Harm to human health and the environment. The Proponent closed the smelter on 12 September 2003 and has been undertaking minor remediation works since that time. The Proponent now proposes to remediate the entire site to enable the land to be beneficially used in the future for a variety of land uses such as residential, industrial/commercial and open space.

The land which is the subject of the remediation project is located in Boolaroo, approximately 13 km south-west of Newcastle just above the northern most point of Lake Macquarie. The site and surrounding land is shown in Figure 1.

The land proposed to undergo remediation comprises four distinct lots, being:

- the "Main Site" which is the former smelter operations area.
- the "Triangle Paddock" which is a portion of the land to the south-west of the Main Site.
- "Munibung Hill" which is located on the north-east and east of the site.
- the "Cockle Creek Pump Station" which is a small portion of land on the east side of Cockle Creek where the Proponent pumps water from the creek to the Main Site.

The description of the land proposed for remediation is outlined in Table 1.

Table 1 - Land Description

	Main Site		Triangle Paddock	Munibung Hill	Cockle Creek Pump Station
Lot and DP No.	Lot 201 DP 805914		Lot 21 DP 253122	Lot 1 DP 523781	Lot 23 DP 251322
Site Area	107.82 ha	14.58 ha	9.46 ha	59.21 ha	0.2078 ha
Existing Zoning (under Lake Macquarie LEP 2004)	4(1) Industrial (Core)	7(2) Environment Protection Conservation (Secondary)	10 Investigation Zone	7(2) Environment Protection Conservation (Secondary)	6(1) Open Space

The Main Site forms an irregular shape comprising the smelter area and includes the western and eastern slag stockpiles and the upper western slopes of Munibung Hill. The Incitec-Pivot site is surrounded by the Main Site on its eastern, northern and western sides. The Triangle Paddock is located on the sites south-western corner together with the Cockle Creek Pump Station area, adjacent to Cockle Creek. The Munibung Hill area is located on the eastern side of the Boolaroo residential area.

The Main Site rises from about RL6 metres in the west to 40-80 metres in the east. The Triangle Paddock is about RL2 to 6 metres.

1.2 Surrounding Land Use

The site is surrounded by a number of existing developed areas (refer to Figure 1). In the north, the site is separated from the residential suburb of Argenton by the Great Western Railway. Adjoining the site on its southern side is the residential area of Boolaroo. The Boolaroo's centre is approximately of 500 metres from the site. Both Boolaroo and Argenton are characterised by low density residential development. There is increased

development growth in the area and some pressure to provide new residential land. The suburb of Macquarie Hills lies to the east of Munibung Hill.

The Cardiff Industrial Estate lies to the north-east of the site and is characterised by large light industrial allotments.

Figure 1 - Site Location (Site Boundary (Orange Line), Remediation Stages (Yellow Lines), Containment Cell Location (Areas 9 and 11))



2. PROPOSED DEVELOPMENT

2.1 General

The proposal involves the remediation of the Proponent's lands by progressive excavation of contaminated soil with subsequent refilling, regrading and surface stabilisation works, and placement of contaminated material in an engineered containment cell on site. The remediation of the site would enable the site to be rezoned in the future for a variety of uses from residential, industrial/commercial activities and open space opportunities.

The remediation strategy described by the Proponent comprises the following components:

- economic removal of residual materials;
- remediation and validation of future development areas;
- construction of on-site containment cell; and
- implementation of a long-term Site Management Plan following the completion of works.

The remediation works would be undertaken in stages (stage numbers are shown in Figure 1) and would involve three principal construction activities, which may occur concurrently:

- excavation of contaminated soils with post excavation activities sufficient to stabilise and level the excavated areas (surface stabilisation). Post remediation surface shaping and regrading would take place after all remediation activities are completed in a particular area;
- temporary storage, treatment and possibly mixing of excavated materials; and
- emplacement of excavated and other materials into an engineered containment cell. The cell would be progressively capped on completion of works in a particular area. Capping of the cell would be undertaken with imported fill off-site.

The Proponent also seeks approval for the continued operation of the existing jig system on the Proponent's lands for the processing of lead slag. The operation of the jig was approved by the then Minister Assisting the Minister for Infrastructure and Planning in March 2005 in a modification of the development consent originally granted by the then Minister for Urban Affairs and Planning in November 1995 for a total improvement plan of the smelter operations. The jig system processes lead slag stored on the site with the aim of collecting high-lead content material for off-site sale disposal.

The site has been divided into 11 separate development areas for remediation. Each area is proposed to be remediated and validated to the point where laboratory validation results indicate that the site is suitable for the proposed future land use. Table 2 provides an outline of the areas proposed for remediation and the order in which they are proposed to be undertaken. The order in Table 2 below may change depending on the detailed design of the remediation works.

Table 2 - Priority of Land Remediation

Land Area No.	Description
1	Cardiff West Estate (Clay Pits)
2	Triangle Paddock South
3	Railway Employment Zone (including part Salt water and Hawkes Dam)
4	Triangular Paddock North and Main Entry Precinct
5	Boolaroo Heights
6	Munibung Hill Residential (including Freshwater Dam sediments)
7	Munibung Slopes Industrial Estate
8	Boolaroo North
9	Cell Surrounds (including part Hawkes Dam sediments)
10	Mixed Use Zone (including part Salt Dam sediments)
11	Containment Cell

Areas 1 to 4 in Table 2 are more likely to be remediated early in the remediation project as these areas have been subject to detailed studies sufficient to lodge applications for rezoning and subdivision approvals with Lake

Macquarie City Council. The preparation of a Site Master Plan for the future development of the site beyond remediation would require approvals separate to the current Part 3A application process.

The Proponent also seeks approval to accept certain specified waste materials from nominated residential properties in Boolaroo, Speers Point and Argenton as a result of the implementation of a Lead Abatement Strategy (discussed in section 5.5 of this report). The Environmental Assessment indicates that contaminated material from the adjacent Incitec-Pivot site could also be deposited in the containment cell, however during the assessment phase consultants representing the Proponent and Incitec-Pivot indicated that material from the Incitec site will not be deposited in the proposed Pasminco's containment cell as Incitec-Pivot proposes to carry out its own remediation project.

Concrete breaking, the demolition of buildings and base slabs that were part of smelter operations would be undertaken prior to any remediation works.

The Proponent expects that site remediation, validation and the audit review process, as well as the cell and associated construction, could be achieved within a five year period.

▪ Excavation Volumes

The Environmental Assessment indicates that the maximum excavated volume of material is expected to be approximately 750,000 m³ (including a contingency factor of 25%) This volume roughly translates to an approximate volume of 75,000 m³ of material excavated every six months. The areas and the volumes expected to be excavated are outlined in Table 3.

Table 3 - Area Excavation Volumes

Land Area Number	Description	Area (m ²)	Excavation Volume (m ³)	Excavation Volume (with 25% - m ³)
1	Cardiff West Estate (Clay Pits)	160,300	20,000	25,000
2	Triangle Paddock South	72,687	75,401	94,252
3	Railway Employment Zone (including part Salt water and Hawkes Dam)	114,800	42,010	52,513
4	Triangular Paddock North and Main Entry Precinct	132,142	49,439	61,798
5	Boolaroo Heights	101,300	20,267	25,334
6	Munibung Hill Residential (including Freshwater Dam sediments)	224,813	43,592	54,490
7	Munibung Slopes Industrial Estate	23,896	4,779	5,974
8	Boolaroo North	122,200	136,478	170,598
9	Cell Surrounds (including part Hawkes Dam sediments)	59,696	96,935	121,169
10	Mixed Use Zone (including part Salt Dam sediments)	89,939	111,403	139,254
Total		1,101,773	600,304	750,380

The volumes of the existing slag stockpiles on site total 171,000 m³. In addition, there is a further 95,000 m³ of Imperial Smelting Furnace Slag which will be distributed across the cell, in addition to the following quantities of other materials:

- Lead Abatement Strategy materials – 75,000 m³;
- smelter inventory material retained on-site including dam sediments – 1,900 m³;
- demolition and dump wastes – 12,500 m³; and
- Cockle Creek Mix (a smelter by-product which is separately stockpiled) – 37,500 m³;

Therefore, in addition to the contaminated material which is proposed to be directly excavated from the site, there is an estimated 392,900 m³ of other contaminated material that will also require containment. The total volume of contaminated material on-site is therefore likely to be in the order of **1,143,280 m³**.

▪ Containment Cell

The containment cell would generally be located in the area of the existing on-site monolith (the eastern slag stockpile). The Environmental Assessment indicates that the upper height limit of the top surface of the cell including the 2-metre capping layer will be no higher than RL34 metres, or equivalent to approximately 12 metres above the adjacent existing ground level to the east of the eastern stockpile. Based on the volumes of materials expected to be contained on site, the cell will have an approximate rectangular footprint 440 metres by 485 metres, and will measure approximately 21 hectares in area. Future residential uses would not be permitted on the cell. Figure 2 shows the general configuration of the containment cell.

Since the containment cell is a key component of the remediation strategy, its feasibility has been subject to more detailed investigation in a "Conceptual Containment Cell Design and Management Plan" (CCCDMP). The CCCDMP has been reviewed by a DEC-accredited Site Auditor under the *Contaminated Land Management Act 1997* in the "Site Audit Report Review of Site-Wide Remedial Action Plan (RAP)" (HLA, November 2005). The RAP also includes a review of the "Whole of Site Remedial Action Plan" (Fitzwalter Group, Sept 2005) (the Site-Wide RAP). The Site Audit Report endorses the overall remedial strategy presented in the Site-Wide RAP and the specific measures proposed in the CCCDMP, but requires that further detailed design of the containment cell be undertaken in a Final Containment Cell Design and Management Plan.

The design in the CCCDMP is based on two adjoining cells, with cell 1 containing materials that require no treatment before placement, while cell 2 is envisaged to contain materials that may need some form of treatment or special placement. The CCCDMP classifies material on the site based on available chemical data, identifying nineteen different types of materials. These materials are proposed to be located in cell 1 or cell 2 in accordance with criteria that relates to the chemical characteristics of acid generation potential, leachability, aggressivity, fouling and corrosion, and flammability and reactivity. The final design of the cell will be determined during detailed design.

An important component of the containment cell is the sub-surface water control measures which include an upgradient cut-off wall keyed into bedrock accompanied by a sub-surface drainage trench to direct groundwater away from building up against the wall, and a down-gradient drainage trench excavated to the top of bedrock along the downstream perimeter of the cell (details provided in Figure 2). A leachate collection and conveyance system is also proposed at the base of the cell, as well as an effluent treatment plant to treat groundwater and leachate prior to discharging. The CCCDMP also provides for engineered capping to minimise the infiltration of water into the cell.

2.2 Project Need and Justification

Remediation Site Declaration and Remediation Order

On 10 September 2002, the EPA (now part of the DEC) declared the Main Site, together with parts of the bed of Cockle Creek and Cockle Bay, as a remediation site under section 21 of the *Contaminated Land Management Act 1997*. The Declaration indicated that the EPA had found that contamination at the Main Site posed a significant risk of harm to the environment. It also indicated that there was a significant risk that harm was being caused to various aspects of the environment and to human health by the offsite migration of contaminated material.

On 1 July 2003 the EPA issued a Remediation Order on the Main Site in accordance with the *Contaminated Land Management Act 1997*. The EPA considered that dust, surface water and groundwater leaving the main site posed a significant risk of harm to human health and the environment. Since the closure of the smelter on 12 September 2003, the Proponent has undertaken a number of actions to address the Remediation Order. Most of the main structures that existed on the site have been demolished and a large amount of material has been removed from the site for reuse or recycling.

Figure 2 - Containment Cell including Surface- and Groundwater Management Systems



In addition, the following actions have been undertaken to address the Remediation Order:

- Groundwater Remedial Action Plan and supplementary documentation has been prepared;
- reduction of surface water overflows have been reduced;
- dust emissions, mainly through the implementation of measures to minimise dust generation on site have been reduced; and
- groundwater emissions, mainly through the installation of groundwater extraction wells (refer to Figure 2), on-site pumping and treatment and maintenance and monitoring of the extraction system and wells have been reduced.

Notwithstanding, the actions that have been undertaken by the Proponent to address the Remediation Order, additional works are still required to address dust and water issues related to the un-remediated lands. These works form the basis of the subject project application.

Project Need

The remediation of the site is required to be undertaken in order to satisfy the DEC's Remediation Order requirements. In addition, remediation of the site would provide benefits to the surrounding environment as it would:

- result in remediation of the site to agreed standards, commensurate with potential future land uses;
- minimise any existing prospect of further on-site pollution occurring as a result of existing contaminated materials on site;
- minimise ongoing site maintenance costs; and
- enable the site to be redeveloped at a later date following the completion of remediation and validation works for other uses such as residential, industrial, commercial and open space.

Remediation of the site would lead to substantial reduction in the environmental and human health risks currently posed by the unremediated land. Once completed, the remediated site would provide a significant area of land that could potentially be redeveloped for a variety of beneficial uses resulting in employment and economic opportunities in the region.

Remedial Options and Selection of Preferred Remediation Strategy

Options for remediating contaminated fill and waste materials on site were investigated in an options report prepared by CH2M Hill (May 2005). Options developed in the options report included:

- no action;
- institutional controls comprising implementation of a health and safety program or restricting site access;
- in-situ biological treatment, such as bioventing, enhanced bioremediation and phytoremediation;
- in-situ physical treatment, such as chemical oxidation/reduction, electrokinetic separating, soil flushing/leaching, soil vapour extraction and solidification/stabilisation;
- in-situ thermal treatment;
- ex-situ biological treatment, such as biopiles, composting, landfarming, use of sulphur reducing bacteria and slurry phase biotreatment;
- ex-situ physical and/or biological treatment, such as solidification/stabilisation, chemical extraction, chemical extraction, chemical oxidation/reduction, segregation and soil washing;
- ex-situ thermal treatment, such as hot gas decontamination, incineration, pyrolysis, thermal desorption treatment in a Waelz kiln;
- containment by in-situ capping, physical separation, capping in prescribed containment areas, partial encapsulation, use of multiple, fully-lined containment cells, hydraulic containment with cap and complete encapsulation;
- homogenisation by vertical mixing;
- excavation and disposal off-site; and
- use of site-specific options for reuse of materials, such as use of Imperial Smelter Furnace (ISF) Slag in concrete during development works and disposal of some ISF slag to the Endeavour mine at Cobar.

The options report (CH2M Hill, May 2005) assessed options against evaluation criteria, with short listed options being assessed in more detailed. The Site-Wide RAP (Fitzwalter Group, Sept 2005) then provided the preferred

remediation strategy. The options report, the Site-Wide RAP and the Conceptual Containment Cell Design and Management Plan (Maunsell, Sep 2005) were reviewed by the Site Auditor in the "Site Audit Report Review of Site-Wide Remedial Action Plan (RAP)" (HLA, November 2005). The Site Audit "endorses the overall remediation strategy presented in the Site-Wide RAP and specific measures proposed in the Conceptual Containment Cell Design and Management Plan for construction and management of the containment cell", and also that "the remedial strategy is capable of being implemented and is environmentally justified".

Options for remediating groundwater were addressed in a separate series of reports that have also been reviewed by the Site Auditor in "Site Audit Report – Review of Proposed Groundwater Control and Monitoring" (HLA, Nov 2005). The Site Audit agrees with the general approach of implementing groundwater control measures, including groundwater extraction, to minimise the migration of contaminated groundwater from the site until the remediation program is completed and validated.

3. STATUTORY CONTEXT

3.1 Major Project

The project is declared to be a Major Project under *State Environmental Planning Policy (Major Projects) 2005* because it is development of a kind that is described as “Land declared as a remediation site under Division 3 of Part 3 of the *Contaminated Land Management Act, 1997*” (Schedule 1, clause 28).

On 31 October 2006, the Director-General, under delegation from the Minister for Planning executed on 31 October 2005, formed the opinion that the project meets the requirements of the Major Projects SEPP and declared the project to be a major project under Part 3A of the *Environmental Planning and Assessment Act 1979* (the Act).

The project will therefore be assessed and determined by the Minister for Planning under Part 3A of the Act in accordance with section 75D(1).

The Director-General's requirements for the preparation of an Environmental Assessment were issued on 23 December 2005.

3.2 Permissibility

The *Lake Macquarie Local Environmental Plan 2004* applies to the site. As shown in Table 1, a large portion of the site is zoned 4(1) Industrial (core), but zones 7(2) Environment Protection Conservation (Secondary), 6(1) Open Space and 10 (Investigation zone) also apply to the site in certain areas.

Notwithstanding the provisions of the local environmental plan, *State Environmental Planning Policy No. 55 – Remediation of Land* stipulates that remediation works are permissible on the land, because the remediation works in question are defined as “category 1 remediation works”.

3.3 Environmental Planning Instruments

There are no environmental planning instruments that substantially govern the carrying out of the project.

Notwithstanding, while the *Hunter Regional Environmental Plan 1989* and *Hunter Regional Environmental Plan (Heritage) 1989* do include provisions specific to remediation works, the Department is satisfied that the project is generally consistent with the aims and objectives of those plans.

State Environmental Planning Policy No. 55 – Remediation of Land contains provisions applicable to remediation works the subject of a development application (Part 4), particularly with respect to undertaking remediation works in accordance with the Contaminated Land Planning Guidelines. While the project is not the subject of a development application, and is therefore not strictly covered by the Policy, the Department is satisfied that the remediation works as proposed are consistent with the Contaminated Land Planning Guidelines.

4. CONSULTATION AND ISSUES RAISED

The Environmental Assessment was publicly exhibited between Thursday 17 August 2006 and Monday 18 September 2006 and submissions were invited in accordance with Section 75H of the Act. Seven submissions were received on the Environmental Assessment. Five submissions were from State Government authorities, including the Hunter-Central Rivers Catchment Management Authority, the NSW Mine Subsidence Board, the Department of Natural Resources, the Department of Environment and Conservation and the Hunter New England Area Health Service. Submissions were also received from Lake Macquarie City Council and from a private company. The submission from the Hunter New England Area Health Service supported the proposal. Other State Government agencies did not object to the proposal, and provided comments to be considered as part of the environmental assessment process. Only the submission from the private company objected to the proposal.

4.1 Submission from Private Company

The private company objected to the proposed remediation method which it considers inappropriate, and proposes an alternative method based on the company's process for converting dross and fines into brickettes. It claims that the alternative method creates a product through which contamination is chemically bound into a solid matrix, which can be reused. The submission claims that the proposal does not satisfy the Remediation Order, that it is costly, restricts re-development of the site, requires ongoing monitoring and funding, and generates more dust than its alternative method proposed.

4.2 Submissions from State Government Agencies

The views of each agency are summarised below.

Department of Environment and Conservation (DEC)

- The Proponent may progressively apply to the DEC to excise remediated sections from the Remediation Order declaration area subject to demonstration to the satisfaction of the DEC that the contamination of the staged remediated section no longer poses a significant risk of harm (SRoH) and does not have the potential to be recontaminated.
- The site could be successfully remediated and redeveloped subject to the following requirements:
 - preparation of detailed Remediation Action Works Plans (RAWPs), consistent with the DEC's *Guidelines for Consultants Reporting on Contaminated Sites*, addressing significant risk of harm, suitability of site for approved end use, recontamination issues, prevention of off site migration of material, odour, and site auditor requirements; and
 - at the completion of remediation for each section the Proponent must prepare and submit to the DEC for approval, final validation reports reviewed by the site auditor.
- The detailed design of the containment cell must address the following requirements:
 - it must include the recommendations made by the site auditor;
 - it should ensure that the waste in the cells is securely contained;
 - a comprehensive characterisation of materials that are to go to the cells must be prepared, including an assessment of potential for chemical interaction. To the extent practicable materials of like classes should be co-located. A revised fate and transport model for the major contaminants of concern, as agreed to by the site auditor, which are intended to be contained should be developed having regard to site auditor recommendations and relevant DEC publications. All models should be reviewed by specialists in contamination migration processes;
 - wastes to the cells must be able to be tracked;
 - a strategy to manage any hot spots must be prepared;
 - it must include assessment/monitoring programs;
 - it must be demonstrated that the containment cells will not result in contamination of the deep aquifer;
 - the cell footprint and volume must be consistent with the Conceptual Containment Cell Design and Management Plan presented in the Environmental Assessment;

- a water balance should be prepared on which to base the sizing of the dam to contain leachate, extracted groundwater and surface runoff from the cell.
- Adequate provision is to be made for the long term management, operation, maintenance and monitoring of the containment cell and provision for any long term potential liability of the cell.
- Overflow from dams is currently the main mechanism whereby the largest load of pollutants is discharge from the premises. Given the size of the remediation project, appropriate measures need to be taken to minimise, to a practicable extent, discharges of contaminated stormwater from the premises during remediation. Stormwater dams need to be sized appropriately as determined in a water balance model, and an automated pump system installed to move water around the premises. Where practicable, any new or enlarged dam should be lined. A groundwater monitoring program should be implemented.
- The risk of exceeding the DEC's PM₁₀ 24-hour average criteria and the DEC's ground level concentration criteria for lead during remediation is considered reasonably low provided works are well managed. Air quality monitoring must be undertaken during remediation. An Air Quality Management Plan that includes continuous monitoring must be developed and endorsed by the Site Auditor.
- The DEC considers that the appropriate noise assessment criteria for the remediation works must be background + 5 dB(A) (instead of background + 10 dB(A) as presented in the Environmental Assessment). Exceedances of noise criteria may occur during remediation unless additional measures (such as installation of acoustic barriers, and other on site management measures) are implemented. It is accepted that remediation vibration will not cause impacts. A Noise and Vibration Management Plan shall be developed and implemented.
- Given the size and duration of the staged remediation works, there is potential for land use conflict during remediation, and therefore is recommended that occupancy of areas adjacent to remediation works be precluded until all activities involving handling of contaminated materials are completed.
- A Lead Abatement Strategy for voluntary lead abatement in residential areas must be completed and implemented in parallel with other onsite remediation works in accordance to an agreed timetable.
- The site will continue to be licensed under the *Protection of the Environment Operations Act 1997*. Any discharge from the site from the proposed effluent treatment plant will be subject to limits set in the licence, although discharges to sewer from this plant are preferable.
- A community communications strategy, developed/reviewed by an independent consultant experienced in planning and implementation of public information strategies, should be implemented for the project.
- There appears to be minimal constraints from a flora and fauna, and aboriginal heritage perspective.

Department of Natural Resources (DNR)

- DNR is prepared to grant a licence under Part 5 of the *Water Act 1912* to cover all remediation works requiring licence/s under this Act. The licence will allow the Proponent to undertake groundwater dewatering as required under the approval and to construct bores for groundwater monitoring purposes.

Mine Subsidence Board (MSB)

- Final drawings of the containment cell have to be submitted to the MSB with a certification by a qualified structural engineer to confirm that the works will not be damaged by predicted levels of mine subsidence.
- On completion of the containment cell, a certification by a qualified structural engineer will also be required to confirm that the cell is in compliance with the MSB's approved plans.

Hunter-Central Rivers Catchment Management Authority (CMA)

- Where the proposal is likely to result in the clearing of native vegetation, the Proponent should demonstrate how the 'improve or maintain' principle of the *Native Vegetation Act 2003* has been achieved.
- Mitigation measures for protecting the *Angophora inopina* – *Angophora floribunda* stand in Site 4 should be included in any plan of management. Collection and planting of *Angophora*'s seeds is encouraged.
- Efforts should be made to plant a succession of endemic species in the upper parts to provide improved habitat quality.
- Wherever possible corridor linkages should be established. The use of grasses for soil stabilisation should be native grasses endemic to the area.
- The Draft Catchment Action Plan should be taken into consideration.

Hunter New England Area Health Service

- Release of lead contaminated dust during remediation is the major risk to human health of the proposal.
- The significant decline in blood lead levels following cessation of active smelting on site provide reassurance that the liberation of historical lead dust during remediation is likely to be less bioavailable than emissions from the smelting process, should adequate measures be taken to limit liberation.
- Dust control protocols and real time monitoring proposed in the Environmental Assessment is believed will mitigate dust exposure to the community.
- Best practice in dust control with regard to meteorological conditions should take precedence over air quality assessment criteria that may not necessarily be predictive of local health impacts in this setting.
- The proposed remediation is supported as it will decrease future movement of lead and other contaminants from the site into the community.

4.3 Submission from Lake Macquarie City Council

Lake Macquarie City Council made a late submission raising the following key issues:

- Long term accountability for the surface and ground water monitoring program, management and the water treatment system, and the ongoing maintenance and ownership of those facilities.
- Feasibility and acceptability of potential discharges of treated water to Hunter Water Corporation's sewer.
- Consideration of total project duration for the development of the construction noise criteria.
- The draft construction noise and vibration operation plan included in the Environmental Assessment is a workable and acceptable noise and vibration minimisation program.
- The Environmental Assessment documentation is not specific about the access locations to be used for the importation of fill material onto the site.

4.4 Submissions Report

On review of the issues identified in submissions received during public exhibition, the Department required the Proponent to prepare a Submissions Report.

A Submissions Report (dated 21 November 2006) providing responses to submissions received on the Environmental Assessment was submitted to the Department. The Submissions Report is attached in Appendix C. During the preparation of the Submissions Report, the Proponent met with the DEC to discuss the DEC's recommended conditions. The Submissions Report reflects the agreements reached with the DEC and also seeks reconsideration of some of the DEC's recommended conditions of approval. The Proponent also noted that it seeks to gain an exemption from any mining underneath the containment cell. The Submissions Report has been considered in the preparation of this assessment report and the recommended instrument of approval.

5. ASSESSMENT OF ENVIRONMENTAL IMPACTS

Key issues raised in the submissions in response to the public exhibition of the project and/or identified during the Department's assessment include:

- air quality (dust and lead in dust) impacts and associated human health issues during remediation
- water (surface and groundwater) quality impacts
- noise impacts during remediation
- long term management and liability of the containment cell
- lead abatement strategy

All other issues are considered to be relatively minor and have been addressed as part of the Proponent's Environmental Assessment, Statement of Commitments and Submissions Report.

5.1 Air Quality and impacts on human health

Issues

The remediation of the site will involve excavating or otherwise removing contaminated material from various parts of the site and ultimately moving the material to the containment cell to be generally located in the central area of the site. These activities have the potential to generate dust, particularly during adverse meteorological conditions (eg. dry and windy weather conditions). Remediation activities identified in the Environmental Assessment as being a specific potential source of dust generation include:

- earthmoving activities and excavation;
- movement of vehicles and construction machinery;
- stockpiling of materials;
- transportation and movement of slag into the containment cell;
- build-up of material around erosion and sediment controls;
- mixing of excavated materials prior to emplacement into the containment cell; and
- compacting during cell construction and material placement.

Emissions of lead in the dust is identified in the Environmental Assessment documentation as a principal potential air quality and human health issue associated with the remediation project. The release of lead dust can potentially impact on human health if lead dust is inhaled, ingested or absorbed. Lead is a neurotoxic heavy metal that may accumulate in human bodies and can also harm other systems in humans such as the kidney and reproductive system. High levels of lead in children are associated with learning difficulties.

The Air Quality Impact Assessment (Holmes Air Sciences, 2006) undertaken as part of the Environmental Assessment indicated that managing impacts of lead, the main contaminant on site, will correspondingly manage any other of the metal contaminants on the site. A similar conclusion was made by the DEC in its submission to the Environmental Assessment, in which it indicated that if lead is adequately managed during remediation then so will other heavy metals present in contaminated soils.

To determine ground-level dust and concentrations and deposition levels in the vicinity of the project area during remediation, a computer-based dispersion model (USEPA ISCST3) was applied as part of the Air Quality Impact Assessment (Holmes Air Sciences, 2006). Estimates of lead concentrations were derived from dust concentration predictions resulting from the model. The model considered the dispersion characteristics in the area as obtained from meteorological data collected at the site.

Three six-monthly stages of the project were modelled representing the periods of remediation that would have the greatest potential for air quality impacts at the nearest residential areas. Dust emissions from the remediation activities were calculated by applying USEPA emissions factors for dust generating activities and by assuming that 750 m³ of material will be excavated and transported to the containment cell each day of the year. This is a conservative assumption since activities are only proposed to take place for about 200 days a year. It was also assumed that 0.6% (6000 ppm by weight) of the off-site total suspended particulate concentrations will be lead which is double the average lead concentration (3000 ppm) been measured in the soil across the site.

The Air Quality Impact Assessment also considered the existing air quality conditions to which the project will contribute, including PM₁₀ data obtained from the DEC's air quality monitoring stations at Beresfield, Newcastle and Wallsend, and dust and lead deposition data at a monitoring location near the site. Background total suspended particulate (TSP) concentrations for the model were derived from the annual PM₁₀ by assuming that 40% of the TSP is PM₁₀. It should be noted that an analysis of the monitoring data indicates that generally there has been a steady decline in measured lead deposition levels around the site since 1996, with the most apparent reduction to measured levels being from 2003 to 2004, which coincides with the closure of the smelter.

In order to assess the effects that these emissions would have on existing air quality, the dispersion model results were compared to relevant air quality criteria as summarised in Table 4.

Table 4 - Ambient Air Quality Criteria

Pollutant	Standard/Goal	Averaging Period	Source
Total Suspended Particulate (TSP) matter	90 µg/m ³	Annual mean	NNHMMRC
Particulate matter < 10 µm/(PM10)	50 µg/m ³	24-hour maximum	DEC
	30 µg/m ³	Annual mean	DEC
	50 µg/m ³	24-hour average, 5 exceedances permitted per year	NEPM
Deposited Dust	2 g/m ² /month	Annual mean (maximum increase in deposited dust level)	DEC
	4 g/m ² /month	Annual mean (maximum total dust level)	DEC
Lead	0.5 µg/m ³	Annual mean	NEPM

The dispersion model provided the following results:

- the highest annual average lead concentration off-site would be less than 0.1 µg/m³ which is below the DEC's criterion of 0.5 µg/m³.
- dust deposition levels and annual average PM₁₀ and TSP concentrations at nearest residential areas would comply with the criteria;
- maximum 24 hour average PM₁₀ concentrations is the only parameter that shows potential for exceeding the criterion (50 µg/m³) at the nearest residential areas at times when excavation activities are only a few hundred metres away from residential areas (eg. Boolaroo) and when meteorological conditions are unfavourable (eg. unfavourable winds for particular residential areas when conditions are dry). Under these circumstances, maximum 24-hour average PM₁₀ concentrations can potentially be up to 100 µg/m³ if mitigation measures are not implemented.

Based on the results of the model, the Air Quality Impact Assessment recommended that excavation activities be managed through a real-time management system involving measures that would minimise high dust generating activities at times when adverse weather conditions occurred. It also advised that the implementation of stringent dust control measures, such as regular watering of haul roads and rehabilitation of disturbed land as quickly as practicable, should ensure that air quality impacts are lower than predicted in the model.

The Air Quality Impact Assessment concluded that the remediation works would comply with the DEC's ground level assessment criteria for total suspended particulates, PM₁₀ and lead, provided works are well managed and consistent with those specified in the Environmental Assessment. It also concluded that, based on compliance with the air quality goal for lead, the health impacts associated with remediation would be well within acceptable levels.

Consideration

The Department is satisfied that the assessment undertaken of potential air quality impacts and associated human health impacts from the proposed remediation works is adequate. The Department concurs with the DEC's submission that the Air Quality Impact Assessment (Holmes Air Sciences, 2006) has generally been

prepared in accordance with the DEC's 2005 document "Approved Methods for the Modelling and Assessment of Air Pollutants in NSW".

The Air Quality Impact Assessment focuses on the impacts of particulates and lead in ambient air quality. Although heavy metals other than lead (ie not associated with particulate matter) are not expressly included in the assessment, the Department agrees with the conclusions drawn in the Air Quality Impact Assessment and by the DEC that managing impacts of particulate-lead will correspondingly manage any other of the metal contaminants on the site. The Department is satisfied with this approach which is considered consistent with the Director-General's Environmental Assessment Requirements for the project.

The air dispersion modelling undertaken as part of the Air Quality Impact Assessment found that all air quality parameters modelled, except one (24 hour average PM₁₀), will comfortably comply with applicable ambient air quality criteria. The model found that there is potential for short-term exceedances of the maximum 24-hour average PM₁₀ concentrations at the nearest residential areas at times when excavation activities are only a few hundred metres away from those areas and when meteorological conditions are unfavourable. This prediction is based on conservative assumptions such as 365 days/year operations while the project described in the Environmental Assessment indicates only 200 effective working days per year. The Air Quality Impact Assessment also indicates that the most significant dust generating activities will be haulage of materials over unsealed surfaces and wind erosion from exposed areas. While these sources can be successfully managed by implementing adequate control measures, the assumption is considered conservative as the Proponent intends to utilise sealed haulage roads on the site. Under normal weather and operating conditions, the Department is satisfied that acceptable ambient air quality outcomes can be met, and in the case of adverse weather conditions, that commonly applied and effective dust mitigation measures are available to reduce off-site dust and lead impacts to an acceptable level.

To ensure that the Proponent meets acceptable air quality outcomes under all circumstances, and generally manages the site consistent with best practice, the Department recommends specific conditions of approval aimed at controlling and managing dust generation during remediation activities. The Proponent will be required to develop and implement an Air Quality Management Plan and Monitoring Program for the duration of remediation activities, which will include a program of continuous monitoring in accordance with a real time/reactive dust management strategy. This approach is consistent with the recommendations made by Holmes Air Sciences (June 2006) in the Air Quality Impact Assessment. The Air Quality Management Plan will require the approval of the Director-General in consultation with the DEC, in addition to the endorsement of the Site Auditor.

The dispersion modelling concluded that the disturbance of lead in the soil during remediation will not present any adverse health impacts at nearest residential areas, based on compliance with the air quality goal for lead. The assessment was based on the assumption of a lead soil concentration of 6,000 ppm, which is double the average concentration that has been measured across the site. Although there a number of localised lead hotspots on the site where lead concentrations can be up to seven times higher than the value used in the assessment, the assessment is considered reasonably conservative given the use of an annual average lead concentration criterion. It is also noted that work on hotspots will not be undertaken on an ongoing/daily basis.

Based on the review of the Air Quality Impact Assessment and the advice provided by the DEC, the Department is satisfied that the impacts on human health at residential areas through exposure to metals in dust generated by remediation activities will not be significant. The implementation of stringent dust control measures through the Air Quality Management Plan will further ensure that air quality impacts are lower than those predicted in the Environmental Assessment.

5.2 Water Quality Impacts

Issues

The remediation works have the potential to impact on water quality in a number of ways, the most significant being:

- potential off site releases of surface water run-off from contaminated areas; and
- potential off site releases of contaminated groundwater.

Following remediation, the on-going management of groundwater and leachate at the containment cell is considered to be the most significant potential water quality issue.

The release of contaminated water off-site can affect Cockle Creek (a tributary of Lake Macquarie) which has the potential to impact on the creek's ecological environment and human receptors that use the creek or the creek resources.

Surface Water Quality Issues During Remediation

Surface water quality assessment and management for the remediation works are addressed in a number of investigations undertaken as part of the Environmental Assessment. The "Site Remediation Surface Water Quality Report" by the Fitzwalter Group (April 2006) describes the existing water environment at the site (eg. existing catchments and collection dams, existing effluent treatment plant, site discharges) and assesses the potential environmental impacts of the remediation works. The "Water Quality and Water Cycle Management Report" by Maunsell (June 2006) describes water management procedures proposed during remediation. The "Conceptual Containment Cell Design and Management Plan" (CCCDMP) prepared by Maunsell (Sep 2005) covers water management at the containment cell (with a focus on the operational phase), and the "Whole of Site Remediation Action Plan" prepared by Fitzwalter Group (September 2005) also addresses water quality management during and after remediation. The "Site Audit Report Review of Site-wide Remediation Action Plan" by HLA (November 2005) includes reviews and opinions of water management practices proposed for the remediation works.

To have an appreciation of water quality issues during remediation it is important to understand the existing water quality management at the site and issues associated with the current situation. This is important as the Proponent proposes to retain the existing surface water management measures throughout the remediation works as discussed later.

Existing Surface Water Management

Currently the site is divided into a number of subcatchments which generally flow westerly towards Cockle Creek. A number of collection dams are retained on site and collect surface water from many of the subcatchments. Subcatchment details, including contamination status, catchment area and flow capture dam are reported in Maunsell (June 2006) as indicated in Table 5 and Figure 3.

Table 5 - Existing Subcatchment Conditions

Catchment Area Number	Catchment	Approximate Catchment Area (ha)	Contamination Status	Flow Path Capture Area
1	South East	71	Uncontaminated	Freshwater Dam
2	South West	17	Heavily contaminated	South West Dam
3	North East	34	Relatively uncontaminated	Hawkes Dams
4	Northern	25	Relatively uncontaminated	Far eastern corner of catchment
5	Offsite	7.3	Uncontaminated	South West Dam
6	Centra	7.7	Contaminated	Saltwater Dams and then offsite
7	Northern Dump	34	Contaminated	Hawkes Dams
8	Triangular Paddock	9.6	Contaminated	Contaminated Cockle Creek Floodplain
Total	-	206	-	-

The dams on site are reported to be generally designed to capture the 10-year ARI, 20 minutes. Hawkes Dam is reported to have a capacity of less than 10 year ARI. Collected water is currently treated at the existing Effluent Treatment Plant (ETP) which has a capacity of 90 m³/hr. Effluent at the ETP is either reused onsite or mixed with water pumped from Cockle Creek prior to discharge into Cockle Creek under the site's existing Environment Protection Licence. The removal efficiency of the ETP is reported to be over 99% for key contaminants such as lead, zinc and cadmium. The existing ETP's capacity is reported to be significantly more than the anticipated treatment load requirements for the site during remediation.

When the water input into the existing dams exceeds the dam capacities, discharges of untreated water occur via overflows. The Environmental Assessment indicates that overflows of untreated water from the dams have been reduced significantly since the closure of the smelter, however it still remains the main source of contaminated releases to waters from the site. Annual load of contaminants entering Cockle Creek from the site (post smelter closure) via surface water, treated effluent and from groundwater, and compared with the total catchment load, are reported in the Environmental Assessment and summarised in **Table 6**.

Table 6 - Estimated Contaminant Loads to Waters Prior to Groundwater Capture

Contaminant	Annual Load to Cockle Creek in Stormwater (kg/year)	Annual Load to Cockle Creek in Groundwater (kg/year)	Annual Load to Cockle Creek from ETP (kg/year)	Annual Load to Cockle Creek from Surface Water (kg/year)
Lead	4,075	0.258	12.4	3
Zinc	10,158	61.4	92.8	225
Cadmium	105	12.1	13.6	27.6

Note: the figures are based on flows prior to the boundary pump well installations. The newly installed pump wells are reportedly expected to collect groundwater emissions for treatment in the ETP, reducing the predicted mass by over 90%

Although the total load from the site is considerably smaller than the estimated load from the catchment, the load of metals from the site's surface water overflows is greater than any other site sources (refer to Table 6). In this regard, the site auditor (HLA, November 2005) has indicated that "the migration of contamination in stormwater from the site continues to present a significant risk and that the measures to minimise the release of contaminated stormwater implemented since the closure of the smelter should be continued". These measures included removing sediments from dams, relocating materials to controlled areas, recovery of lead from the slag using a jig, demolition of the smelter plant and washing down buildings and cleaned areas to remove surface contamination.

Proposed Surface Water Management

The Proponent proposes to substantially maintain the existing water management measures on site throughout the remediation works. The following key water management principles are proposed during remediation:

- divert all clean water around contaminated sites to discharge topographically downstream of the site;
- separate "clean" and "dirty" water across the site;
- trap "dirty water" and eroded sediment from disturbed sites, as close to the source of the sediment as practical;
- runoff from contaminated sites to be treated before discharge to Cockle Creek;
- minimise the extent of disturbed areas during remediation;
- rapidly revegetate / stabilise remediated areas where possible;
- continue Effluent Treatment Plant operations during remediation;
- maximise the reuse of treated water on-site for dust suppression;
- maximise dam storages during remediation operations and minimise any overflows from dams thus retaining contaminated runoff;
- maintain the integrity of essential piped drainage networks during remediation; and
- progressively cover containment cell to minimise leachate. All leachate to be appropriately treated.

The Proponent proposes to maintain the capacity of the existing dams and/or new temporary dams to provide retention capacity of 10 year ARI 20 minute duration storm. It also proposes to maintain the existing ETP until remediation is completed or the new ETP is commissioned.

For the construction of the containment cell the Proponent intends to divert water from the cell via diversion bunds. Water falling on capped areas will be classified as clean stormwater and fall to the internal catchment drain being constructed progressively around the base of the cell footprint and ultimately draining to sedimentation ponds. Water that comes in contact with uncapped emplaced materials will be regarded as contaminated leachate and therefore subject to treatment.

The Environmental Assessment concludes that the implementation of this strategy, reinforced through environmental management plans for each phase of the works, is expected to minimise the risk of any contamination of surface water by pollutants from the site during remediation, thus protecting the environmental values of the downstream receiving waters in accordance with the ANZECC 2000 guidelines.

Groundwater Quality Issues During and After Remediation

Groundwater quality issues at the site have been investigated in a number of studies undertaken for the remediation project. These documents were reviewed by the Site Auditor in "Site Audit Report Review of Interim Groundwater Control and Monitoring" (HLA, November 2005). In addition, the "Conceptual Containment Cell Design and Management Plan" (CCCDMP) prepared by Maunsell (Sep 2005) and the "Whole of Site Remediation Action Plan" prepared by Fitzwalter Group (September 2005) provide for groundwater management at the cell, mainly during the operational phase. The "Site Audit Report Review of Site-wide Remediation Action Plan" by HLA (November 2005) includes reviews and opinions of water management practices proposed for the remediation works. The groundwater quality issues at the site and current measures to control migration of groundwater are discussed below.

Existing Groundwater Quality issues and Management

Groundwater flow over most of the site is predominantly from the east to the west and north-west which reflects the local and regional topography. Groundwater migration from the site is reported to occur within filling materials, referred to as "shallow" groundwater/aquifer, and within the coal measures, referred to as the "deep" groundwater/aquifer.

The site's shallow groundwater is reported to discharge into Cockle Creek principally in two zones located within bedrock depressions in the South West Dam and the Hawkes Dam. Shallow groundwater has been shown to be more contaminated than deeper groundwater. Shallow groundwater contains high levels of heavy metals, metalloids and other chemicals of potential concern with the highest concentrations being in the shallow groundwater at the South West Dam. The flux of groundwater and contaminants migrating across the South West Dam boundary is relatively high while the flux of groundwater and contaminants migrating across the Hawkes Dam boundary is reported to be moderate.

The site's deep groundwater migrates from the site and passes beneath Cockle Creek before is drawn by dewatering operations into deep coal mines located to the west. The deep groundwater contains moderately high concentrations of heavy metals, metalloids and other chemicals of potential concern. The mass of contaminants migrating across the South West and Hawkes Dams boundary in the deep aquifer is reported to be moderate. Estimates of contaminant fluxes at discharge boundaries are provided in Table 7.

Table 7 - Estimated Groundwater Contaminant Fluxes at Discharge Boundaries

Aquifer	Cd (kg/yr)	Cu (kg/yr)	Ni (kg/yr)	Pb (kg/yr)	Zn (kg/yr)
South West Dam – Shallow	12-17	0.01-0.03	0.17-0.29	0.08	58-65
South West Dam – Deep	0.0005-0.001	0.004-0.005	0.002-0.009	0.008-0.015	0.007-0.1
Hawkes Dam – Shallow	0.012	0.008	0.06	0.13	2
Hawkes Dam – Deep	0.001-0.004	0.01-0.03	0.05-0.07	0.002-0.04	0.5-0.8

Based on the above, the Site Auditor rates groundwater discharge impacts, in order of magnitude, are:

- South West Dam shallow aquifer;
- Hawkes Dam shallow aquifer;
- Hawkes Dam deep aquifer; and
- South West Dam deep aquifer.

Groundwater modelling undertaken as part of the remediation groundwater investigations recommended that effective capture of contaminated groundwater can be achieved using a number of extraction wells installed into the shallow aquifer at the South West Dam and into deep groundwater at the Hawkes Dam. Such an approach was agreed by the Site Auditor, who also noted that the recommended groundwater control measures should be continued for some time after completion of remediation until the quality of groundwater discharging from the site is demonstrated to be acceptable.

As a result of the above investigations and the Site Auditor's recommendations, interim capture of groundwater at the down-gradient boundaries of the site (ie. at South West and Hawkes Dams) was implemented by the Proponent and has been operational since April 2006. The Environmental Assessment indicates that the interim system consists of three pumped wells at each boundary collecting the shallow groundwater for treatment before it is discharged from the site in accordance with the site's Environment Protection Licence. It also indicates that the pumped wells at the Hawkes Dam have been installed at the shallow aquifer because a greater flow in the shallow aquifer of Hawkes Dam was observed during installation than was originally estimated. The Environmental Assessment notes that the pump systems are being operated and monitored to measure their efficiency.

Groundwater Management during and after Remediation

During operation, there is potential for groundwater contamination as the containment cell will not be fully sealed underneath. In this regard, the Proponent proposes a number of additional design measures.

The Proponent proposes to maintain the interim capture groundwater controls described above until the site is remediated, the containment cell sub-surface water control measures installed and monitoring demonstrates that the interim controls are no longer necessary. A leachate collection and conveyance system is proposed at the base of the cell, which would collect and direct leachate to an effluent treatment plant to treat groundwater and leachate prior to discharging in accordance to an Environment Protection Licence or a Trade Waste Agreement. The containment cell provides for engineered capping to minimise the infiltration of water into the cell and therefore the generation of groundwater and leachate.

The Proponent proposes permanent groundwater control measures at the cell involving down-gradient capture of shallow groundwater from the containment cell and upgradient interception of shallow groundwater at the containment cell footprint. These specifically include (as depicted in Figure 2):

- an upgradient cut-off wall keyed into bedrock along the eastern boundary of the cell accompanied by a sub-surface drainage trench to direct groundwater away from building up against the wall; and
- a down-gradient drainage trench excavated to the top of bedrock along the downstream perimeter of the cell.

It is proposed to install the down-gradient trench late in the remediation works when the final cell boundary can be established, and the up-gradient cut-off wall and diversion drain as soon as the eastern boundary of the cell is complete. Monitoring of groundwater is proposed to demonstrate the success of the remediation project.

The Environmental Assessment concludes that, assuming the groundwater and leachate diversions and capture/treat systems meet the design criteria, then no adverse impacts are expected since no contaminated groundwater will leave the site.

Consideration

Surface Water Quality Issues During remediation

The remediation works will temporarily disturb and expose contaminated material, making the site more vulnerable to the release of contaminants to Cackle Creek during stormwater overflowing of the dams, as compared to the existing situation. This is of significance given the volume of contaminated material proposed for excavation which is in the order of 750,000 m³, and the fact that overflowing is identified as the main vehicle of contaminant releases from the site.

The Department considers that the surface water quality management principles proposed for the remediation works are generally adequate but that the site's surface water capture capacity needs to be further developed to minimise the risk of off site overflow releases of contaminated water. In this respect the Department has

considered the Site Auditor's comments in the "Site Audit Report Review of Site-wide RAP" (HLA, Nov 2005) which indicate that "the Audit has doubt that the existing stormwater management system is adequate to address run-off of surface water during construction of the containment cell, especially if Hawkes Dam or the saltwater dams are reduced in capacity during development works in this part of the site" and that "the Audit requires that the matter of stormwater management during construction of the cell be addressed comprehensively in the containment cell detailed design".

In its submission to the Environmental Assessment, the DEC has recommended that an appropriate approach to limit overflows of contaminated surface water from the areas of the site being remediated or to be remediated is to develop a water balance to determine the rainfall storage capacity to prevent overflows of contaminated stormwater to Cockle Creek. The DEC recommends that the water balance is run using monthly time steps and to include all inputs to and outputs from the storage dams. Under this approach the storage needs for the site would need to be temporarily increased for the commencement of the remediation works when the area contributing to contaminated run-off is likely to be the greatest. As the site is remediated and the areas contributing contaminated run-off decrease, so too will the contaminated storage capacity needs. The DEC also recommends the installation of automated means to pump the contaminated water around the premises principally for use in dust suppression on the contaminated areas and to ensure a continuous supply to the ETP. It also recommends that where practicable any new and/or enlarged dams be lined.

For the containment cell, the DEC has recommended that a lined storage dam be constructed based on a water balance which would enable the dam to contain the 90th percentile wet year in year 1 and then onwards average monthly rainfall without overflowing.

The recommended instrument of approval has adopted the recommendations of the DEC and the Site Auditor in terms of surface water management during remediation. It has also included a requirement to carry out detailed design of the containment cell and to consider in its design a range of water quality management parameters. The recommended approval also includes requirements for the final detailed design of the containment cell to be audited by the Site Auditor and approved by the DEC and the Director-General.

In the longer-term the Department is satisfied that the successful remediation of the site will be the best method to minimise the migration of contaminated stormwater from the site.

Groundwater Quality Issues During and After Remediation

The Department supports the Proponent's commitment to maintain the interim groundwater capture controls until the site is remediated and monitoring results demonstrates that the interim controls are no longer necessary. Notwithstanding, the Department has adopted the DEC's recommended condition which requires the Proponent to intercept and monitor groundwater until such time it is demonstrated to the satisfaction of the DEC that there is no longer a Significant Risk of Harm posed by the contamination on or moving off the site. It is also noted that the Site Auditor has required the Proponent to prepare an Interim Groundwater Remedial Plan for the interim groundwater controls which is to be reviewed by the Site Auditor after installation of the groundwater extraction wells. This requirement has been included in the recommended project approval.

The Department considers that the containment cell is a critical component of the remediation strategy. Most of the cell is proposed to be unlined and therefore there is potential for groundwater contamination during and after cell construction. A leachate collection and conveyancing system is proposed to capture the cell's leachate and ultimately direct it to the ETP for treatment. The DEC has recommended a number of conditions to address leachate management during cell design, construction and operation. The Site Auditor has advised that leachate management was addressed satisfactorily in the conceptual cell design report but indicated a number of areas that required further works during detailed design. The Site Auditor and DEC's recommendations have been adopted in the recommended conditions of approval.

The Proponent proposes to intercept and manage the shallow aquifer upgradient and downgradient of the containment cell. The Proponent does not however propose to manage or monitor the deep aquifer, even though the containment cell is proposed over a geological fault with the potential transfer of contaminated groundwater from the cell to the deeper aquifer. Although groundwater investigations undertaken for the remediation project have assumed minimal connection between the deep and shallow aquifers, this has not been confirmed with

testing beneath the site for the containment cell. The recommended approval includes conditions that require the monitoring of both the shallow and deep aquifer around the containment cell commencing no later than six months after approval, with an aim to determine the connectivity between the shallow and deep aquifers, and use the data for a fate and transport model to be undertaken as part of the containment cell detailed design. The recommended approval requires the Proponent to incorporate in the final cell design the recommendations made by the Site Auditor in Site Audit Statements and Reports prepared for the remediation project. As indicated above, the final containment cell detailed design will be audited by the Site Auditor and approved by the DEC and the Director-General prior to commencement of remediation.

The Department has acknowledged the Site Auditor's comments made in the Site Audit Report Review of Site-wide RA in relation to the preference that the up-gradient groundwater interception trench be installed prior to commencing construction of the cell to minimise the quantity of groundwater passing beneath the cell and to minimise the risk of groundwater being contaminated by leachate generated in the cell. Such comments are consistent with the DEC's recommendations. The Department has considered the DEC's and the Site Auditor's comments and has included conditions in the recommended approval requiring Proponent to install the containment cell's up-gradient cut-off wall and up-gradient collection trench and make it operational within three months of the DEC's approval of the containment cell detailed design.

Following construction of the cell, it will be necessary to manage and monitor the cell's water management systems. The Department has included conditions in the recommended approval requiring the Proponent to prepare a Containment Cell Environmental Management Plan to detail environment management practices and procedures to be followed during operation of the cell, including with respect to surface and groundwater.

Overall the Department is satisfied that by adopting the recommendations provided by the DEC and the Site Auditor, and by implementing the conditions of approval, groundwater quality issues can be satisfactorily managed during and after remediation.

5.3 Noise Impacts

Issues

Noise generated from remediation activities has the potential to impact on adjacent landuses including residential areas located in the immediate vicinity of the site. The risk of noise impacts will be greater during remediation stages that occur near residential areas.

A noise impact assessment (Vipac, April 2006) was conducted as part of the Environmental Assessment to determine the potential noise impacts associated with the remediation works. The study also assessed vibration impacts and included a draft noise and vibration management plan for the remediation works. The noise study was undertaken in accordance with the NSW Industrial Noise Policy, the Environmental Noise Control Manual, the Noise Guide for Local Government and other guidance documents such as the Lake Macquarie City Council DCP No. 1.

The study assessed noise generated by typical construction machinery during excavation of material, transportation to the cell area, temporary storage and treatment, compaction into the cell, and capping with material imported to the site by trucks. The potentially worst affected sensitive noise receivers around the perimeter of the proposed remediation site were identified as follows:

- Argenton Residential District: nearest potentially affected residential area to the north of the site, situated on the opposite side of the railway line;
- Cardiff Industrial Estate: nearest potentially affected industrial area to the north-east of the site, adjacent to the Cardiff West Estate remediation area (area 1);
- Macquarie Hills District: nearest potentially affected residential area to the east of the site, adjacent to the Minibung Hill residential remediation area (area 6);
- Boolaroo Residential District: nearest potentially affected residential and/or commercial area to the south of the site, adjacent to Triangular Paddock (area 2), Boolaroo Heights (area 5) and Boolaroo North (area 8) remediation areas; and
- Argenton Industrial Area: nearest potentially affected industrial area to the north of the site.

Ambient background noise monitoring within the Argenton, Macquarie Hills and Boolaroo residential areas was carried out as part of the noise study for use in determination of the noise assessment criteria. As the remediation is temporary in nature and it will require the use of typical construction equipment, the Proponent has developed remediation noise criteria using the Noise Control Guideline Construction Site Noise which is formerly published as Chapter 171 of the Environmental Noise Control Manual (EPA 1994). The Proponent proposes to conduct remediation activities only during daytime and therefore evening and night criteria do not apply. Since the proposed works have an expected duration of no more than 26 weeks in each work area, the Proponent has applied a noise criterion of background plus 10dB(A). Predicted noise levels at the potentially affected noise sensitive receivers are summarised in Table 8.

Table 8 - Predicted Noise Impacts by Receptor and Work Area

Work Area	Predicted Noise Impacts (L _{10(15-minute)} , dB(A))				
	Argenton Residential District	Cardiff Industrial Estate	Macquarie Hills District	Boolaroo Residential District	Argenton Industrial Area
Area 1	49-70	55-76	46-61	-	-
Area 2	-	-	-	58-79	-
Area 3	51-63	-	-	-	57-68
Area 4	-	-	-	49-64	-
Area 5	-	-	-	53-79	-
Area 6	-	-	53-60	-	-
Area 7	57-70	-	-	-	-
Area 8	-	-	-	53-76	-
Area 9	49-60	-	-	-	-
Area 10	-	-	-	46-56	-
Area 11	46-58	-	45-54	42-53	-
Noise Criteria (dB(A))	49	60	50	48.5	59

The upper limits of the ranges in Table 8 are reported as a maximum L_{A10} noise levels based on a worst case 15-minute periods with the plant items unshielded, positioned at the closest boundary of the site to the receivers of the particular works area and with maximum power levels of plant occurring continuously. The lower limit is based on reduced plant usage and/or operations occurring at areas of the site that are remotely located from the receiver and/or significantly shielded. Actual noise levels during remediation are reported to generally fall somewhere within the given range.

As shown in Table 8, worst-case exceedances of up to 15-20 dB(A) are predicted at times in residential areas, and 10-15 dB(A) exceedances in industrial areas. To mitigate these impacts, the Proponent proposes a number of measures including the preparation of noise management plans, noise monitoring during remediation and in some circumstances, the installation of temporary acoustic barriers.

Consideration

The Department is generally satisfied that the noise impact assessment undertaken for the remediation works is appropriate and consistent with the requirements of the NSW Industrial Noise Policy and the Environmental Noise Control Manual, except for the criteria developed for the remediation works. The Department concurs with the DEC's advice and accepts the suitability of Noise Control Guideline Construction Site Noise guideline for developing noise criteria, but it disagrees with the proposed criterion of "background plus 5dB(A)". This is because the total duration of the proposed works is in the order of five years, rather than "less than 26 weeks" suggested by the Proponent. For works lasting up to five years, the appropriate noise criterion would be "background plus 5dB(A)". This would, in effect, increase predicted noise exceedances by 5dB(A).

The noise impact assessment has shown that there is potential for significant exceedances of the noise criteria in the nearest residential areas. Although the predictions are based on worst-case scenarios and would be temporary, noise management controls will be required during remediation.

The Department has received advice from the DEC that noise levels at residential areas adjacent to other remediation projects, and other activities of limited duration have been attenuated by the erection of extensive barriers along the site boundary immediately opposite the affected residential areas. Such barriers have been formed by stacking shipping containers, or by forming earth berm. The noise levels predicted for the Boolaroo residential area in particular, opposite areas 2, 5 and 8, which Table 3.4 of the EA indicates will take nearly two years to remediate, not including filling, indicate such barriers may be appropriate.

The Department recommends imposition of conditions of approval requiring the Proponent to hold and maintain during the remediation works contingency for the placement of noise attenuation barriers along the boundaries of Areas 2, 5 and 8 immediately opposite residences in Boolaroo. The erection of such barriers will be determined by the results of liaison with the potentially affected residents and results of noise monitoring during the remediation works. The Department has also recommended conditions that require the Proponent to prepare and implement a noise monitoring program and management plan for the remediation works in accordance with the Noise and Vibration Management Plan prepared by Vipac (April 2006), including discretion for the Director-General to require the Proponent to install acoustic barriers if noise monitoring shows significant exceedances of the criteria.

The Proponent proposes to release parcels of land for subdivision as these parcels are remediated. The Department has received advised from the DEC that the Noise Impact Assessment does not consider the impact of ongoing remediation on areas that have been remediated and developed and occupied. In this regard the Department has adopted the DEC's advice and recommends that the Noise Impact Assessment be revised to include an assessment of impacts of ongoing remediation on areas that have been remediated, developed and occupied, and that results of the revised Noise Impact Assessment be considered in updating the Noise Management Plan. Conditions have also been included in the recommended approval prohibiting occupation of subdivided lots that are located immediately adjacent to active remediation works, or in a buffer zone of at least 200 metres in the adjacent lot, whichever is the greater. The conditions provide discretion for the Director-General to permit occupation if such remediation activities do not pose a risk to human health or significantly impact the occupiers of the subdivided and developed land.

The Department believes that the successful implementation of the commitments made by the Proponent in the Environmental Assessment and the recommended conditions of approval will ensure that noise from the remediation works will not have significant impact on adjacent landuses.

5.4 Long Term Management and Liability of Containment Cell

Issues

The Proponent proposes to release land at the site for subdivision and development as remediation stages are progressively completed. These include Work Areas 9 and 11 (refer to Table 2 and Figure 1) where the containment cell is to be located. Preliminary strategic planning undertaken for the Environmental Assessment indicates that the containment cell area, or parts of it, could be use for light industrial or commercial development. The Proponent has advised that it is progressing with a number of additional investigations pursuant to the preparation of an overall site plan for future redevelopment.

The engineered containment cell will require ongoing management and monitoring. At this stage it is anticipated that the following parameters will, at least, require ongoing management:

- groundwater monitoring;
- leachate management;
- surface and stormwater management;
- management and maintenance of capping;
- revegetation management; and
- corrective actions as necessary.

Catastrophic failure of the cell structure can potentially cause damage to development above the cell and cause serious environmental contamination. Future owners/developers of the land above the containment cell could potentially be affected in the longer term as a result of:

- ongoing cell funding, management and monitoring requirements; and

- potential liability caused by failures in the cell structure.

In the Environmental Assessment, the Proponent proposes to develop an Operational Management Plan for managing and funding the containment cell and the Effluent Treatment Plant (ETP) operations. The Proponent also proposes the following arrangements for the containment cell and the ETP:

- land on which the containment cell and the ETP are located would, through subdivision of the Main Site, form part of either the 'common property' of a strata scheme or the 'community property' of a community scheme. The relevant property will exclude the surface of the containment cell which will be developed for highest and most beneficial use;
- other lots, including the surface of the containment cell, within the relevant subdivision would be sold to third parties following completion of remediation;
- the cost of ongoing maintenance of the containment cell would be funded by contributions levied under the relevant strata titles or community titles legislation, on the owners of the various lots within the subdivision;
- it is proposed to let long term contracts (30-40 years) for the construction and maintenance of the cell and the ETP. The contractor would be required to obtain and maintain an appropriate level of insurance;
- it is intended that the owners' corporation would obtain and maintain an appropriate level of insurance in respect of the possible catastrophic failure of the containment cell in addition to the constructor's warranty and defects liability protection negotiated before the commencement of works; and
- the Proponent would fund the construction and maintenance of the containment cell until it is able to establish (with actuarial assistance as required) that levies and any owner contributions are sufficient to meet budgeted expenditure requirements.

Consideration

The Department is satisfied that the containment cell can be successfully engineered subject to detailed design and the undertaken of additional investigations recommended by the Site Auditor, the DEC and consultant's reports provided in the Environmental Assessment documentation. In principle, the Department also supports the Proponent's approach to the on-going management of the containment cell.

The Department has obtained advice from the DEC that should the Proponent seek to have the current remediation order under the provisions of the *Contaminated Land Management Act 1997* (CLM Act) lifted from the site of the containment cell, an option for the DEC is the imposition of a public positive covenant under section 88E of the *Conveyancing Act 1919* in accordance with the provisions of section 29 of the CLM Act. Before attaching such a covenant, the DEC would have to be satisfied that adequate provision has been made for the long term management, operation, maintenance and monitoring of the containment cell and provision for any long term potential liability for the cell. In relation to the need to maintain an appropriate level of insurance for the failure of the containment cell proposed by the Proponent, the DEC has advised that such a requirement would need to be supplemented with a security bond, or other financial surety.

In this context, and to manage the long term liability of the containment cell, the Department has included conditions in the recommended approval that:

- require the Proponent to prepare and implement a Containment Cell Environmental Management Plan for the approval of the Director-General and the DEC. The condition specifies the scope of the plan, covering issues such as surface and ground water management, operation of the ETP, cell integrity management and landscaping management, and requires the submission of the plan for approval no later than one month prior completion of cell construction. This condition further develops the Proponent's commitment to develop an Operational Management Plan for managing and fund the containment cell and the ETP; and
- provide for the imposition by the DEC of a Public Positive Covenant under section 88E of the *Conveyancing Act 1919* in accordance with the provisions of section 29 of the *Contaminated Land Management Act 1997*. The covenant, to be developed by the Proponent in consultation with the DEC and the Department, will require the ongoing maintenance, funding and monitoring of the containment cell after completion of construction. The condition also includes matters to be addressed in the covenant such as liability insurance, funding ongoing maintenance and monitoring costs, and execution of the covenant.

The Department believes that the adoption of the above conditions will provide an adequate framework for the long term management, monitoring and funding of the integrity of the containment cell and any potential liabilities.

5.5 Lead Abatement Strategy

Issues

In 1992, the Public Health Unit reported elevated blood lead levels in children living in North Lake Macquarie. Such levels were associated with high soil lead levels in properties around the smelter. In response, the North Lake Macquarie Environmental Health Centre (EHC) was established with the objective to reduce the blood level levels in children living within its designated area of Argenton, Boolaroo and Speers Point. The EHC, which has been jointly funded by NSW Health, the DEC and the Proponent, has since been undertaking a range of lead awareness and abatement services to affected residents such as education programs, blood lead testing and abatement actions to reduce the risk of exposure. The DEC has advised that the EHC was closed in September/October 2006 and that its closure was triggered by the reported reductions in lead blood levels in children.

In February 1995, the then Minister for Urban Affairs and Planning granted development consent to Pasminco Metals – Sulphide Pty Ltd for a Total Improvement Plan comprising the upgrade of the existing plant operations in terms of increased production and improved environmental technology and controls. The 1995 consent included conditions (no. 42, 43 and 44) which required the Proponent to undertake, upon request from an owner, lead monitoring in soils and in some circumstances remediation work to the satisfaction of the DEC in properties located around the site. The area nominated in the consent includes to a large extent residential properties of Argenton, Boolaroo and Speers Point.

In September 2003 the Pasminco Cockle Creek Smelter closed. Blood testing in children undertaken in 2003/4 indicated that blood lead levels had decreased significantly. Despite the cessation of production in the smelter and that since closure no lead has been emitted into the air through the smelter emissions, there is recognition that elevated levels of lead still remain in some properties around the smelter site.

In 2004, the DEC requested that the Proponent develop a strategy to address the reduction of lead exposure from dust deposition on the properties nominated in the 1995 consent. A draft Lead Abatement Strategy (LAS) was prepared in 2005 which was consequently reviewed following feedback from State Government agencies and stakeholders. Revisions of the LAS are dated 24 August 2006 and November 2006. Key points of the revised LAS include:

- voluntary nature of the strategy: the owners of properties will voluntarily choose participation;
- it involves 5 steps: i) consultation; ii) soil analysis; iii) development and undertaking of lead abatement measures; iv) preparation of documentation for the property owners identifying the property status following the implementation of the strategy; and v) the management of the implementation strategy;
- it is targeted to deal with lead dust contamination in soils, and not with lead slag for which the Proponent does not claim responsibility. In this regard, the Proponent has indicated that slag was voluntarily placed by residents in some properties as fill material;
- finite lifetime: the Proponent proposes to implement the strategy over a two year period which will commence shortly after the consultation period; and
- it is proposed to involve a Site Auditor through the implementation process.

In the current application the Proponent reflects the possible acceptance into the containment cell of certain specified waste materials from nominated residential properties in Boolaroo, Speers Point and Argenton as a result of the implementation of the LAS. The Proponent has also indicated that it is not seeking approval for the implementation of the LAS which is a voluntary off-site program by the Proponent.

The Department has received advice from the DEC that any approval of the proposal must include the requirement for finalisation of the LAS to the satisfaction of the DEC and other relevant stakeholders and its implementation in parallel with the on-site remediation works. The DEC has also indicated that the revised LAS does not address a number of issues raised by the DEC in correspondence dated 16 May 2005.

Consideration

The Department considers that the Proponent has certain responsibilities for dealing with the legacy of dust lead soil contamination in residential properties around the smelter site. The Department also considers that the 1995 consent should be surrendered and that relevant conditions of the 1995 consent (eg. operation of the jig slag, lead abatement) should be adapted in the Part 3A approval for the remediation project.

As discussed above, the 1995 consent imposes certain requirements on the Proponent which relate to lead abatement in residential areas around the smelter site. Condition 44 of the 1995 consent specifically requires that in circumstances where lead levels remain above 600 ppm and on application by the owner, remediation work is to be undertaken to the satisfaction of the DEC.

The Proponent, who prepared the LAS on request by the DEC, has advised that it is committed to implementation of the LAS. Subsequent to the revised LAS dated 24 August 2006, the Proponent has submitted a proposed way forward to finalise the LAS in letter dated 25 August 2006 and a further revised LAS dated November 2006. Meetings and discussions have been held since then between the Proponent and Government agencies with the aim of agreeing on the final LAS.

The Department considers that the LAS provides the vehicle to progress the lead abatement conditions of the 1995 consent and for the Proponent to address the lead contamination legacy in residential areas resulting from the smelter operations. Including the LAS in the approval of the current application is also consistent with the recommendations of the DEC.

The Department recommends that the remediation works' approval includes a requirement to surrender the 1995 consent once the LAS has been finalised and approved by the DEC. It also includes a condition which requires the Proponent to finalise the LAS in consultation with relevant agencies and to the satisfaction of the Director-General and the DEC. The Department believes that the adoption of the proposed approach will ensure compliance with the relevant conditions of the 1995 consent and will facilitate the process already initiated by the Proponent on request to the DEC.

6. CONCLUSIONS AND RECOMMENDATIONS

The Department has reviewed and assessed the Proponent's Environmental Assessment and associated specialist documents, Statement of Commitments, submissions on the proposal, and the Submissions Report. Based on its assessment, the Department is satisfied that the proposed remediation project could be undertaken within acceptable environmental limits subject to the implementation of the Proponent's commitments and the recommended conditions of approval. This conclusion is made in recognition that further detailed design and investigations are required particularly associated with the proposed containment cell.

Key issues during remediation include potential dust and noise impacts in residential areas, and potential off site water quality impacts from releases of contaminated water. After remediation, key issues include the long term management of the containment cell and monitoring the performance of the cell to ensure that there is no migration of contamination. The Department's recommended conditions have been prepared to address these key issues, placing a significant focus on the detailed design phase and on ensuring that off-site impacts are minimised to acceptable levels. The Department has also recommended that the Minister's 1995 consent on the site be surrendered after approval of the remediation works. Relevant conditions of the 1995 consent have been adopted or further developed in the recommended approval, including a requirement to finalise and obtain approval of a Lead Abatement Strategy for nominated properties around the site.

The Department therefore recommends approval of the current project application.

APPENDIX A – RECOMMENDED CONDITIONS OF APPROVAL

APPENDIX B – STATEMENT OF COMMITMENTS

APPENDIX C – PROPONENT'S RESPONSE TO SUBMISSIONS

APPENDIX D – ENVIRONMENTAL ASSESSMENT
